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Assessment of Delay Causes of Construction Projects in Palestine

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الإهداء

إلى أحق الناس بصحبتي والدي ووالدتي العزيزين اللذان دعماني ووقفو بجانبي وساعداني على ان اتقدم بمسيرتي المهنية والتعليمية لكما مني جزيل الشكر والعرفان أطال الله في عمرهما.

إلى نصفي الآخر ورفيق دربي وملهمي زوجي الغالي (فراس) حفظه الله.

الى من علمني كل معاني الامومة والبراءة الى ملاكي الصغير (عدنان) حفظه الله.

الى احبتي اخواني واخواتي (نبال، مراح، منار، نفين، فرح، عيسى، محمد، نور الدين) حفظهم الله.

إلى كل من وقف إلى جانبي وكان لي عونا ونصيرا.

إلى جميع أصدقائي المخلصين.

وأرجو من الله أن تكون هذه الدراسة عونا لكل باحث أو طالب علم يسلك هذا الدرب.

نهال جواد عيسى البطش.

الشكر والتقدير

يسعدني بعد اتمام اطروحتي ان اشكر الله واحمده اولا واخيرا على فضله وكرمه الذي انعم علي ووفقني لانجاز هذا العمل ليضاف لميادين البحث العلمي.

اتقدم بالشكر والتقدير لاساتذتي والعاملين في برنامج الادارة الهندسية في جامعة النجاح الوطنية واخص بالشكر الجزيل لمشرف رسالتي الدكتور محمد عثمان الذي لم يبخل عليه بعلمه وتوجيهاته لانجاح هذا البحث.

كما اود ان اتقدم بالشكر للمشرف الدكتور منذر دويكات.

اتقدم بالشكر لكل من وقف بجانبي ودعمني طوال فترة كتابة الاطروحة ولم يبخل على بمساعدة وتوجيه.

وختاماً أتوجه بالشكر للجنة المشرفة على تقييم هذه الدراسة

الإقرار

أنا الموقعة أدناه، مقدمة الرسالة التي تحمل العنوان:

Assessment of Delay Causes of Construction Projects in Palestine

تقييم عوامل تأخر انجاز المشاريع الإنشائية في فلسطين

أقر بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وأن هذه الرسالة كاملة، أو أي جزء منها لم يقدم من قبل لنيل أي درجة أو لقب علمي أو بحثي لدى أي مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis، unless otherwise referenced، is the researcher's own work، and has not been submitted elsewhere for any other degree or qualification.

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Date: التاريخ: ٩/٢/٢٠١٥م

Abbreviations

CPM	Critical Path Analysis Model
GDP	Gross Domestic Product.
FIDIC	The Federation International of Consulting Engineers.
PCBS	Palestinian Central Bureau of Statistics.
PCU	Palestinian Contractors Union.
PECDAR	Palestinian Economic Council for Development and Reconstruction.
PNA	Palestinian National Authority.
SPSS	Statistical Package for Social Science.
UNDP	United Nations Development Program.
USAID	United State Agency for International Development
UNRWA	United Nations Relief and Work Agency.
W.B.	West Bank

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Abstract

Delays in the construction industry are a global phenomenon and the construction industry in Palestine is no exception. The construction sector is one of the most important economic sectors in Palestine; this research discusses the importance of studying the construction sector through the identification of gaps between theory and practice associated with delays in the completion of construction projects. The importance of this research comes from what appeared in the past few years, the exposure of most construction projects in the West Bank to delay or to increase in the cost or both, so the continuation of this phenomenon affects the progress of the construction industry, as it may expose some relevant institutions to collapse. The main purpose of this study is to identify the most important factors that delay the completion of projects and their effect, by taking a representative sample from each of the engineering offices, the owners, and the contractors, then analyze to obtain the results help to achieve the goal of this research. This study done during the period (2012-2014). The objectives of this research achieved through viewing many of the research and references for previous studies, which included study delay factors in many countries , and through making set of interviews with some contract parties to identify the delays causes, Also, a questionnaire was designed

and distributed to each of the contracting companies, consulting engineering offices, and owners' institutions in the main three cities in the West Bank includes: (Hebron in south, Ramallah in medium and Nablus in north) to assess importance degree of these causes. Upon the results of this research show that referral of bids to the lowest price, incorrect and inappropriate bid pricing, lack of sufficient cash for project implementation, contractor failure to regulate the cash flow of the project, and Irregular cash flow for the project on owner's side are the main causes for projects delay. It also concluded many implications of the delay, including: an increase in cost, the large number of delayed projects affect the community, the weakness of productivity, lack of revenues, conflicts, trial, and litigation between the parties of the contract. Based on the results of the study, the researcher developed some of the proposed solutions that help avoid or minimize the causes of delay, such as : find suitable mechanism for the process of evaluating and awarding tenders without resorting always a lower price, should be available to the contractor sufficient experience in the bidding pricing , adequate financial resources of the contractor to cover project expenses, must provide financial payments by the owner to the contractor on time without delays cause obstacles in the workflow, work of the tender documents by the consultant properly to avoid variation order and problems caused due to errors and provide project manager with enough experience to manage the project .

Based on the results of this research, a framework has been developed to be an effective tool to help all parties to avoid causes of delay.

Finally, recommendations have been developed for each of the contracting parties (owner, consultant, contractor), Engineers Association and Palestinian Contractors Union were presented in this research in order minimize and avoid the delays causes and get projects completed within the planned schedule.

Chapter One

Introduction

Chapter One
Introduction

This thesis is concerned with the delay of construction projects in Palestine. It investigates the importance of studying and assessing the causes leading to delay in construction projects in the West Bank. Delays in construction projects are a universal phenomenon. They are usually accompanied by cost and time overruns. Construction project delays have a debilitating effect on all involved parties (owner, contractor, and consultant) in a contract; in terms of a growth in adversarial relationships, distrust, litigation, arbitration, cash-flow problems, and a general feeling of apprehension towards each other. Therefore, it is essential to identify the actual causes of delay in order to minimize and avoid the delays and their corresponding expenses. This chapter discusses an overview of construction sector and delay in construction projects, significance and problems of this thesis, and the research questions. In addition, the objectives and the structure of the thesis are outlined at the end of this chapter.

1.1 Overview

Since the creation of the earth has arisen human need to construction, building a house is the first construction project ever known to humanity. The construction projects developed through the ages until it became a craft, which needs specialists and skilled workers.

To keep up with the requirements of growing human needs; new construction methods and projects have been adopted (non-residential

buildings), such as bridges, factories, dams and other. In the modern era, the construction projects were characterized by extreme complexity, and magnitude within limited time and cost, to implement construction projects many parties are needed such as, financiers, designers, consultants, contractors, materials suppliers; the involvement of all those parties in the project implementation represents a major challenge.

The construction sector is one of the most important economic sectors in Palestine. It contributes significantly in the Gross Domestic product (GDP). Israeli restrictions on materials entry, barriers, confiscation of land and property, and the destruction of institutions influence directly and indirectly in the period of construction projects, as well as control of natural resources in the Palestinian territories, which is an important part of the resources of the construction industry and associated industries (Abu Sneineh, 2010). During the past few years, Palestine witnessed the emergence of many construction projects in the West Bank, which exceeded the time, and cost specified in the time schedule and contract documents, some of these problems lead to increase in claims, conflicts, and disputes (PCU, 2003).

This research discusses the importance of studying the construction sector through bridging the gaps between theory and practice related to the delay that occurs in the completing of construction projects. The completion of a project on time is one of the main goals (other main goals include end project within specific cost and within required quality) in

projects management. Delayed projects have negative repercussions on the final contract result, because most construction contracts are associated with many expensive elements such as financial funding, equipment, materials etc. Any delay in the project will be undoubtedly detrimental to both the owner and contractor alike (Rashed, 2008).

This research studies the causes of delay that result from different circumstances and parties of construction Projects in Palestine "W.B.".

1.2 Significance of the Proposed Study

The purpose of this study is to identify the most important factors that delay the completion of projects and their effect, by taking a representative sample from each of engineering offices, owners, and contractors then collecting and analyzing obtained data to reach the results help achieve the goal of search . This research will help to discover the causes of delay in construction projects and then reduces their effects. Among the most prominent problems in construction sector in the West Bank is the increasing numbers of construction companies that are not commensurate with the volume of work available, leading to a weak capacity of institutions working in the construction sector to continue to retain technical and administrative staff trained and resulted in low productivity.

There are three goals that construction project seeks to achieve which are: the highest possible quality, with minimum cost and time,

where time is considered from the basics in the implementation process of a project.

1.3 Problem Statement

Palestinian Contractor Union (2003) and Osaily (2010) mentioned that the construction sector is one of the key economic sectors; it is a major force driving the Palestinian National economy. Many construction projects have faced various problems and delay of time is one of the major problems. Project finishing on time is considered important factor of successful projects. Most construction projects in the West Bank are exposed to delay; it is possible to say that it is rarely to find projects that have been implemented within the planned timetable.

There must be reasons for delays in projects, for example, causes related to one of the three main parties, namely (contractors, consultant's offices, and owners) or other circumstances that cause delay. Delays in completion affect the success factors of a project. Delays cause many problems and disputes between the parties, and have negative impact on society as a whole, which shows the importance of this study; will find out the responsibility of each of the three main parties about the projects delay, and other circumstances cause delay in construction projects, to detect the factors causing delay and so giving specific priorities and solution in order to avoid or prevent occurrence of delay , identify and treat all the weakness points related in all sides.

The study of Assaf (2006) was carried out the main causes of delay in large building projects in Saudi Arabia. The survey covered a random sample of contractors, consultants, and owners. Sambasivan and Yau (2007) conducted a survey on the causes and effects of delays in Malaysian Construction Industry, which was focus on the reasons and impact to the project delays in Malaysia.

1.4 Research Questions

- First question states that: is the delay in the completion of construction projects due to administrative and technical matters? from the perspective of:

  1. Contractors companies.
  2. Engineering consultant office.
  3. Owner's institutions.

- Second question states that: is the delay in the completion of construction projects due to financial matters? From the perspective of:

  1. Contractors companies.
  2. Owner's institutions.

- Third question states that: is the delay in the completion of construction projects due to equipment and materials associated with construction projects? From the perspective of:

1. Contractors companies.
2. Engineering consultant office.
3. Owner's institutions.

- Fourth question states that: is the delay in the completion of construction projects due to human resources? From the perspective of:

1. Contractors companies.
2. Engineering consultant office.
3. Owner's institutions.

- Fifth question states that: is the delay in the completion of construction projects due to contracts?
- Sixth question states that: is the delay in the completion of construction projects due to the project nature?
- Seventh question states that: "is the delay in the completion of construction projects due to other causes (external reasons)?

1.5 Research Hypothesis

Hypotheses are tested to determine the differences between groups of the main causes of delay in the Palestinian construction projects and the characteristics of the respondents and the institutions

- The first hypothesis is to determine the differences between groups of the main causes of delay and the type of Institution.

- The second hypothesis is to determine the differences between groups of the main causes of delay and the Financial Size of the Institution.
- The third hypothesis is to determine the differences between groups of the main causes of delay and the company location in the West Bank.
- The fourth hypothesis is to determine the differences between groups of the main causes of delay and the Contractor's company.
- The fifth hypothesis is to determine the differences between groups of the main causes of delay and the respondent level of education.

1.6 Research Objectives

The main goal of this thesis is to develop a framework that can consider making a set of procedures and solutions to prevent or mitigate the problem of delay in construction projects in Palestine. The objectives of this study include the following:

- To identify the major causes of delays in construction project in the West Bank; State of Palestine.
- To study the perceptions of the three major parties (owners, contractors and consultants) in any delay in a certain construction project.
- To identify the effects of delays on construction projects.
- To develop a framework that recommends strategies to reduce delays and minimize them based on the research findings.

1.7 Research Methodology

The research methodology defines the sequence of activities to be carried out in order to achieve the research goals. The research will be initiated by descriptive analytical approach that has been adopted to get the results of this study. The data collected by using various tools such as:

1 Questionnaires prepared and distributed to selected samples of the involved parties; in order to determine the factors causing delays in the completion of construction projects. These samples represent expertise from several positions including engineers, project manager, owner etc., from different sectors.

2 Periodicals, books, references, master and Ph.D. thesis and websites that dealt with search subject.

3 Palestinian contractors union (PCU).

4 Engineering association (EA).

5 Palestinian Central Bureau for Statistics (PCBS).

6 Interviews with experts, academics and professionals to enrich the research results.

7 The statistical methods used in the analysis for the purpose of data analysis.

1.8 Research limitations

- ✓ The study is conducted from the point of view of three main stakeholders, namely: consultant engineering offices, contractors, and entities owners' representatives of each local and private sectors.
- ✓ This study deals with the delay during the design and implementation stages in projects.
- ✓ This study included {consultants engineering offices, construction companies and owners institutions) in the West Bank, Palestine, a sample was taken representing all of the north, south and medium regions population in West Bank, represented by three major cities in south (Hebron) , in north (Nablus), and medium (Ramallah). The study did not include Gaza area, since a search covered the area of Gaza on the subject of delay in construction projects in 2009 by Jom'a Alnajar (Alnajar, 2009).
- ✓ This study is limited to a random sample of engineering offices namely those obtained consultant classification from Engineers Association.
- ✓ This study is limited to a random sample of contracting companies; who are registered in the Palestinian Contractors Union (PCU), including only (first A and B class, second, and third class). In several fields includes:

  - Buildings sector.

- Water and wastewater.
- Electromechanical.
- Roads.
- Public Works:

✓ This study includes a random sample of owners mainly: municipalities, ministries, public and private institutions etc. Those institutions are mostly funded by several donors (co-owners) include Arab and foreign donors such as: Saudi Arabia, United Arab Emirates (UAE), Qatar , the U.S Agency for International Development government (USAID), the United Nations Relief and Work Agency (UNRWA), European union (EU), etc. (PCU, 2003; shweiki, 2013).

1.9 Thesis Organization

This research is organized as follows: Chapter two introduces the literature review related to delay causes in Palestinian construction projects, including construction industry in Palestine, construction projects and the success factors for construction projects, construction project life cycle, parties in project. It also includes summary of previous studies and literature pertaining to the delay in construction project. Chapter three discusses the methodology used in this research in order to achieve its objectives, viewing the used methods and tools in collecting and analyzing the research related data. Chapter four shows and discusses the resulted analyses of the collected data obtained from questionnaires, then ranking

the delay causes and identifies the critical causes of delay in Palestinian construction projects. Chapter five proposes solutions and avoidance procedures for the main research problem. Finally, chapter six presents the conclusions, the recommendations, and future research directions for this thesis.

Chapter Two
Literature Review

Chapter Two
Literature Review

This chapter presents review of researches covering the subject of "delay in construction projects". It includes an introduction to the construction industry in Palestine, construction projects, success factors of a construction projects, construction project life cycle, types of delay, the parties in a project and definition of delay in construction project. In addition, the related previous studies have been discussed.

One of the most important problems facing the construction industry the fact that in most projects the time limit for execution is exceeded. The reasons leading to delay in construction projects varies from one project to another, some projects are only a few days behind the schedule; some are delayed by over a year. The purpose of this study is to identify the actual causes of delay of construction projects in Palestine "W.B." in order to minimize and avoid delays.

Many negative aspects result from delay in construction projects. For example, adversarial relationships, mistrust, arbitration, dispute, etc. This study seeks to mitigate and reduce these problems, and the consequent negative effects. Thus, this chapter aims to review the related studies concerned with causes leading to delay in construction projects.

The delay in construction projects is one of the main causes of the dispute between owners or owners' representatives and contractors. The high frequency of projects delays occurrence introduce large negative

consequences, therefore we find that all construction contracts contain a number of items which emphasizes the importance of implementation during the specified period of contract and according to the timetable approved for a certain project (Rashed, 2008). He mentioned that there are three types of delay in construction projects that encompass different reasons:

1. Conditions beyond the control of contractors; normally related to owners or owners representatives. When the delay is due to the owner, this delay is an excuse for the contractor to claim schedule and financial compensation, the contractor entitled an extension of timetable by studying the delay resulting from the owner and determining the period needed to cover the delay, and studying financial compensation if contractor deserves it. If an extra period is granted to the contractor and still too late, then a delay fine, which is specified in the conditions of the contract -after the completion date, set in the contract- could be applied upon the contractor (Rashed, 2008).

2. Conditions beyond the control of the two parties either the contractor or owner. This type of delay caused by circumstances beyond the control of contractor and owner, examples of this kind of delay includes; bad weather, natural disasters, wars, etc. under the terms of the contract the contractor usually does not get any compensation as a result of this delay, as this delay is of indirect factors that must be taken into account when studying the project (Rashed, 2008).

3. **Delay resulting from contractor's private circumstances.** It is a delay in the project that is produced due to circumstances related to the contractor. Examples of these circumstances are the defect in the implementation plan, deficiencies in the methods of implementation, and problems with subcontractors and suppliers. In this case, the contractor is not entitled to any financial and time compensation, but he has to adhere to a delay fine if imposed upon him, and the main contractor go back to sub-contractor to claim compensation for discount demurrage and other damages, which is suffered as a result of this delay. Often the contractor shall provide financial indemnify to the owner. Many of the contracts organizers resort to determine the value of the compensation caused by the contractor, which is known as (agreements compensation). The agreement compensation is a kind of sanctions on the contractor; the owner obtained lump sum compensation either more or less than the value of actual harms for the amount of agreements compensation (Rashed, 2008). another term related to the value of the compensation caused by the contractor called "liquidated damages", the liquidated damages is an amount of money agreed upon by both parties to a contract which one (contractor) will pay to the other party (owner), Sometimes the liquidated damages are the percentage of contract amount per day equal 0.01%, or are based on a formula (maximum amount is 10% of the contract amount) (FIDIC, 1999).

2.1 Construction industry in Palestine

The Palestinian Federation of Industries (2009) stated that construction industry is a unique industry in terms of their relevance and

its relation to other sectors of the economy such as (contracting sector , engineering works including design and supervision works, stone and marble industries, metal and plastic industries, transport service and financial service.

Construction industry is one of the major and important industries in Palestinian economy in the West Bank and Gaza Strip. The residential projects are the most common ones, because the Palestinians prefer home ownership with large spaces, where the average Palestinian family members are six persons, many residential projects been executed and some of them are still in the implementation phase, such as Rehan suburb in Ramallah, Jenin in Jenin ,Rawabi in Ramallah and many other residential suburb (Najmi, 2011).

Construction industries divided into two main sectors:

1- Public sector: most projects are infrastructure and road works, which are financed by international donors, mostly USAID. Most of these projects focus on water supply, sewage disposal, road construction and job creation ventures (Najmi, 2011; PCBS, 2010).

2- Private sector: Companies working in the field of contracting lead it, this sector includes a large number of private companies that have different specialties and classifications, and employee large number of workers (Najmi, 2011; PCBS, 2010).

Palestinian Contractor Union (2003) and Osaily (2010) mentioned that the construction sector is one of the key economic sectors; it is a major

force driving the Palestinian National economy. In 1994, the construction sector has expansion of activities significantly when the Palestinian National Authority (PNA) established. The result was to influence the construction sector and other sub-industries, which noticeably occupies a high percentage of the Gross Domestic Product (GDP). Encourage a group of Palestinian expatriates to invest in the local construction sector and contribute to the provision opportunities of jobs for thousands of Palestinians. Thus, the construction sector has occupied a very important rank compared to the rest of the sectors, by attracting investment and creating new jobs.

Table 2.1 presents the percentage of contribution for the Palestinian construction sector in the GDP for the years (1994 – 2012), the table shows that its share been increasing since the PNA establishment to reach 14.1% of the Palestinian GDP in 2012. (PCBS, 2010; PCBS, 2013a).

Table (2.1): illustrates percentage contribution of the construction sector in the GDP for the years (1994 – 2012) from (PCBS, 2010; PCBS, 2013a).

Year	***GDP %***	***Year***	***GDP %***
1994	9	2004	5.7
1995	6.9	2005	6.8
1996	8.4	2006	7.2
1997	7.8	2007	6.6
1998	8.9	2008	6.5
1999	13.7	2009	7.4
2000	8.9	2010	11.1
2001	5.5	2011	13.9
2002	3.9	2012	14.1
2003	5		

Table 2.2 presents the percentage of the construction sector compared with other economic sectors and it appears that large proportion is covered by this sector compared to other economic activities. Therefore, this sector positively affects other various economic, social, educational and vocational sectors and other Palestinian institutions (shweiki, 2013; PCBS, 2013b).

Table (2.2): shows percentage contribution to GDP by the economic activity (West Bank, 2012) from (PCBS, 2013b).

Economic Activities	GDP %
Construction	14
Education	8
Manufacturing	10
Wholesale And Retail Trade	12
Agricultural	5
Transportation And Storage	2
Information And Technology	7
Public Administration And Defense	12
Services	18
Financial Activities	3
Others	9

Palestinian economy, in contrast to other economies, lacks the control on a national strategy, and the system of self-financing، because it has never been under full Palestinian sovereignty. The economy suffered drastic changes, these changes are related to several factors such as the size of donations from foreign donors, matters related to the Israeli occupation, the control over the movement of people and goods, and the repeated closures. Many challenges faced Palestinian development efforts, whereby recovery and reconstruction must proceed (Osaily, 2010).

2.2 Definition of construction projects

Health and safety authority (2012) define Construction work is a high-risk activity, it must be managed from procurement, through the design process to the end of the construction stage (completion phase). Everyone involved in a construction project, each parties are important and must appreciate their role, from client, project supervisor, designer, contractor and employees.

Construction projects include many unique features that can be distinguished from others projects, such as time, nature, and size, etc. Construction projects usually takes long period of time until it reaches the operation stage, its financial weight along with the size of the project, and difficult working environment; needs a dynamic organization structures (Zou, Zhang, and Wang, 2007).

Takem, Akintoye (2002) and Majid (2006) have defined a construction project as a successful one when some characteristics are contained within it such as: good management, completed on time, within budget, conform to the specifications required, satisfy all parties, and achieve the profitability for the contractor with absence of financial claims and litigation.

Project success defined as achieving goals and objectives as described in the project plan, within budget, time schedule, and performance required. To achieve success, projects must have an effective

plan, effective control and monitoring (Frimpong, Oluwoye and Crawford, 2003).

The construction industry shows a weak response when dealing with delay in construction projects. This is done either by pretending that it does not happened, or by simply adding a fine (which is in most cases not sufficient to make contractors abide to preset completion dates), the result was that many of the major construction projects fail to complete on time. In the construction industry time equals money and time management is very important and critical (Duran, 2006; Luu, et al. 2009).

2.3 Success factors for construction projects

The success of any project depends on many factors such as the experience of the project manager, the stability of the project team and the level of each of the planning, monitoring, supervision, cash flow, and control of the project etc. Many researchers agree that the properties of a successful project significantly associated with the good administration, good management including (Planning, monitoring, control, specific and clear target and provide motivation for project employees) (Kloppenborg, 1987).

Abdul Rahman (1993) said success factors for construction projects must have successful management that achieve three main goals; which are as follows time, cost and quality. Those goals are interrelated and any change in one of them could affect others.

Robins, Stephen, and Kotze (1988), and Bosneneh (2010) stated success factors are achieved through:

1- End the project at less period.

2- End the project at less cost.

3- End the project with high quality.

Success any Palestinian constructions projects associated mainly in financial and administrative factors.

Is rare that these three goals are combined in a single project. Cost is usually associated with quality and speed of execution, as the cost is less, it lead to a reduction in the required quality and slow in implementation. On the other hand, when the cost is high or well estimated it lead to high quality and speed in implementation.

2.3.1 Time

Scott (1991) define time is period needed to finish the project according to the planned schedule, the projects vary in the duration from project to another according to the nature, type, size of the project.

Since time equals money, it is the most important factor in the success of any project.

Time is also connected to quality since good quality cannot be achieved -generally- with little time.

2.3.2 Cost

The cost necessary to execute the project, it is an important factor, When the cost of the project decreases, the project profits increase, project managers must take this objective into account when they are assessing contractors bids to choose the best price, usually choose the lower price, this price is (the estimated cost) of the project (Jdedo, 1999).

It is difficult to estimate the cost of the project with high accuracy because it rarely match the budget of the project with an initial estimate for the project , here appears the term named (cash flow management) focuses on the relationship between the time and the cost , this spending commensurate with the project's budget (Scott,1995).

2.3.3 Quality.

Defined by quality engineers as conform to the specification, do product specification conform to the required specifications or not? Are the service achieve the stated requirements of the project or not? Quality of implementation of the project depends on the quality of its resources (equipment, materials, skilled workers, the parties operating in the project (contractor, consultant and owner) and Project Management (Peter, Morris, and Houph, 1979; Alkmichi, 2004; Bosneneh, 2010).

2.4 Construction project life cycle.

Projects pass through different stages during their life cycle begins as an idea for the owner to develop and pass through several stages until it

reaches the stage of operation. Life cycle vary from a project to another depending on the size, nature; but all share that it begins and ends with the owner.

Featuring the life cycle of construction projects from other projects, the life cycle of construction projects are definite and clear , any fault in the early stages of the project affects the later stages; since it may become extremely difficult and complicated to improve or correct, if not impossible (Scott,1991;Bosneneh,2010).

Jammaz (2010): explained that structural project passes through six key stages (project life cycle) they are illustrated in Figure (2.1).

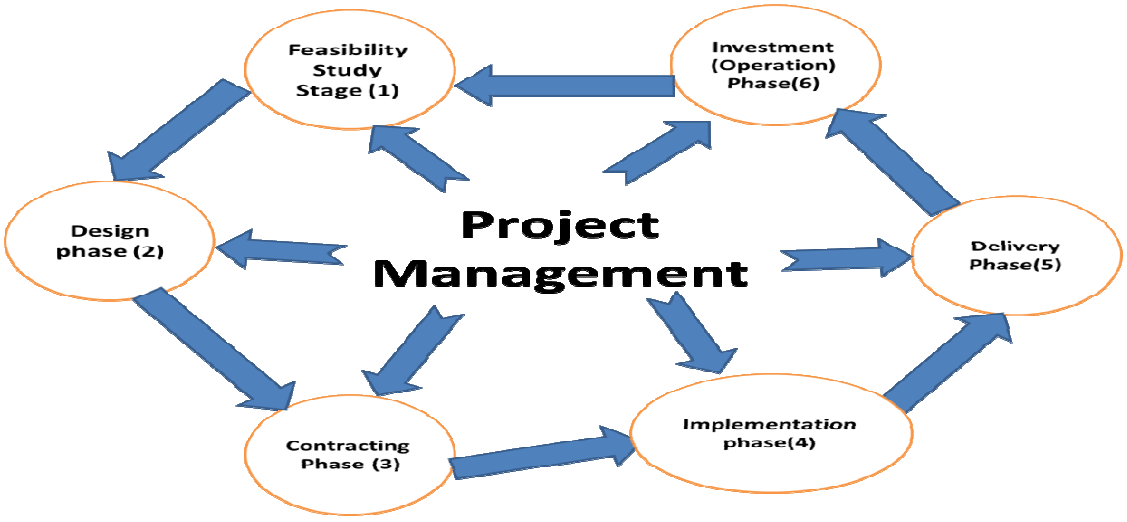

Figure (2.1) illustrates project life cycle (Jammaz, 2010).

2.4.1 Feasibility study phase

This stage carried out by specialized consultant offices for the owner, consultant offices describe to the owner and put a vision to him about the feasibility of the project in terms of achieving the desired objective of the

establishment (physical, services). These objectives are placed in the feasibility study as follows: (Scott, 1991; Jammaz, 2010).

- The Cost
- The expected time for implementation
- The availability of sources for the implementation and operation
- Financial flow during implementation and the extent of the financial return during the life span of the project

Shows recommendations that should be followed throughout this phase:

- Begin identifying targets.
- Put alternative solutions.
- Assess alternatives in general view.
- Assess the alternatives in detailed view.
- After the evaluation, the owner made the decision to both begin procedures and take approvals to complete the project or dismiss it.

2.4.2 The design phase

This stage required from a consulting engineering offices to work tender documents (plans, architectural designs, structural designs, detailed and implementation plans, bill of quantities, specifications, then intended to

invite contractors to enter into a tender, then selected contractor a according to the standards set by the bidding committees. The consultant office should study the project by visiting the site to be aware of what will be done to avoid the work of adjustments and changes during implementation, thus adversely affect the implementation period, and must put alternatives designs in case bad events occur (Jammaz, 2010).

2.4.3 The Contracting phase.

Scott (1991), and Jammaz (2010), said this phase includes preparation and processing all the tender documents, then inviting contractors to tenders. Then choosing a contractor; usually involved in this process consultant and owner together, then sign a contract with him. Therefore, the consequent obligation between the parties may result in conflict, which requires return to justice to see if one of the parties violates its obligations.

Jammaz (2010) mentioned the main information that should be covered in the contract document:

1 - The names of all parties and complete data about them.

2- The contents of the contract of Insurance, fines of delay, drawings, conditions, cost, time, and other.

3- How financial transactions between the owner and the contractor are done.

Jammaz (2010) discussed that the contracts must involve the following:

1- Avoid discrepancy or contradictions in terms of the contract.

2- The style of the terms and wording is clear, simple language and easy to understand.

3- Explicitly clarify the system of fines and how to handle them.

2.4.4 The implementation phase.

It is the most important phase for the owner because it accounts for more than 80% of the total cost of the project. At this stage, transforming what is on documents and drawings into reality identical with the plans, specifications, and conditions (Jammaz, 2010). At this stage, there is a process of monitoring and supervising by the owner or his representative to workflow and compare with the actual implementation of the plan and determine the extent of deviation from the plan (Scott, 1991).

At this stage, the contractor has full responsibility for providing the necessary resources for the project (human, financial, material and equipment). It does not stop at providing resources, but managing and utilizing properly them; within a plan and a schedule convenient and appropriate for the time of project insert in the contract items , determine the necessary of (labor , materials and funding) for each phase of the project (Jammaz,2010).

Contractor should choose material suppliers depending their commitment to supply the required material that agree with specifications in the specified time. Usually activities interfere with each other, therefore the provision of materials in the proper time saves the rest of the activities at the time, and thus works to avoid falling into any breach Influential at the time, which eventually result in delays in the achievement and thus delay in delivery (Jammaz, 2010).

2.4.5 The delivery phase

Jammaz (2010) said this phase divided into two types:

1- Primary handing over of the project: Handing over of all works that had been assigned to contractor, which has been contractually agreed upon, and called initial delivery. In this stage, the project remains under the responsibility of the contractor. In order to make sure that all work has been properly executed , if the defects appeared or outputs for errors occurred during the execution, asks the contractor to repair it during the period of maintenance.

2- Final handing over of the project: all works are received in this stage when the agreed maintenance period expires, and then the contractor orders the financial amount held by the owner.

2.4.6 The investment (operation) phase.

In this stage the project is used according to the purpose for which it was constructed (Jammaz, 2010).Then convert the project resources to other projects (Scott, 1991).

2.5 Parties in project.

"Each of the three principal parties in a project has a role to fulfill in the various phases of design development and construction. A team approach between the owner, consultant, and contractor must be created with a cooperative relationship to complete the project in the most efficient manner. Too often an adverse relationship develops that does not serve the best interest of anyone"(Oberlender, 2000, p.6).

In construction projects in Palestine there are generally four parties: owner, Contractor, Consultant and donors. Owner is considered the party who is funding the various construction projects in Palestine, owner party mostly funded by several donors (co-owners) include Arab and foreign donors.

Note: but in this research was adopt the perspective of each of the three main parties (owner, contractor and consultant) and considering the donor (co-owner).

2.5.1 Owner

The owner of the project is the party that owns, manages, and funds the project; the owner assigns either a firm or individual representing him to overseeing the implementation of one phase or more of the phases of the project. Owner representatives takes the responsibilities of critical decision-making on the project, and choose other parties such as consultant and

contractor to implement the project. (Peter, Morris, and Hough, 1979; Bosneneh, 2010).

"The owner is responsible for setting the operational criteria for the completed Project, owner is also responsible for setting parameters on total cost, payment of costs, major milestones, and the project completion date"(Oberlender, 2000, p.6).

2.5.2 Contractor

Contractor is the party that is contracted with, to implement one or more of the phases of the project, Sometimes there are sub-contractors assigned by the contractor to implement some activities of the project or even the whole project (Bosneneh, 2010; Picdar, 2012).

"Contractor is responsible for the performance of all work in accordance with the contract documents that have been prepared by the designer. This includes furnishing all labor, equipment, material, and knowledge necessary to build the project. The construction phase is important because most of the project budget is expended during construction"(Oberlender, 2000, p.7).

2.5.3 Consultant

Consultant is the party assigned by the owner to prepare studies, designs, and documents for the project. (Bosneneh, 2010).

The consultant role may even extends to the execution phase if some problems appears and an adjustment of the designs needed.

2.6 Definition of delay in construction project.

Delay is a situation when the contractor and/or the project owner contribute jointly or separately in making the project, implementation fails to finish on time, by exceeded the planned period of implementation or exceeded the stipulated period of contract (Aibinu and Jagboro, 2002).

Sambasivan and Soon (2007) defined delay as a situation in which a project due to some causes related to the contractor, consultant, and client or other causes has not been finished in (contractual or agreed) period.

Delay caused by the contractor either by not having trained staff of workers and technicians or having shortage in skilled workers, or not having the suitable equipment. It may be even caused by the material suppliers who did not deliver materials needed on time. Delay depend on the nature and volume of work, may be delayed part of the work or the entire work (Twort, 1975).

While others Defined delay as the contractor's failure to complete the work within the period specified in the contract and not have to complete the work in accordance with the specifications prepared by the employer (Chesly and Ayers, 1983).

To delay the adverse effects on the success of the project in terms of time, cost, quality and safety, but not limited impact on the construction industry only, but extends to affect the entire national economy of the country. Delay is classified as a deviation of time within the following deviations (Karkh and Majeed, 2000).

Namely:

1. Deviations of time: a lack of achievement in the schedule for many reasons leading to an imbalance in the timetable for the implementation of the project.

2. Deviations of quantity: a failure to achieve and accomplish the required works.

3. Deviations of qualitative: mismatch specifications and technical conditions required for the work carried out, must be given a great importance for this deviation.

4. Deviations of planning: are deviations that can be observed when comparing between actual and planning results the stand on the extent to which those results.

Construction delay was defined as “the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project.”(Assaf and Al-Hejii, 2006, p.349).

Delay was also defined as an “act or event which extends required time to perform or complete work of the contract manifests itself as additional days of work”. (Zack, 2003, p.831). Al-Najjar (2008) defined delay in the project caused by internal or external reasons surrounding the project, lead to increase the time of project beyond planned date.

From above, the researcher sees the delay as one of the biggest problems facing the construction industry. It result in failure of one or more

of the parties of the project in achieving their obligations in the contract within a specified period. It is important to study the reasons associated with delay with respect to the contractor, consultant, and owner.

2.7 Main types of delay

The completion of the project is of the main goals and mission in the management of projects, delayed project has repercussions negative value of the contract because the contract work associated expensive elements such as employment, equipment and financial funding, any delay to the project will be detrimental to both the owner and contractor (Jammaz, 2010).

Vidals and Najafi (2002), Alaghbari et al. (2007), (Al-Najjar, 2008) have shown that the delay in construction projects is divided into the following main types:

- Excusable compensable delays.
- Excusable non- compensable delays.
- In Excusable delays (Non- Excusable delay).
- Concurrent delays.
- Non-Concurrent delays.
- Critical and non-critical delay.

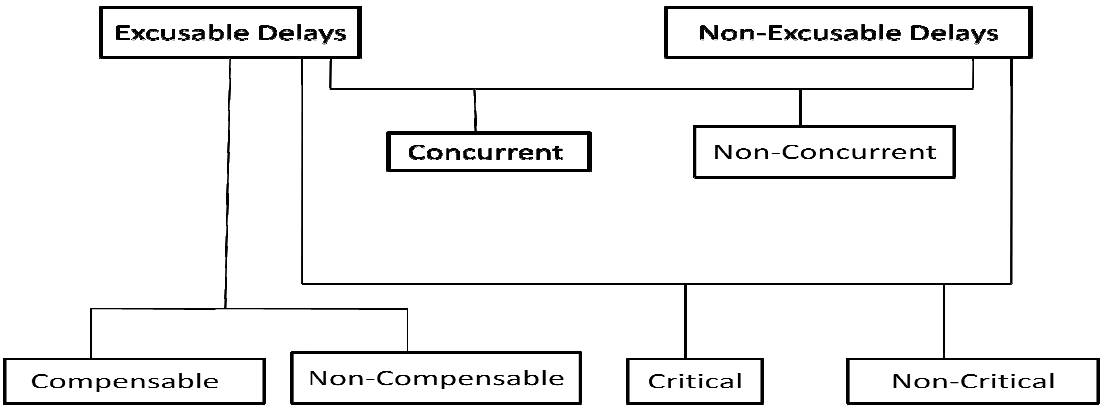

Figure (2.2): Sequential relationships of various categories of delays (Vidalis et al, 2002)

These types of delay is an effect of internal and external reasons surrounding the project, internal reasons arising from the designers, contractors, and owner . External causes arising out of the project, such as the government, labor unions, weather, nature , laws and regulations of the country, etc. (Vidals and Najafi ,2002; Al-Najjar ,2008).

Excusable Delays are delays that are unforeseeable and beyond the control of the contractor. Non-Excusable Delays are delays located within the contractor's control.

Obviously, the distinction between these two is significant in that it determines which party is liable for the delay. Similarly, it also dictates whether a contractor would be entitled to a time extension and possibly, if the contractor would be entitled to compensation for that time extension.

Excusable Delays are further subdivided into two categories, which are:

- Non-Compensable Delays

- Compensable Delays.

2.7.1 Inexcusable Delay (Non- Excusable Delay)

This type of delay results from the contractor or his supplier. In this case, the contractor generally is not entitled to request an extension of the contract period or a compensation for the delay. The contractor may be compensated for the delay to accelerate the pace of work, and the owner is entitled to impose on the contractor demurrage, which will be deducted from his dues, which described in the contract. Liquidated damages are generally expressed as a daily rate that is based on a forecast of costs the owner is likely to incur in the event of late completion by the contractor (Fugar and Agyakwah-Baah, 2010; Soon, 2010).

These delays result from poor planning, poor management of the site, improper ways of building, missing of cooperation with suppliers, the weakness in equipment and skilled manpower (Scott, 1995; Majid, 2006; Tumi, Omran, and Pakir, 2009).

2.7.2 Excusable delays

2.7.2.1 Non-compensable delays

Of the reasons for the delay according to Scott (1995) study : Force majeure, wars, natural disasters such as an earthquake or flood, unforeseen circumstances, exceptional weather conditions, snow or heavy rain, etc. it is a delay occurring as a result of events beyond the control of both the contractor and the owner (Fugar and Agyakwah-Baah, 2010). Examples of

this type of delay are unusual weather, wars, and environmental phenomena such as earthquakes, fires, and acts of government (Soon, 2010). In this case, the contractor is normally entitled to a time extension but no compensation for delay damages Ibironke (2013).It is Not the result of fault or liability of any party, most of contracts allow the contractor an extension of time without financial compensation (Vidals and Najafi, 2002; Al-Najjar, 2008).

2.7.2.2 Compensable delays

The owner or his representative causes them (Fugar and Agyakwah-Baah, 2010). An example of this would be the late release of drawings from the owner's architect. This type usually lead to the extension of the time schedule and to clarify the financial damage that occurred to the contractor, submitted and claimed by contractor from the owner (Soon ,2010). In this case, the contractor incurs additional indirect costs for both extended field office and home office overhead and consumed home office overhead (Ibironke 2013).Compensable delays are those that are generally caused by the owner or its agents. The most common form of compensable delay is insufficient specifications and drawings. Compensable delays can also arise from the owner-delayed response to the request of the contractor for information or drawings. When the owner changes the material specification or design, or suspend the work, in this case, contractor shall be entitled to claim financial and time compensation (Tumi, Omran, and Pakir, 2009; Alaghbari et al., 2007; Al-Najjar, 2008).

2.7.3 Critical and Non – Critical delay

Critical delays are delay claims that affect the progress, time, and compensation. Noncritical delays do not affect the completion date of the project. They affect the succeeding activities that are not on the critical path of the schedule. This can set back activities if they do not have a float in the schedule (Abudul-Rahman et al., 2006).

2.8 Types of delay according to occurrence

- Delay in construction projects is divided - according to how it occurs - into two types:

2.8.1 Concurrent delays.

It is the result of more than one factor at the same time, leading to a delay in the project or in overlapping periods (Alaghbari et al., 2007). This type of delay arises when an event or more of delay coincides. Two types of delays or more in the same time. Each party has to document and organize his daily construction reports, to make it easy to know the party causing delays, so that he will take responsibility for them (Robins, Stephen, and Kotze, 1988).

The use of critical path analysis model (CPM) for planning and representation of work activities; can make it easy to assess the time schedule of the project, and compare it to what has been done. This way may be used in the delay solo (not concurrent delay) successfully, but it usually fails in the evaluation of the delay that is caused by several parties.

Which makes us look for other ways to analyze and measure delays, those ways vary from one case to another. It is important to develop (CPM) to be more realistic in representing the difficulties related to construction projects. (Wickire and smith, 1974). Until the development of CPM schedule analysis, there is no reliable method to differentiate the impact of owner-caused delays from contractor -caused delays. With the sophisticated computerized techniques now available, however, it has become possible to segregate the impacts of apparently concurrent owner and contractor delays (Alwi and Hampson, 2002).

2.8.2 Non – Concurrent delay or solo delay

The delay caused by one party, with the other parties not having any responsibility for it. It happened when one of the project's activities need more than the planned time to accomplish it in the (schedule time listed in plan). Critical Path Method is the tool used to know the duration of the delay, the resulting cost, and its impact on other activities. In addition, it assist in the identification and knowledge of party causing the delay and therefore carry the responsibility and the costs of delay (scott, 1995).

Table 2.3 show the different between different types of delay from point of view several researchers. Different between (Critical Versus Non-Critical Delays, Excusable Versus Non-Excusable Delay, Compensable Delay versus Non-Compensable Delay, and Concurrent Delay versus Non-Concurrent Delay).

Table (2.3): The difference between the types delay

Critical Versus Non-Critical Delays	
Critical delays	**Non-Critical Delays**
Critical delays are considered when delay affect at project completion time or specific date in project execution plan Theodore (2009).	Non-critical delays are considered when delay do not affect the project completion or specific date in project execution plan Theodore (2009).
Excusable Versus Non-Excusable Delay	
Excusable delays	**Non-excusable delays**
Caused by reasons or responsibility related to the owner party, hence, in this type the contractor is entitled to compensation in extension of time Behboudi (2009).	Caused by the contractors actions or responsibilities, in this type the client is compensated from contractor Behboudi (2009).
delay occur beyond contractor's or subcontractor's control , through Incidence an unforeseeable events ; delays resulting from the following events would be considered excusable delay: General labor strikes, fires, floods, owner-directed changes, errors in the plans and specifications, differing site conditions or concealed conditions, difficult climatic conditions, Intervention by outside agencies and Lack of action by government bodies Theodore(2009).	Events that are within the contractor's or sub contractor's control. Non-excusable delays include late performance of sub-contractors, Delay by suppliers and Poor workmanship by the contractor or sub-contractors Theodore (2009).
Compensable Delay versus Non-Compensable Delay	
Compensable Delays	**Non-Compensable Delays**
Contractor is entitled to get compensation, such as payment for delay and extend the period; only excusable delays can be compensable. Compensable delay is caused by the owner or the owner's agents Mohammed and Isah (2012)	Caused by third parties or external incidents beyond the control of both the owner and the contractor, where the contractor is normally entitled to get extension in time but do not compensation for delay damages Mohammed and Isah (2012).
Concurrent Delay versus Non-Concurrent Delay	
Concurrent Delays	**Non-Concurrent Delays**
When two or more parallel and independent delays to the critical path of a project this type called Concurrent delays. Can be on the same critical path or on a parallel critical path Rider and Long (2013).	When there are difficulty of completing one of the project's activities according to the listed plan (Scott, 1995).

2.9 Factors that cause delay problems in construction project

Mulenga et al (2013, p.174)"Causes of delays are factors or events that occur before and during the construction process that will affect the time of completing a project".

Wideman (1990) and Ahmed et al. (2003) showed two type of factors caused delay in completing construction projects that are internal and external reasons. Internal causes are reasons produced from one of three main parties in the project (contractor, consultant and owner), these factor include (technical, administrative, financial, human, etc.) factors. External factors related to materials, weather conditions, governmental, political reasons, etc. There are many reasons that lead to delay in construction projects, which come from different sources and cannot be counted; each project has a special environment and circumstances that distinguish it from other projects such as nature of work, total cost, experience of contractor, site condition, and flexibility in design and implementation (Alzubaydi, 2000).

Assaf et al (1995), Al Kass and Mazeroll (1996) ,Scott (1997), Chan et al(1996), Kaming et al(1997), Elinwa et al(2001) , Hussein (2002) Ahmad et al(2002),Enshasi (2003), Rahman and Yahya (2006),Alghbari et al (2007), Al-Najar (2008) ,Bosneneh (2010),pourrostam et al (2011) and Ibronk et al(2013). Table 2.1 summaries the general causes of project delays appears from the above previous studies. Associated with each of the contractor, consultant, owner, contract, project, and external causes.

Table (2.4): Summary of causes of delay in construction projects according to the above previous studies.

NO	*Factors appeared through previous studies*	*NO*	*Factors appeared through previous studies*
contractor related delays			
1	Mistakes during construction	13	Shortage of materials
2	Study is not sufficient for the site by the contractor	14	Poor quality of materials
3	Stop work without valid reason	15	Materials specifications
4	Not verify the validity of the designs before starting execution	16	Unavailability of equipment's on request
5	Poor planning	17	Weakness productivity of the equipment's
6	scheduling or resource management	18	low productivity of labor
7	Poor quality control	19	Shortage of manpower
8	Unsmooth external and internal communications	20	Inadequate skill of manpower
9	Lack of experience of similar	21	Lack of trades skill
10	Contractor failure to regulate the flow of cash for the project	22	Incompetent contractor staff
11	Irregular payments of subcontractors	23	Bad Relationship between top management and site staff
12	Financial efficiency of the contractor is not suitable for the project	24	Human error
Consultant related delays			
1	Slowness in giving instructions	8	Poor design and delays in design
2	Waiting time for approval of tests and inspections	9	Inadequate project management assistance
3	Delays receipt of executing stages	10	Lack of incentives for staff
4	existence of deficiencies or errors in design	11	Do not use the software in modern design
5	Delays in payment	12	Materials are difficult to obtain
6	Inadequate consultant experience	13	Poor communication between consultant staff
7	Inaccurate site investigation	14	Absence of consultant's site staff
owner related delays			
1	Slow decision making	7	Project objectives are not very clear

NO	*Factors appeared through previous studies*	*NO*	*Factors appeared through previous studies*
2	Change orders	8	Irregular payments
3	Time for implementation inadequate	9	Financial problems
4	Lack of communication and coordination	10	delayed payments
5	Ineffectiveness fine	11	Lack of qualified human resources for the project
6	Lack of incentives for staff	12	Lack of attention to staff training
Contract related delays		**Project related delays**	
1	Deficiencies, errors, contradictions, ambiguities in contract documents	1	Project Location
2	Context of Contract	2	Project Design complexity
3	Responsibilities of the parties is not clear	3	High Level of Quality requirements
4	Contract type	4	Problem with neighbors
5	Inadequacy of dispute settlement procedures		
External related delays			
1	Bad Weather conditions	5	Poor site conditions (location, ground, etc.)
2	Unknown geological conditions	6	Poor economic conditions (currency, inflation rate, etc.)
3	Labor restrictions	7	Conflict, war, and public enemy
4	Labor strike	8	Strikes, Israeli attacks and border closures

Assaf et al (1995) studied the most important reasons for delay in large construction projects in Saudi Arabia and the relative importance. A survey was undertaken of a randomly selected sample of 24 contractors, 15 consultant engineering office, and nine owners from the Eastern Province of Saudi Arabia. The survey included 56 causes of delay, asked of the sample questionnaire to determine the degree of importance for these reasons, the delay factors were grouped into nine major groups. The results show that there is a consensus in the views of both the contractors ,

consultants and owners in the order of reasons for the delay and its importance, and financial matters was ranked first among the items. Several reasons found in this study such as:

- Adoption of documentation.
- The delay in payment to contractors and liquidity problems in the implementation phase.
- Change in engineering designs.
- Conflicts because of schedule for sub-contractors.
- Slow in making decisions.
- Mistakes in design.
- Shortages and lack of employment experience.

Assaf and Al-Hejji (2006) studied a variety of projects in Saudi Arabia to determine the most important reasons for the delay in construction projects, from the point of view of both the owner, contractor and consultant. The study conducted on 23 contractors , 19 consultants and 15 owner was developed 73 reason for the delay in nine groups and the study showed that overtaking time by (10%-30%)and appeared the most common causes of delay is (change order) and found 45 out of 76 project may delayed from the planned date for the implementation of. The study revealed that most of the reasons for the delay are as follows:

- Delay in progress payments.
- Ineffective planning and scheduling by contractor.
- Poor site management and supervision by contractor.
- Shortage of labors and difficulties in financing.

All parties agree that the following causes are the least important: changes in government regulations, traffic control, restrictions at site, effect of social and cultural factors and accidents during construction.

Mezher and Tawil (1996) studied of the most important reasons for the major causes of delays in the construction industry in Lebanon and the relative importance of these reasons. Was undertaken a survey of a randomly selected sample of 11 owners, 15 contractors and 10 consultant engineering office from Lebanon. The survey included 64 causes of delay, grouped into 10 major groups, which the participants were asked to indicate the level of importance of each delay. The study showed that most of the reasons for the delay in construction projects in Lebanon are:

- Factors related to the owner are financial problems.
- Factors related to the contractor is the contractual relationship.
- Factors related to the consultant is project management.

Ogunlana et al (1996) (52) Studied the delays in construction projects, A survey was conducted to study the delay in skyscrapers building

construction projects in (Bangkok, Thailand), and the resources supply problems are more severe problems that have emerged in the construction industry in the boom years of Thailand . The study showed that most of the reasons for the delay in construction projects in Thailand are:

- Owner-related factors include the change in the area of work and slowness in decision-making.
- Factors related to the designer include missing graphics and slow response.
- Factors relating to a contractor are material management problems, poor management and coordination, Problems of planning and scheduling, problem in allocation materials, labor, equipment, and poor management of the site.

The research study the most important reasons for the delay in Hong Kong, the results of this study showed the most important reasons of delay in Hong Kong are mismanagement, delay in processing of materials, slow decision-making, and lack of communication between the various parties (Chan and Kumarswamy, 1998).

Aim from this study to find and develop modeling mathematical linking the relationship between the time planned for implementation and the actual time of implementation to be used by project managers and consultants to estimate the time required by the implementation of projects. The study showed that the designer is the main reason on delay, bad

weather, different work condition, late deliveries, economic condition and increase in quantity. Then built a mathematical model (simple linear) of the relationship between time planned and actual for projects, confidence 99% degree (Al-Momani, 2000).

Odeh and Battaineh et al (2002) studied aiming to identify the most important reasons for the delay in construction projects in Jordan from point of view of both contractors and consultants, the results were that contractors and consultants may gather and agreed on the following reasons leading to the delay:

- Enter the owner.
- Inexperience of contractors.
- Financial matters and payments.
- Labor productivity.
- Slow decision-making.
- Improper planning.
- Sub-contractors is one of the ten major reasons for the delay.

Frimpongs et al (2003) studied the delays in construction projects in Ghana, study revealed that most of the reasons for the delay are as follows:

- Monthly payment difficulties.

- Poor management of sub-contractors.
- Supply and collection of materials.
- Poor technical performance of the Project Management.
- Change in the prices of materials.

In this study, the researchers did not find any similarity in the reasons for the delay between those countries, (Britain and Saudi Arabia) the contractor-related factors appeared first, then the employer-specific factors (Falqi, 2004).

Studied field types and causes of claims in terms of construction projects in United Arab Emirate, the study showed that claims for compensation arising from the delay-causing agents and is considered the most important causes of conflicts in financial claims (AL-Abedien, et al, 2005).

Koushki et al (2005) Studied causes of delay in construction projects in Kuwait, Have emerged some following reasons:

- Owner's lack of experience and poor financial potentials.
- Lack of materials necessary for working and poor quality.

Wiguna and Scott (2005) studied the risks and increase in the cost affecting the delays in construction projects in the cities of (Swar Abaya and Yanbassar) in Indonesia, the study revealed that the most important risks are:

- An increase in the prices of materials.
- Change in designs by the owner.
- Mistakes designs
- Weather conditions
- Delay in cash flows
- Mistakes in the course of implementation.

Al Hindawi and Awad (2007) (62) this study showed main reasons of delay in construction projects in Iraq, a questionnaire was includes 78 causes of the delay was presented the questionnaire to 27 who specializes in this area has been reached to 62 reasons in questionnaire after modify, were displayed on random samples include engineers, owner and contractors. Have been placed degrees of the reasons and find arithmetic mean and demonstrate the importance of the reasons, was used regression analysis method to find the relationship between the number of years of experience and the rate of delay rate among respondents. The most important reasons for delay appeared as follows:-

- Refer the bid to the lowest price.
- Contractors' financial incompetence and weakness in time scheduling.
- Height and change in the price of materials.
- Delay in laboratory tests of materials.

The study showed that the reasons for the owner are more important in a delay, then the reasons for contractor.

Sambasivan and Soon (2007) identified the delay factors and their effect on project completion in Malaysia. Earlier studies considered either the causes or the effects of project delays, separately. In this study, an integrated approach and tries to analyze the impact of specific reasons for specific effects. Was done through the work of a questionnaire was distributed to 150 respondents from clients, consultants and contractors and identified the top ten causes for the delay within 25 reason and 6 different effects of the delay and the top ten reasons appeared as follows:-

- Poor planning contractor.
- Poor site management contractor.
- Experience of the contractor is not sufficient.
- Inadequate funding by the client for completed work.
- Problems with sub-contractors.
- Lack of materials.
- Availability of equipment and failure.
- Weakness of the process of communication between the parties.
- Errors during the implementation phase.

Abd El-Razek, et al (2008) studied the main reasons for delay in construction projects in Egypt from the point of view of both the contractor and consultant and the owner. The important causes are:

- Financing by contractor during construction.
- Delays in contractor's payment by owner.
- Design changes by owner.
- Partial payments during construction.
- No utilization of professional (construction/contractual) management.

The contractor and owner were found to have opposing views, mostly blaming one another for delays, while the consultant was seen as having an intermediate view. The study showed there must be a collective work between the three parties to reduce the rate of delay in projects, and showed that the delay depends on the type and size of the project.

Tumi, et al (2009) studied delays in construction projects in Benghazi city in Libya, this study said the problem of delay will not be solved unless measures have been taken. Administrative strict order to reduce this phenomenon through proper planning and oversight of good design activities and construction works, then study recommended that the application of good practices for the planning and coordination work to reorganize control method. One of the most important reasons that emerged from the study with regard to the reasons for the delay in construction projects in Libya are:

- Lack of effective communication.
- Design errors.
- Shortage of supply some material.
- Slow decision-making.
- Financial issues.
- Cash-flow problems during construction.
- Increase in quantities.

Many related studies found that the bad political situation in Palestine due to the Israeli occupation was major influential on the Palestinian construction sector. As an illustration, Osaily (2010) illustrated that the political situation was the major barrier that prevents implementing sustainable construction in West Bank. Also ,(AL-Najar,2008) studied delay and cost overrun in the construction projects in Palestine-Gaza Strip through the work of a random survey includes 66 contractors and 27 consultants and 31 owners and contained 110 reason within 12 groups included 42 reason for cost overruns. There seems to be a general agreement between contractors, consultants and owners regarding causes of delays and cost overruns, the most important reason for the delay is political matters, especially strikes and border closures. The main four causes of time delays included:

- Strikes and border closures.

- Material-related factors.
- Lack of materials in markets.
- Delays in materials delivery to the site.

The main three causes for cost overruns included:

- Price fluctuations of construction materials.
- Contractor delays in material and equipment delivery.
- Inflation

Al-Momani(2000), lim & mohamed (2000), Odeh and Battaineh (2002), Frimpong et al (2003), long et al (2004), Koushk et al (2005), Faridi &El-Sayegh (2006), Zaneldin (2006), Assaf and AL-Hejji (2006), Meeampol & Ogulana (2006), Lo et al (2006), Alaghbari et al (2007), Sambasivan and Soon (2007), Le-Hoai et al (2008), Gkriza& Labi (2008), El-Razak et al. (2008), Sweis et al (2008), Toor and Ogunlana (2008), Enshassi et al. (2008), and Kaliba (2009)

Table (2.5) summaries the general causes of project delays appears from the above previous studies. Associated with each of the contractor, consultant, owner, materials and equipment, contract, project, labor, and external causes.

Table (2.5): illustrate the general causes of project delays appears from the above previous studies.

	Causes of delay in construction projects.	Al-Momani (2000)	lim & mohamed (2000)	Odeh & Battaineh (2002)	Frimpong et al (2003)	long et al (2004)	Koushk et al (2005)	Faridi & El-Sayegh (2006)	Zaneldin (2006)	Assaf & AL-Hejji (2006)	Meeampol & Ogulana (2006)
	Contractor's Responsibility										
1	Poor site management	√	√		√	√		√		√	√
2	Ineffective planning and scheduling of project			√		√				√	
3	Financial difficulties	√			√	√	√		√		
4	Incompetent subcontractor									√	
5	Mistakes during construction	√		√							
6	Improper construction method			√						√	
7	Problems with subcontractors			√							
8	Inadequate contractor experience		√	√		√				√	
	Consultant's Responsibility										
1	Lack of consultant’s experience	√	√								√
2	Inaccurate estimates	√				√					
3	Poor contract management			√						√	
4	Mistakes and discrepancies in design documents	√		√						√	√
5	Late in reviewing and approving design documents	√		√				√		√	
6	Delays in producing design documents	√		√				√		√	
	Owner's Responsibility										

	Causes of delay in construction projects.	Al-Momani (2000)	lim & mohamed (2000)	Odeh & Battaineh (2002)	Frimpong et al (2003)	long et al (2004)	Koushk et al (2005)	Faridi & El-Sayegh (2006)	Zaneldin (2006)	Assaf & AL-Hejji (2006)	Meeampol & Ogulana (2006)
1	Change orders by owner during Construction	√					√		√	√	
2	Delay in progress payments				√		√		√		
3	Slowness in decision making process			√				√		√	
	Contractors ,Consultants & Owners										
1	Lack of communication between the parties			√							
	Labors										
1	Shortage of labors			√				√		√	√
2	Low productivity level of labors		√	√	√			√	√	√	
	Material										
1	Lack of materials on market						√				
2	Delay in delivery of materials to site	√			√		√	√			
	External Factor										
1	Obstacles from government			√		√					
2	Bad weather	√		√	√					√	
	Equipment										
1	Equipment unavailability			√		√					
	Project										
1	Problem with neighbors and site condition	√		√							
2	Type of project bidding and award									√	

	Causes of delay in construction projects.	Al-Momani (2000)	lim & mohamed (2000)	Odeh & Battaineh (2002)	Frimpong et al (2003)	long et al (2004)	Koushk et al (2005)	Faridi & El-Sayegh (2006)	Zaneldin (2006)	Assaf & AL-Hejji (2006)	Meeampol & Ogulana (2006)
	Contractor's Responsibility										
1	Poor site management	√	√	√	√		√		√	√	√
2	Ineffective planning and scheduling of project							√	√		
3	Financial difficulties			√	√		√	√	√	√	√
4	Incompetent subcontractor				√						
5	Mistakes during construction		√	√	√	√					
6	Improper construction method				√						
7	Problems with subcontractors			√	√						
8	Inadequate contractor experience	√		√							
	Consultant's Responsibility										
1	Lack of consultant’s experience		√								
2	Inaccurate estimates				√						
3	Poor contract management				√						
4	Mistakes and discrepancies in design documents				√	√					√
5	Late in reviewing and approving design documents		√			√					
6	Delays in producing design documents		√	√		√			√		√
	Owner's Responsibility										
1	Change orders by owner during Construction				√	√	√	√	√		√

	Causes of delay in construction projects.	Al-Momani (2000)	lim & mohamed (2000)	Odeh & Battaineh (2002)	Frimpong et al (2003)	long et al (2004)	Koushk et al (2005)	Faridi & El-Sayegh (2006)	Zaneldin (2006)	Assaf & AL-Hejji (2006)	Meeampol & Ogulana (2006)
2	Delay in progress payments			√	√		√			√	√
3	Slowness in decision making process										
	Contractors ,Consultants & Owners										
1	Lack of communication between the parties				√		√				
	Labors										
1	Shortage of labors			√	√	√			√	√	
2	Low productivity level of labors				√	√		√			√
	Material										
1	Lack of materials on market		√	√	√				√	√	
2	Delay in delivery of materials to site		√						√	√	√
	External Factor										
1	Obstacles from government				√						
2	Bad weather	√			√	√					
	Equipment										
1	Equipment unavailability			√							√
	Project										
1	Problem with neighbors and site condition										
2	Type of project bidding and award	√				√					

Pourrostam and Ismail (2011) showed main reasons and consequences of the delay in construction projects in Iran. Questionnaire was used to determine the reasons and consequences delay from the point of view of both consultants and contractors, appeared 10 major reasons for the delay from the list contains 27 different reasons for the delay, the study showed the six different effects resulted from delay. The predominant reasons for the delay are:

- Poor site management and supervision.
- Delay payments by the client.
- The emergence of change order during construction.
- Ineffective Planning and Scheduling by the contractor.
- Financial difficulties by the contractor.
- Slow in decision-making by the client.
- Delay in the design documents.
- Weakness in the review and approval of documents by the client.
- Poor contract management by the consultant.
- Problem with subcontractor.

Mohammad and Isah (2012) studied the causes that lead to delays in construction projects in Nigeria, through the adoption of survey through the

work of a questionnaire has been distributed to each of the contractors, consultants and owners, the study showed that the delay many of reasons, the most important reason is shortage of supply, improper planning, lack of communication, design errors. The study showed that the delay is causing more damage than good in construction projects so you must take strict measures in order to improve the efficiency and effectiveness of the construction industry by work adequate planning, coordination, and proper monitoring of the construction projects by an experience and qualify professionals.

Ibironke et al (2013) this study causes that lead to non-excusable delays in completion of construction projects in Nigeria. Through work of survey to find out reasons for the delay , its effects and ways to reduce them from the standpoint of consultants and contractors have been collecting and analyzing information by weighted mean, the questioners has been contained 57 factor of non-excusable delays in eight main groups. Some of the most important factors that cause non-excusable delays are:

- Insufficient numbers of equipment.
- Change orders.
- Poor design/delays in design.
- Incompetent project team.
- Improper planning and scheduling.

Ensuring adequate source of finance, engaging competent Project Manager and making all necessary resources available among others are the means of minimizing non-excusable delays.

Shweiki (2013) studied the construction contracting sector in Palestine, highlight this sector problems and obstacles from the point of view; contractors, project owners, consultants, and donor countries institutes.

This study showed that the problems related to the career ethics are the most important problems that faced Palestinian construction sector. Also

1. Intense competition between contractors to the extent of bidding at cost prices or by losses, and awarding the tender to the lowest price.
2. Owners' payments delay.
3. Currency exchange rate fluctuation.
4. Owner deceleration in decision-making.
5. Number of available contractors is high compared with the size of tendered projects.

Najmi (2011) study case of the management of construction projects in the West Bank has been adoption of the researcher to the qualitative approach mainly and quantitative in a complementary way, through

interviews with managers of 36 projects from various area in West Bank. Of the most important problems facing the project management are:

1. Poor planning and management of project.
2. Weakness of communication between parties.

As a result, the researcher developed a model to try to arrange and organize the process of managing construction projects in order to be an effective tool to help project managers.

2.10 Effects emerged because of the delay in construction projects

Pourrostam and Ismail (2011) effects of delays are the consequences that occur when the reasons of delay are unknown; they usually have large impact on the completion of a project.

Sunjka and Jacob (2013) identified and defined effects of delays and tabulated them as follows:

- Time overrun: When they are exceeded in the stipulated time necessary to completion the project.
- Budget overrun: when end of the project at a cost higher than the stipulated budget.
- Poor quality: Poor workmanship or bad materials lead to the emergence of low quality.
- Bad Public Relations: When delay occur a bad reputation resulting for each parties (owner, consultant, and contractor).

- Litigation: Disputes can lead to court cases especially when large penalties expected happen.
- Arbitration: Will carry on the project extra time and cost result by Participation of professional arbitrators.
- Disputes and claims: Disputes and claims arise from either party in the contract from the losses incurred when delay are occur.
- Total abandonment: if delay issues are not resolved timeously, delays in project execution could lead to total abandonment.

These findings generally agree with other studies; like those carried out by Aibinu and Jagboro (2002), Sambasivan and Soon (2007), Tumi, Omran and Pakir (2009), Motaleb and Kishk (2010), Pourrostam and Ismail (2011), Ibironke et al (2013) mentioned several effects produced when there is a delay in a construction project. These are; time overrun, cost overrun, disputes, complete abandonment and litigation, arbitration, projects blacklisted by the authorities, gaining a bad reputation and waste in time and money.

Kikwasi (2012) identified 14 effects of delays in Tanzania and ranked them as follows; time and cost overrun, negative social impact, waste of resources, arbitration, disputes, lead client to return the loans, poor quality, Delay in making a profit for the owner, bankruptcy, litigation, create stress on contractors, total abandonment and acceleration losses.

2.11 Mitigation the effects of construction delays

There is a need to conduct an analysis to determine the effect of the delay on the time, followed by taking appropriate action to minimize the delay. It is important to improve the estimated duration of the activity, according to actual skill Levels, unexpected events, efficiency of working time. Are necessary to minimize the losses, this can be achieved by many measures , such as the protection of the work is completed in a timely manner , and timely change or cancel purchase orders . It is important to predict and identify problems in the early stages of construction and diagnose the cause to finding and implementing the most appropriate and economical solutions (Abdul-Rahman et al 2006).

Aibinu and Jagboro (2002) said that time effects of delays could be minimized by applicable acceleration of subsequent site activities to reduce or if possible eliminate time overrun.

Pourrostam and Ismail (2011) had recommended factors to address in reducing delays to owners, consultants and contractors are:

- Owners should recruit competent project manager, and provision progress payments to contractors on time.
- Consultants have to complete and prepare design on time; try to manage the project professionally, using professional specialists and implementation of accurate per-design for minimizing future changes.

- Contractors need to provide effective planning of project execution, and provide adequate source of finance during construction.

Tumi et al (2009) said to avoidance of delays in construction projects in Libya should achieve the following factors:

- Making Risk Management
- Proper Planning
- Proper Payment from owner.
- Prepare Insurance Claims.
- Good Scheduling Program.
- Owner Representative for Project
- Selecting Expert Understand Their Assignment
- Clear Contract and Bill of Quantity.
- Compute the Amount of Financial Damages.

Mohammad and Isah (2012) recommended that the impact of delays on construction projects might be reduced by achieving adequate planning; coordination; and proper monitoring of the construction projects by hiring experienced and qualified professionals.

2.12 General Discussion

The researcher in this chapter, display several previous studies of local, Arab and foreign studies related to the subject of the present study ,to learn and stand on the most important topics covered , to identify the methods and procedures adopted , identify the results that have been reached , comment on and clarify the extent to which have been reached .

Previous research studies mention lack of symmetry with respect to the reasons for the delay in construction projects because of different of environment from one country to another, and difference in the elements of the construction industry from one country to another. Was to take advantage of the results and the reasons identified by the researchers for the purpose of building and preparing suitable questionnaire in this research.

❖ Demonstrate the importance of this study through :

1. The importance of the completion of construction projects on time; delay lead to negative effects at; all parties of project {contractor, owner, and consultant}, on the society, and on the national economy.

2. The main parties of project {contractor, owner, and consultant} do not give importance to (Time Management) concept, and lack of interest to evaluate the required time to completion project.

3. The importance of this study in the West Bank due to many reasons, mainly :

A. Research and studies in this field in Palestine are few or rare , the research that has been worked in Palestine, particularly in Gaza strip, researcher thesis (Jomah Mohammed Al-Najjar) talked about "Factors Influencing Time and Cost Overruns on Construction Projects in the Gaza Strip" in The Islamic University of Gaza at 2008. Moreover, I did not find any research in the West Bank talking about factors cause delay in construction projects.

B. Many or most of the Palestinian construction projects are exceeding required time for implementation.

C. Delay leads to many of the negative effects of the most important; overrun time and cost, and appear disputes and conflicts between various project parties.

D. Prevent or minimize delays in Palestinian construction projects lead to improve the construction industry in Palestine, and consequent positive effects on the national economy, and good returns on all project parties.

4. The problem of delay in the construction industry is a global phenomenon, and the construction industry in Palestine is no exception. It has been found from previous studies that many researchers have studied the subject of delay in construction projects in order to assess the causes of it and notes from previous studies taken. The lack of symmetry with respect to the reasons for the delay in construction

projects, the reason for this is due to the different elements of the construction industry from one country to another.

5. The study agree or disagree with the previous studies, but there is a close relationship between the current study and most previous studies in terms of the subject of the study and the current study will follow an integrated approach and tries to analyze the impact of specific reasons.

6. This search will be an integrated study of the reasons for the delay from the point of view of both contractors, consultants and the owners in Palestine, Palestine environment differ from other country because it located under the Israeli occupation.

7. Has been utilized to study the reasons for the delay in construction projects in previous studies in building an organizational structure of the study and the preparation of the questionnaire form for this search.

Chapter Three

Research Methodology

Chapter Three
Research Methodology

3.1 Introduction

This chapter deals with a methodology and procedures followed to determine the style and methods of collecting information and data from study population through field sources. The aim of this study is to know the reasons for the delays in construction projects from the contractors, consultants, and owner perspectives. This chapter discusses the scope of research, research strategy, research design, description of study population, study sample, methodology of this study, location of study, and statistical tools used in the research

3.2 Scope of research

The study includes the reasons for the delays during both the design, and implementation stages. The research sample was chosen from the three main large areas (cities): Hebron, Ramallah, and Nablus. The data for this study have been gathered through detailed literature review and questionnaire survey.

3.3 Research Strategy

The researcher used the descriptive analytical approach to analyze the data and get to the results of the study. A brief review for some of the characteristics of this approach is discussed.

3.3.1 Descriptive analytical approach

Descriptive analytical approach is a scientific method of analysis and interpretation used to reach a particular goal to explain certain phenomena, whether social, humanitarian or others.

The descriptive approach uses two methods to describe a phenomenon:

(Quantitative and qualitative research).

- Qualitative approach: is interested in describing the phenomenon, and describes the characteristics; used to collect realistic data and study the relations between the facts.
- Quantitative approach: is interested in describing the phenomenon described digitally illustrates the size, amount and interdependence with other phenomena (Asa'ati, 1993).
- Qualitative and quantitative research is two of the main schools in researches. However, there are researches where one method is more useful than the other is.

In this thesis mixed approach is used, specifically a quantitative approach used to understand the perception of construction professionals in the West Bank towards factors causing delay in construction projects, the qualitative approach is needed to have more complete understanding of the phenomenon.

3.3.2 Steps of description Approach

1- Define a specific problem and gather relevant information

2- Identify the problem and formulate research questions,

3- Select the sample, which will be held by the study size and style selected, then identify tools that will be followed by the researcher in research (interviews, questionnaire, etc.), then tested the credibility of these tools.

4- Collect information correctly and accurately organize and categorize it.

5- Analyze the results, debriefing conclusions and interpretations.

3.4 Research Design

Figure 3.1 shows the methodology flow chart, which includes Summary of methodology used in this research. Research design refers to the plan, which will be followed by the scientific research aimed at guiding the process of data collection and analysis (Poilt and Hungler, 1985).

This research consists of eight phases:

1. The first phase of the research is the proposal includes identifying importance of study, definition problems of the study; identify objectives of the study and development of study plan.

2. The second phase of the research is literature review including literatures and studies related to the causes of delay in construction projects were reviewed.

3. The third phase of the research includes conducting interviews with company owners or their representatives of managers or engineers for some local firms includes owners institutions, consultants office, contractors companies, and academic experts to collect actual causes leading to delay in construction projects completion.

4. The fourth phase of the research includes the questionnaire design and distribution, making interviews with engineers, managers, academics and others to know the most important reasons causing delays in construction projects. The purpose of the pilot study was to test if the questions in the questionnaire are clear to be answered; the information (answers) that will be gathered through the questionnaire will help to achieve the objective of the study.

5. The fifth phase of the research was distributing questionnaire , through distribution 410 questionnaires to research sample includes local contractors companies, engineering consultants' offices and owners' institution by communicating with their experts, and distributing it to other experts in other disciplines, 222 questionnaire were collected only 219 questionnaire valid to analyze. To collect the necessary information and data that will help in achieving the objective of the study.

6. The sixth phase of the research includes analysis of data and discussion it by using Statistical Package for the Social Sciences program (SPSS), to execute the required analysis.

7. The seventh phase of the research includes develop procedures and models to improvement Palestinian construction projects performance.

8. The last phase of the research includes the conclusions and recommendations.

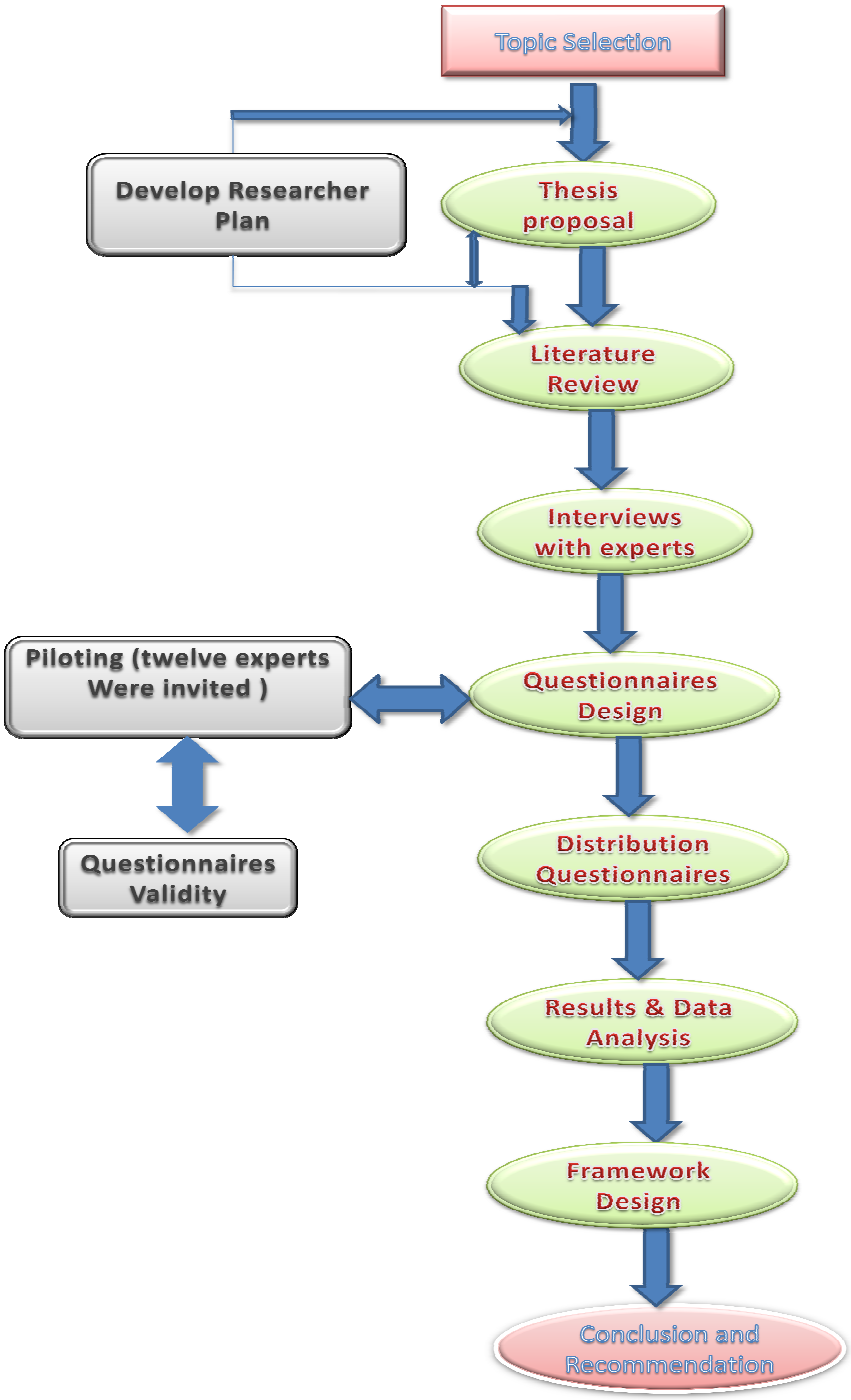

Figure (3.1): Methodology flowchart

3.5 The study population

Study population is composed of those people who are directly affected by the problem of the thesis (delay in construction projects).

This population included consultants engineering office, contracting companies (first A&B class, second and third classes), and owner's institutions.

3.6 Study Sample

3.6.1 Study Sample (consultants' offices)

This sample represents the consultants office party, the researcher choose a sample of the study population, which includes all consulting engineering offices with a valid membership in the engineering association in each of Hebron, Ramallah and Nablus. The Engineers Association (EA) gave the data regarding the classified engineering offices (consultants) in the West Bank. 113 offices distributed among the three main cities in the W.B. divided as follows: (52) office in Ramallah, (29) office in Hebron, and (32) office in Nablus (Engineering Association, 2013).

Table (3.1): The distribution of the consultant offices population. (Engineering Association, 2013).

Region	Hebron (South)	Ramallah (Medium)	Nablus (North)	Classified
Number of Engineering offices valid membership	29	52	32	consultant
Percentage %	26	46	28	

3.6.2 The study sample (Contracting Companies)

This sample represents the contractors' party; include only the companies that had valid registration according to the Palestinian Contractors Union records. PCU in the W.B. classified the contracting companies into five major categories depending on their size of executed projects, capital, and staff qualifications.

According to the PCU class one refers to the largest contractors, divided into two categories (A&B) and class 5 refers to the smallest. The total number of companies located in the W.B., classified and recorded According PCU classification lists in 31 March 2013 for the following fields: building, water and wastewater, roads and electromechanical is 405 companies includes five classes (class 1 (A&B), class 2 class 3 class 4 class 5) in various fields. This list includes companies' names, addresses, fields of work and classifications. The following figure shows the distribution of these companies among W.B. cities:

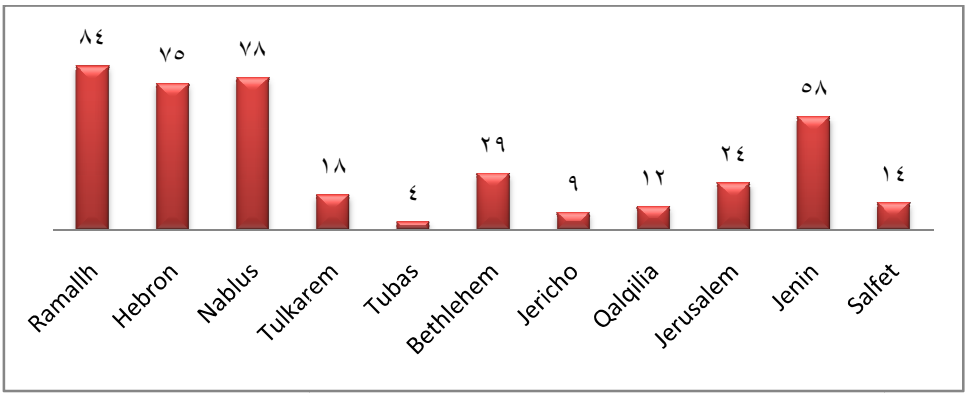

Figure (3.2): distribution of companies in the West Bank Formatted from classification lists in 31 March 2013(PCU, 2013).

In these research categories, four & five were neglected because they are new companies with little experience in construction sector. Figure

(3.2) illustrate the largest distribution contracting companies in Ramallah, Nablus and Hebron includes 187 contracting company.

Figure (3.4): illustrates distribution of the contracting companies' population in the three largest cities in the West Bank (Ramallah, Hebron, and Nablus)

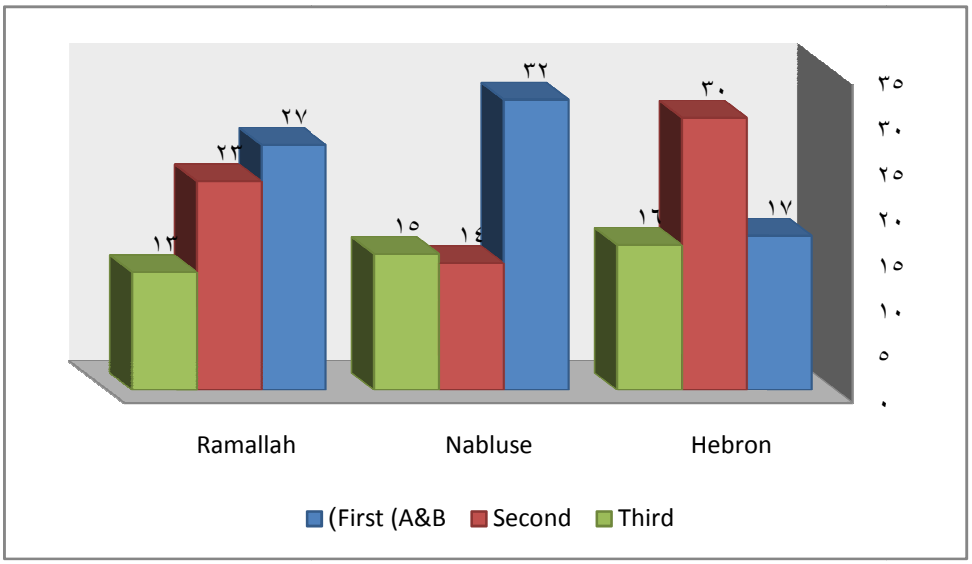

Figure (3.3): The distribution of the contracting companies' population. (PCU, 2013).

3.6.3 The study sample (owners)

The researcher encountered difficulty in knowing the real number of owners who have practice and knowledge in the construction projects in the West Bank, because there is no official reports which shows the number and names of the projects owners in the W.B.

The researcher seeks to find solutions to help identify and know the owners through meetings with many public and private entities, which include (municipalities, ministries, Engineers Association, and Palestinian Contractors Union (PCU), etc.). Because of these meetings, a list of the

names owners who have experience in the construction projects which include (international and government agencies, ministries, municipalities, public and private projects owners, etc. (shweiki, 2013).

The questionnaire was distributed randomly to a sample of (110) owners in different research representative cities in the W.B. include samples in Hebron, Nablus, and Ramallah.

3.7 Methodology of this study

The present study used the descriptive analytical approach to collect data then analyze these data to achieve goals of this study, used the approach of sampling survey questionnaire (appendix A; B), as major tool for data collection on subject of study. In addition, Interviews was a secondary tool. A questionnaire was developed to study the causes and effects of delay of construction industry in the W.B.

3.7.1 Questionnaire approach

Questionnaire was developed to assess the perceptions of owners, consultants, and contractors due to the importance index of factors causing delay and effects of it in construction projects in west bank. (See appendix A; B).

3.7.2 Interviews

Interviews were conducted with a number of representatives of the research sample includes contractors or their representatives, consultants or

their representative and owners or their representative, including a number of experts, academics, project managers, engineers, owners of (companies, offices and institutions) and PCU representative. Open conversations were held with interviewees, asking them about the following：

- Reasons for the delay in construction projects
- Effects resulting from the delay in construction projects.
- Factors (solutions) that lead to reduce the occurrence of delay in construction projects.

In addition, to know their opinion and comments in the following:

- The top ten causes contributed to delays resulting from analysis.
- Research questions and their answers resulting from the analysis.
- Proposed Framework

The obtained data will be used to:

1. Build and formulate suitable questionnaire to help to achieve the goals of this research
2. To check the reliability of the results of the research (compare between the information that was obtained from previous interviews with the results produced from questionnaires analysis).

3.7.2.1 Interviews analysis

Thematic analysis method is used in the analysis of the interviews.

Guest (2012) defined thematic analysis method as the most common way in the analysis of qualitative research. It tightens on setting, examining, and recording themes within data (Braun and Clarke, 2006).

"Themes are patterns across data sets that are important to the description of a phenomenon and are associated to a specific research question"(Daly and Gliksman, 1997). Braun and Clarke (2006) said thematic analysis is performed through six phases as follows:

1. Familiarization with data.
2. Generating initial codes.
3. Searching for themes among codes.
4. Reviewing themes.
5. Defining and naming themes.
6. Producing the final report

3.7.3 Questionnaire design

3.7.3.1 Collection of data for formulating the questionnaire

In order to achieve the goals of research, the following information has been gathered from several sources：

1- Theoretical study

The researcher used a number of sources such as scientific references (books, journal, articles, papers, M.Sc. thesis, internet, and previous studies and research) related to the subject of study to build a base of data out of them.

Reasons for the delay in construction projects and the implications therefore, solutions that help to mitigate the problem, will be valid for presentation to the experts for the first phase of the study.

2- Practical study

As mentioned previously several personal interviews were conducted. Field visit to several of contractors in the headquarters of their companies and projects to find out their opinions of the problem of delay. The goal is to identify the reasons for the delay they faced in previous projects or facing currently in projects under implementation. Field visit to several of consultants in the headquarters of their offices to find out their opinions of the problem of delay through an interview. Field visit to several of owners in the headquarters of their institutions to find out their opinions of the problem of delay through an interview.

- Palestinian Central Bureau for Statistics (PCBS).
- Palestinian contractors union (PCU).
- Interviews with experts, academics and professionals to enrich the research results.

Data collected during interviews and theoretical study was used to build a preliminary questionnaire.

3.7.3.2 Pilot study

A preliminary questionnaire evaluated with the help of experts and academics.

Pilot study used to test and prove that questions in questionnaire is clear and could be answered; to help in achieving the goal of searching through a field survey using the initial version of the questionnaire in Arabic language. The questionnaire was presented to the experts of in the construction projects field include :{ consultants, owners, contractors, academics and statisticians}. To clarify their views on wither the questionnaire is comprehensive and effective, a space left for them to work the necessary amendments to modify the text or add new reasons. In general, they agreed that the questionnaire is suitable, comprehensive and appropriate to achieve the goals of the study, with emergence of minor adjustments, and exclude the questions that were rejected by more than 20% of the experts.

The comments and some modifications been done, a final design and formulation of the questionnaire reached. A test was made to check the questionnaire content validity and to assure that the sentences are clear and precise; accordingly, the draft version was modified.

3.7.3.3 Questionnaire Validity

The objective of literature review includes many of relevant materials from textbooks, professional journals, papers, research reports, and internet to develop a framework for the research study and to prepare structured interviews and questionnaire survey. The identified causes have been verified through literature review and a series of interviews with a number of selected experts in construction project such as managers, engineers, owners, academic and contractors.

3.7.3.4 Questionnaire Distribution

Questionnaire was distributed in several ways to increase the number of response research sample and these methods include:

- Distribution of the questionnaire by hand: by contacting them and making an appointment to meet, finding out their address, and then going to their offices and their companies.

- Distribution of the questionnaire by phoning: by making calls to sample search asking for meeting appointments, or to obtain their faxes number or email. It was difficult to get to their offices to be delivered by hand, for several reasons; there is no enough time for some people to meet them personally, or Lack of offices, where the office is for some part of their homes. Therefore, it has been sent to their faxes or emails, with a demand to fill the questionnaire.

- Distribution of the questionnaire by placing a copy of the questionnaire in the Engineers Association and Palestinian Contractors Union.

3.8 Location of study (questioners' distribution)

West Bank is the location of this study; Hebron, Ramallah and Nablus, were the main cities that represent the three regions of the West Bank; Southern, Middle, and Northern regions. Questionnaire was distributed to 187 local contractor companies, 113 engineering consultant offices and 110 owner institutions, questionnaires were distributed as follows:

- 61 contractors from the North the West Bank, 63 from Middle area and 63 from the South the West Bank.
- 35 owners from the North the West Bank, 40 from Middle area and 35 from the South the West Bank.
- 32 consultants from the North the West Bank, 52 from Middle area and 29 from the South the West Bank.

Table (3.2): summarize the number of questionnaire distributed, returned, excluded, and valid questionnaires.

Respondent regions	# of Questionnaires	#of returned Questionnaires	Response %	#of excluded Questionnaires	#of valid Questionnaires
Hebron	127	81	63	0	81
Nablus	128	67	52	2	65
Ramallah	155	74	48	1	73
					219

Note: Three questionnaires were excluded because of:

- Shortage in the number of questionnaire papers.
- Lack of required data by the respondents, because the respondents do not response to an answer all questions in the questionnaire.

3.9 Statistical Tools Used in the Research

1. Descriptive Statistics (Mean, percent).
2. Likert Scale.

A Likert scale is a psychometric scale commonly used in questionnaires. It is the most widely used method to scaling responses in survey research. Five-point Likert scales are most commonly used. With a five-point scale the points can be labelled, strongly agree, agree, neutral, disagree, and strongly disagree. If the mean of the statement ranging from 1 to less than 1.8, it considered to be very low effect. 1.8 to less than 2.6 considered to be of low effect, 2.6 to less than 3.4 is of medium effect. 3.4 to less than 4.2 considered to be of high effect. In addition, 4.2 to less than 5 considered to be of very high effect. The scale is named after its inventor, psychologist Rensis Likert. Likert (1932).

3. One-Way Anova Test.

The one-way analysis of variance (ANOVA) is a powerful statistical procedure that is used to determine whether there are any significant

differences between the means of three or more independent (unrelated) groups.

4. Correlation analysis.

Correlation analysis is used to study the relationship between variables that have interval data and to test the degree of agreement between the main groups of respondents (Assaf, 2006 and Sekaran, 2000).

Chapter Four

Data Analysis and Discussion

Chapter Four
Data Analysis and Discussion

4.1 Introduction

This chapter describes the results and discussion of questionnaire survey concerning time exceed from contractors, consultants and owner viewpoints in West Bank. The main aim of the current study of is to assess the causes of delay in Palestinian construction projects. This chapter focuses on describing questionnaire sample characteristics analysis.

4.2 Discussion of Results

4.2.1 Questionnaire Sample Characteristics Analysis

It is divided to nine questions including information about the respondent and about the institution. The topics of questions are:

4.2.1.1 Distribution of the sample with respect to the institution work type

It has been found that most of the institutions in the sample work on many fields at the same time such as working on construction, roads, and electro mechanic together. For that, here we calculated how many institutions work on each field. We can see that almost half of the institutions (53.8%, n=203) were working on construction, 19.6% (n=74) were working on water and wastewater, 18% (n=68) were working on roads and just 8.5% (n=32) of the institutions were working on electro mechanic (See Figure 4.1).

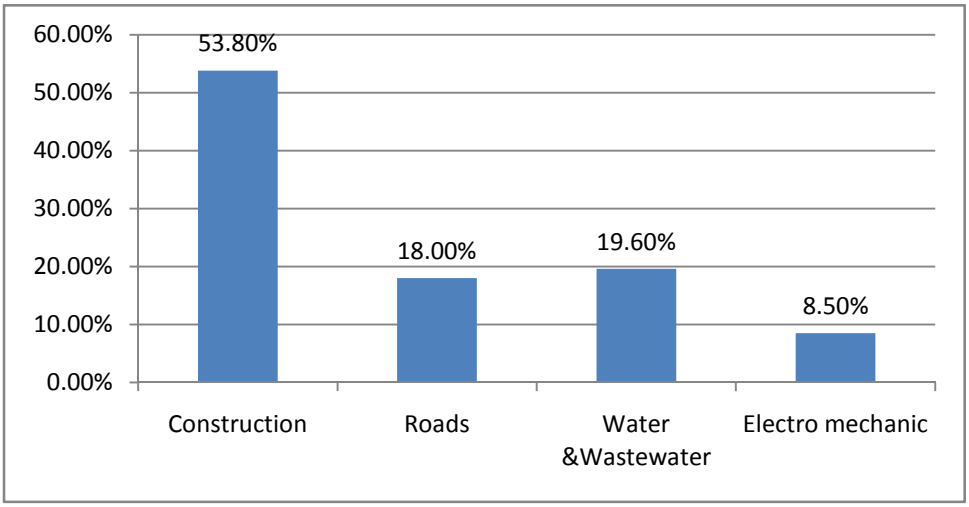

Figure (4.1): The institution work type.

4.2.1.2 Distribution of the sample with respect to the respondent work type

Regarding the participants' work type, 44.7% (n=98) of the respondents in the sample were contractors, 28.8% (n=63) were consultants, and 26.5% (n=58) were owners (see Table 4.1).

Table (4.1): The respondent work type.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Consultant	63	28.8	28.8	28.8
	Contractor	98	44.7	44.7	73.5
	Owner	57	26.5	26.5	100.0
	Total	219	100.0	100.0	

4.2.1.3 Distribution of the sample with respect to the type of institution

For the type of the institution, the vast majority (78.6%, n=169) were private sectors, 20.9% (n=45) were public sectors, and 0.5% (n=1) of them were academic sectors (see Table 4.2).

Table (4.2): The type of institution.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public sector	45	20.5	20.9	20.9
	private sector	169	77.2	78.6	99.5
	Academic Sector	1	.5	.5	100.0
	Total	215	98.2	100.0	
Missing	System	4	1.8		
Total		219	100.0		

4.2.1.4 Distribution of the sample with respect to the financial size of the institution.

Regarding the institution financial size, 45.2% (n=98) their financial sizes' were from 0 to 2 Million $, 9.2% (n=20) from 2 to 4 Million $, 8.8% (n=19) more than 54 Million $, and 6% (n=13) from 4 to 14 Million $, 3.7% (n=8) from 14 to 54 Million $, and 27.2% (n=59) were other than the mentioned financial sizes (Figure 4.2).

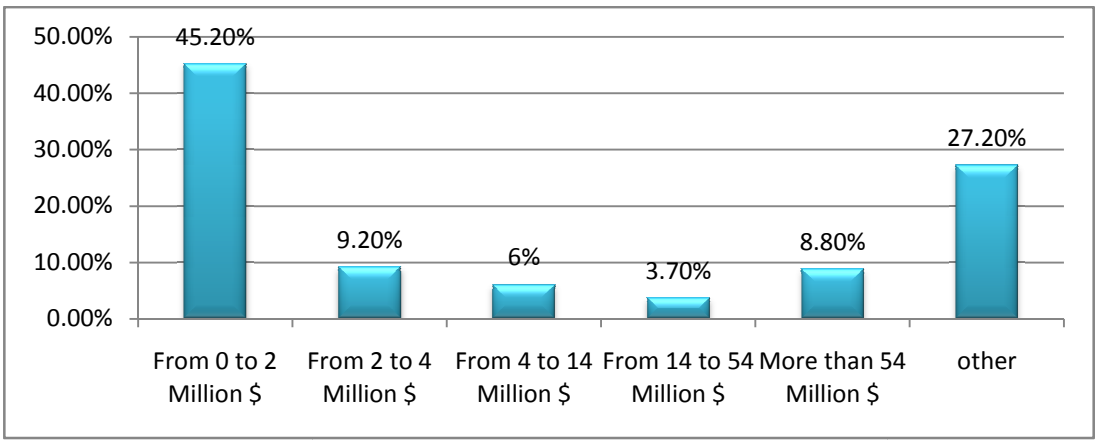

Figure (4.2): The financial size of the institution.

4.2.1.5 Distribution of the sample with respect to company location in the West Bank.

For the company location, 36.9% (n=80) of the companies in the sample were in the south of the west bank, 33.6% (n=73) were in the

medium of the west bank, and 29.5% (n=64) of them were in the north of the west bank (Figure 4.3).

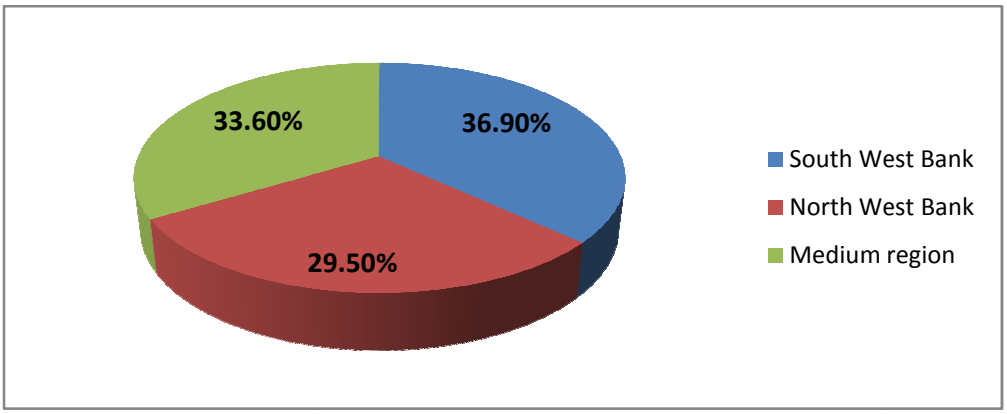

Figure (4.3): Location of the company in the West Bank.

4.2.1.6 Distribution of the sample with respect to contractor classification based on Degree.

When the contractors were asked about their company classification, they responded as the following: almost half of them (47.5%, n=47) their companies were classified as second-class, 29.3% (n=29) were classified on the third class and 23.2% (n=23) were classified on the first class A&B (Table 4.3).

Table (4.3): Contractor's company classification based on Degree.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First class A & B	23	10.5	23.2	23.2
	Second class	47	21.5	47.5	70.7
	Third class	29	13.2	29.3	100.0
	Total	99	45.2	100.0	
Missing	System	120	54.8		
Total		219	100.0		

4.2.1.7 Distribution of the sample with respect to the respondent position in the company

Regarding the participants position in the company, 30.7% (n=67) of the respondents were project managers, 28% (n=61) of them were institutions' owners, 26.6% (n=58) were office engineers, and 14.7% (n=32) were contractor's engineers (Figure 4.7).

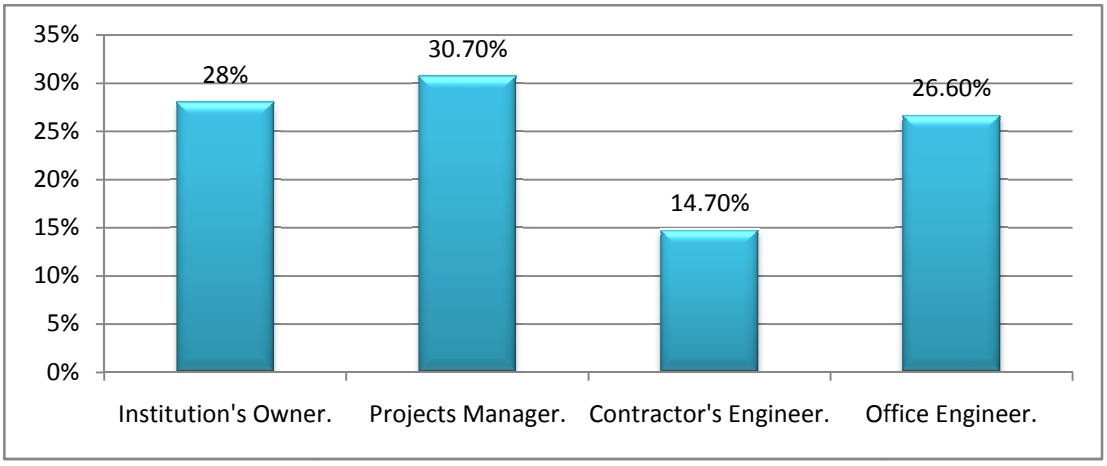

Figure (4.4): the respondent position in the company.

4.2.1.8 Distribution of the sample with respect to the respondent level of education.

The educational level varied among the participants, most of the participants (70.3%, n=154) had bachelor degree, 21.5% (n=47) had master or more, 5.5% (n=12) had diploma, 2.7% (n=6) other than the mentioned qualifications (Table 4.4).

Table (4.4): the respondent level of education.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma.	12	5.5	5.5	5.5
	Bachelor	154	70.3	70.3	75.8
	Master or More.	47	21.5	21.5	97.3
	Other	6	2.7	2.7	100.0
	Total	219	100.0	100.0	

4.2.1.9 Distribution of the sample with respect to the respondent years of experience

For the participants years of experience, half of them (50.2%, n=110) were 10 years or more, 32.4% (n=71) were from 5 to 10 years, and 17.4% (n=38) were from 1 to 5 years (see Table 4.5).

Table (4.5): years of experience.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	From 1 to 5 years.	38	17.4	17.4	17.4
	From 5 to 10 years.	71	32.4	32.4	49.8
	10 years or More.	110	50.2	50.2	100.0
	Total	219	100.0	100.0	

4.2.2 Analysis of the causes of delay in Palestinian construction projects.

In order to analyze the causes of delay in Palestinian construction projects, a five-point Likert scale, ranging from “very high effect” to “very low effect” was used. If the mean of the statement ranging from 1 to less than 1.8, it considered to be very low effect. 1.8 to less than 2.6 considered to be of low effect, 2.6 to less than 3.4 is of medium effect. 3.4 to less than

4.2 considered to be of high effect. In addition, 4.2 to less than 5 considered to be of very high effect. Moreover, we ranked each statement in each section according to the value of its average starting from the largest average to the smallest average, by assigning the value 1 to the largest average, 2 to the second largest average, and so on.

4.2.2.1 Analysis of the causes that are related to owners.

This section assesses the owners' causes of delay in the completion of construction projects. It is divided into four subsections, the owners' administrative and technical causes, the owner's financial matters, machines, equipment, and materials of the owner, and owner's human resources.

4.2.2.1.1 The owners' administrative and technical causes.

In this section, seventeen questions were formulated to assess the owner's administrative and technical causes of delay in Palestinian construction projects. For example, almost half of the participants (48.9%, n=107) agreed that there are weakness in the Communication and coordination (both internal and external) (the owner with the other parties), 43.8% of the participants (n=96) agreed that the chain of decision-making process is too long or complicated.

Further, 29.2% (n=64) disagreed about having weakness in the administrative stability of the owner's side. 36.2% (n=79) agreed on the statement which says that the owner's demands are not understood by the

consultant. Also, 3.7% (n=8) of the participants extremely disagreed that the time for completion is not enough.

Furthermore, 36.1% (n=79) agreed that there is lack of Sufficient experience on Owner's side in construction Projects, and 6.8% (n=15) extremely disagreed about it. Also, 41% (n=89) reported that they agree about having ineffectiveness of Late completion penalties. Finally, almost half of them (48.9%, n=107) agreed that there is a delay in the review and approval of design documents. For more details, refer to Figure (4.5)

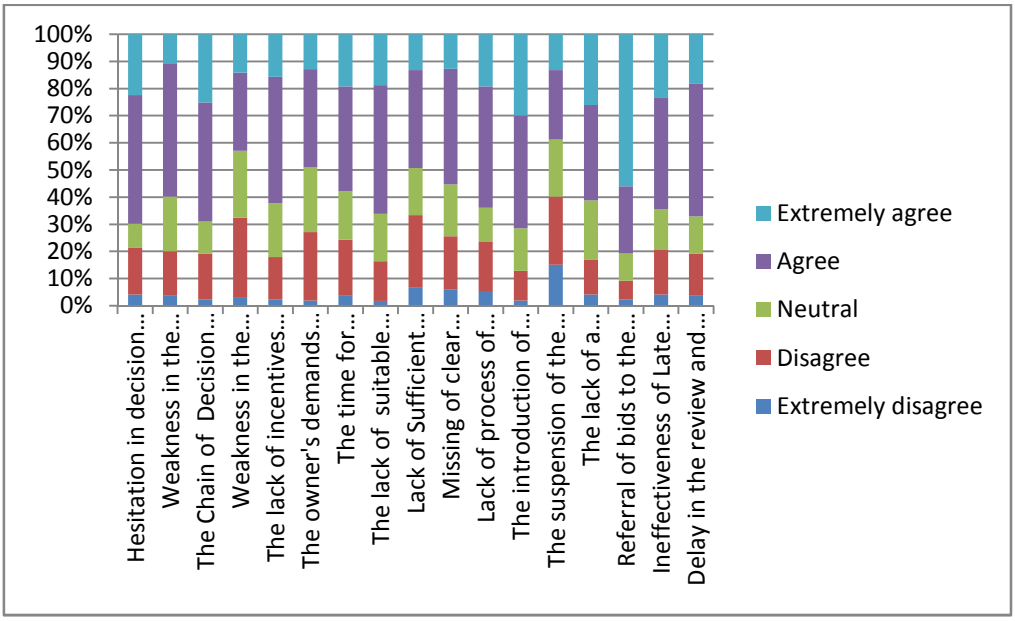

Figure (4.5): Owner's administrative and technical causes.

By the 5-point Likert scale, the mean of the Owner's administrative and technical causes equal 3.55 which means that it have a high effect on the delay of the Palestinian construction projects. Figure 4.5 shows that "Referral of bids to the lowest price" is the most effective cause on the delay of the Palestinian construction projects among the Owner's administrative and technical causes, and "The suspension of the work by the owner without actual reasons" is the least effective cause among them.

4.2.2.1.2 The owner's financial matters

This section assesses the owner's financial matters causes of delay in Palestinian construction projects as seen in Table (4.6). This section included three questions. For example, almost half of the participants' (44.3%, n=97) said that they are extremely agree that Irregular cash flow for the project on owner's side cause delay of Palestinian construction projects, 6.4% (n=14) extremely disagreed about it. Whereas, 40.1% (n=87) extremely agreed that Delay of due payments (according to progress) cause delay of the Palestinian construction projects, 8.8% (n=19) extremely disagreed about it.

Table (4.6): Owner's financial matters causes

N			Count	Layer N %	Mean	Ranking
1	Irregular cash flow for the project on owner's side.	Extremely disagree	14	6.4%	3.97	1
		Disagree	23	10.5%		
		Neutral	16	7.3%		
		Agree	69	31.5%		
		Extremely agree	97	44.3%		
2	High rates of interest.	Extremely disagree	9	4.1%	3.34	3
		Disagree	28	12.9%		
		Neutral	84	38.7%		
		Agree	73	33.6%		
		Extremely agree	23	10.6%		
3	Delay of due payments (according to progress).	Extremely disagree	10	4.6%	3.96	2
		Disagree	19	8.8%		
		Neutral	28	12.9%		
		Agree	73	33.6%		
		Extremely agree	87	40.1%		
The mean of the owner's financial matters = 3.74						

By the 5-point Likert scale, the mean of the owner's financial matters equal 3.74, which means that it, have a high effect on the delay of the Palestinian construction projects. Table 4.6 shows that "**Irregular cash flow for the project on owner's side**" is the most effective cause on the delay of the Palestinian construction projects among the Owner's administrative and technical causes, and "**High rates of interest**" is the least effective cause among them.

4.2.2.1.3 Machines, equipment, and materials of the owner.

This section included two questions to explore the machines, equipment, and materials of the owner causes of delay in Palestinian construction projects as seen in Table (4.7). For example, 40.6% (n=89) agreed that changing the specifications of requested materials cause delay of Palestinian construction projects, almost half of the participants' (48.4%, n=106) agreed that not using modern software in making decisions and procedures regarding the project materials cause delay of Palestinian construction projects.

Table (4.7): Machines, equipment, and materials of the owner causes

N			Count	Layer N %	Mean	Ranking
1	Change the specifications of requested materials.	Extremely disagree	9	4.1%	3.41	2
		Disagree	41	18.7%		
		Neutral	50	22.8%		
		Agree	89	40.6%		
		Extremely agree	30	13.7%		
2	Not using modern software in making decisions and procedures regarding the project.	Extremely disagree	6	2.7%	3.54	1
		Disagree	32	14.6%		
		Neutral	47	21.5%		
		Agree	106	48.4%		
		Extremely agree	28	12.8%		
The mean of machines, equipment, and materials of the owner causes = 3.48						

By the 5-point Likert scale, the mean of machines, equipment, and materials of the owner causes equal 3.48 which means that it is of High effect on the delay of the Palestinian construction projects. Table (4.7) shows "**Not using modern software in making decisions and procedures regarding the project**", and "**Change the specifications of requested materials**" are the most and the least effective causes of delay of the Palestinian construction projects respectively among machines, equipment, and materials of the owner causes.

4.2.2.1.4 The owner's human resources.

Seen in Figure (4.6), this section included four questions that assess the owner's human resources causes of delay in Palestinian construction projects. For example, 43.8% (n=96) of the participants agreed that there is

lack of qualified human resources with competence and experience needed to deal with similar types of construction projects, 4.6% (n=10) extremely disagreed about it.

Regarding having problems in employment, 34.9% (n=76) of participants agreed about that, 26.1% (n=57) were neutral, 4.1% (n=9) extremely disagreed about having problems in employment. Further, 46.1% (n=100) of the participants agreed that there is lack of attention to the training and development of human elements in charge of the project, whereas, 3.2% (n=7) of the participants disagreed about that.

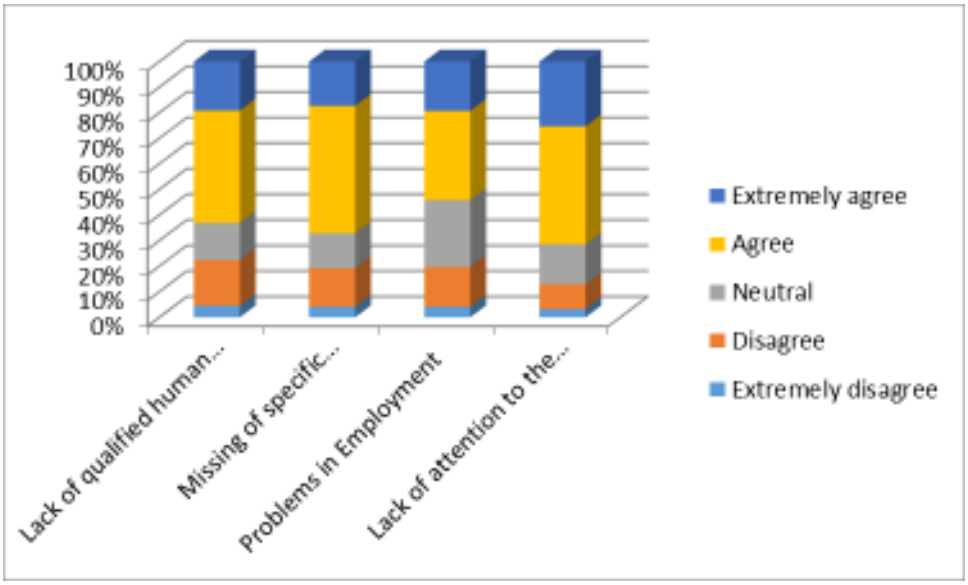

Figure (4.6): Owner's human resources causes.

By the 5-point Likert scale, the mean of the Owner's human resources causes equal 3.62, which means that it, have a high effect on the delay of the Palestinian construction projects. Figure 4.6 shows that “Lack of attention to the training and development of human elements in charge of the project” is the most effective cause on the delay of the Palestinian

construction projects among the Owner's human resources, and “Problems in Employment” is the least effective cause among them.

4.2.2.2 Analysis of the causes that are related to consultants.

This section assesses the consultants’ causes of delay in the completion of construction projects. It is divided into three subsections, the consultants’ administrative and technical causes, the consultants’ human resources, and machines, equipment, and materials of the consultants.

4.2.2.2.1 The consultants’ administrative and technical causes.

The questionnaire included thirteen questionnaires related to the consultants’ administrative and technical causes of delay in the Palestinian construction projects. (Figure 4.7)

Almost half of the participants (47.5%, n=104) agreed that the existence of the delays in the approval of adjustments during the execution phase causes delay in the completion of construction projects. Further, 44.7% (n=98) agreed that design changes during construction by the Owner cause delay in the completion of the construction projects. Also, 30.1% (n=66) of them disagreed that fault in soil testing cause delay in the completion of the construction projects, 28.8% (n=63) agreed and 29.2% (n=64) were neutral about it.

Furthermore, 36.5% (n=80) agreed that that lack of planning, monitoring and follow-up processes and periodic inspection by supervision during implementation phase cause delay in the completion of the

construction projects. Almost half of the participants (47.5%, n=103) agreed that unfinished Plans or Documents as per the Project time schedule cause delay in the completion of the construction projects, 3.2% (n=7) extremely disagreed about it. Finally, 46.3% (n=101) agreed that changes and redesign many times during design phase cause delay in the completion of the construction projects.

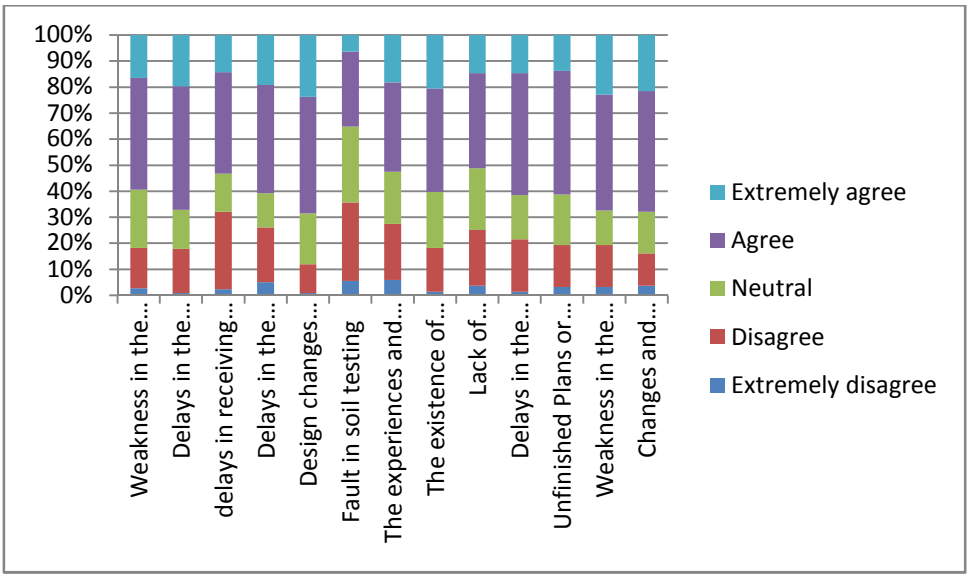

Figure (4.7): consultants' administrative and technical causes.

By the 5-point likert scale, the mean of the administrative and technical causes of consultants equal 3.51 which means that it have a high effect on the delay of the Palestinian construction projects. Figure 4.7 shows that "Design changes during construction by the Owner" is the most effective cause on the delay of the Palestinian construction projects among the consultant's administrative and technical causes, and "Fault in soil testing" is the least effective cause among them.

4.2.2.2.2 The consultants' human resources.

The consultant's human resources is another critical factor that might affect the delay of the Palestinian construction projects. This section consisted of four questions to explore this variable see Figure (4.8).

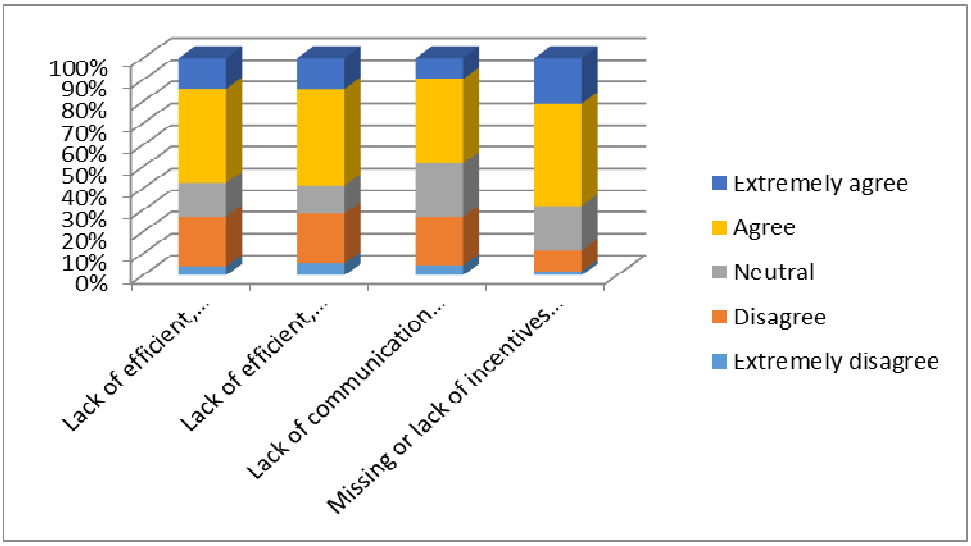

Table (4.8): The consultants' human resources causes.

By the 5-point Likert scale, the mean of the consultants' causes related to human resources equal 3.46, which means that it, have a high effect on the delay of the Palestinian construction projects. Figure 4.8 shows that "Missing or lack of incentives for workers institution" is the most effective cause on the delay of the Palestinian construction projects among the consultants' causes related to human resources, and "Lack of communication between employees" is the least effective cause among them.

4.2.2.2.3 Machines, equipment, and materials of the consultant.

Five questions were included in this section, which discussed the Machines, equipment, and materials of the consultant effect on the delay of

the Palestinian construction projects as seen in Figure (4.9). For example, 43.8 (n=96) agreed that the delay in the approval of samples submitted from the contractor cause delay of the Palestinian construction projects, 21.5% (n=47) indicated that they are extremely agreed, and only 1.4% (n=3) extremely disagreed on it.

Regarding the effect of requiring Materials that are missing locally and needs to be imported from outside on the delay of the Palestinian construction projects, 28.8% (n=63) responded “disagree”, 26% (n=57) responded “agree”, 21% (n=46) responded “neutral”, and 5.5% (n=12) responded “extremely disagree”. Further, 40.2% (n=88) of the participants agreed that changing in the Materials specifications cause delay of the Palestinian construction projects.

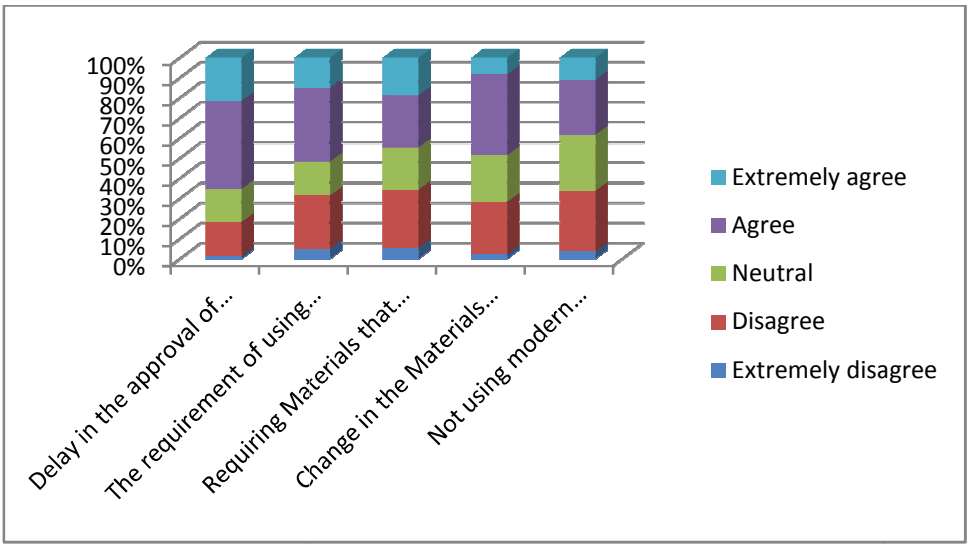

Figure (4.9): Machines, equipment, and materials of the consultant causes.

By the 5-point Likert scale, The mean of machines, equipment, and materials of the consultant causes equal 3.32 which means that it have a medium effect on the delay of the Palestinian construction projects. Figure

(4.9) shows that “Delay in the approval of samples submitted from the contractor” is the most effective cause on the delay of the Palestinian construction projects among the machines, equipment, and materials of the consultant causes.

4.2.2.3 Analysis of the causes that are related to contractors.

This section assesses the contactors causes of delay in the completion of the Palestinian construction projects. It is divided into four subsections, the contractors' administrative and technical causes, the contractors’ human resources, machines, equipment, and materials of the contractors, the contractors’ financial matters.

4.2.2.3.1 The contractors’ administrative and technical causes.

Seventeen questions discussed the contractors’ administrative and technical causes' effect on the delay of the Palestinian construction projects as shown in Figure (4.10). For example, the participants were asked if Weakness in the follow-up and site management could cause delay in the Palestinian construction projects and their responses were as following: 40.6% (n=89) agreed, 25.1% (n=55) extremely agreed, 16.4% (n=36) were neutral, 13.2% (n=29) disagreed and 4.6% (n=10) extremely disagreed.

Also, 38.4% (n=84) of the participants agreed that lack in the coordination with the subcontractors cause delay in the completion of the Palestinian construction projects, 21% (n=46) responded “neutral”, and

41.7% (n=91) agreed that contractor delay in starting works cause delay on the completion of the Palestinian construction projects.

Furthermore, 40.8% (n=89) reported that they "agree" that missing of a plan for the execution of works or not following it could cause delay on the completion of the Palestinian construction projects, 23.9% (n=52) responded as "extremely agree". Finally, 42.5% (n=93) stated that they "agree" that late in preparing shop drawings by the contractor could cause delay on the completion of the Palestinian construction projects, 3.2% (n=7) reported that as "extremely disagree". For full details, refer to Figure (4.10).

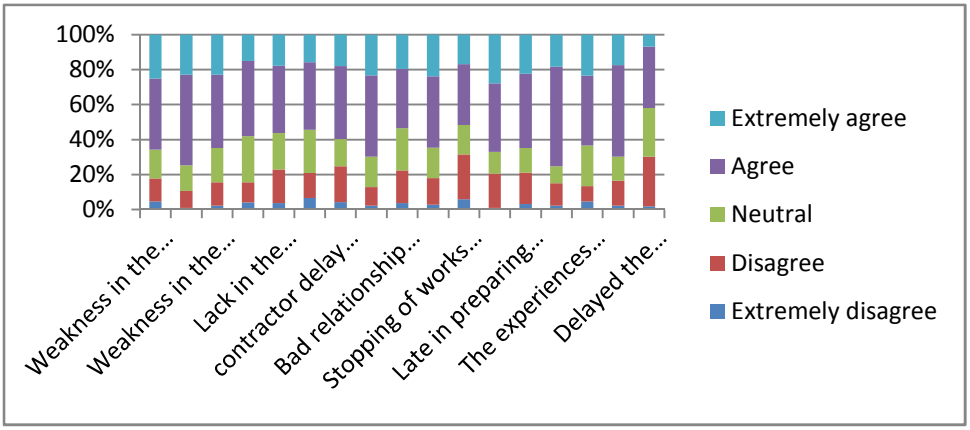

Figure (4.10): contractors' administrative and technical causes.

By the 5-point Likert scale, the mean of the contractors' administrative and technical causes equal 3.59, which means that it, have a high effect on the delay of the Palestinian construction projects. Figure 4.10 shows that "Mistakes during the process of implementation (intentionally or unintentionally) require readjustment." is the most effective cause on the delay of the Palestinian construction projects among the contractors' administrative and technical causes.

4.2.2.3.2 The contractors' human resources.

The contractors' human resources is another critical factor that might affect the delay of the Palestinian construction projects. This section consisted of six questions. For example, 44% (n=96) agreed that shortage in skilled, trained and experienced employees and workers may cause delay of the Palestinian construction projects, 29.4% (n=64) said that they are extremely agree on it.

Furthermore, almost half of the participants (50.7%, n=111) agreed that insufficient planning for the contractor's workers may cause delay of the Palestinian construction projects, 18.7% (n=41) responded as "extremely agree". Finally, 44% (n=96) agreed that Weakness in Contractor's Engineer Performance (normally newly graduated) may cause delay of the Palestinian construction projects. For more details, refer to Figure (4.11).

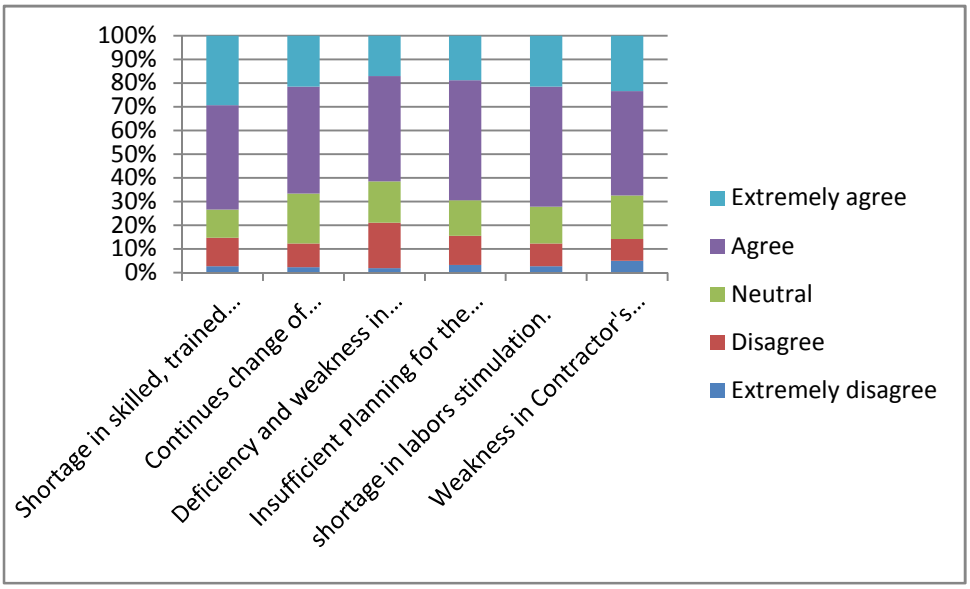

Figure (4.11): The contractors' human resources causes.

By the 5-point Likert scale, the mean of the contractor's human resources causes equal 3.72, which means that it, have a high effect on the delay of the Palestinian construction projects. Figure 4.11 shows that "Shortage in skilled, trained and experienced employees and workers" is the most effective cause on the delay of the Palestinian construction projects among the contractor's human resources causes, and "Deficiency and weakness in productivity of workers" is the least effective cause among them.

4.2.2.3.3 Machines, equipment, and materials of the contractor.

This section assesses machines, equipment, and materials of the contractor causes of delay in Palestinian construction projects as seen in Figure (4.12). This section included twelve questions. For example, almost half of the participants' (48.9%, n=107) agreed that unavailability of required equipment when demanded or delayed availability behind schedule may cause delay in Palestinian construction projects, 26.9% (n=59) responded, "Extremely agree". Whereas, 40.2% (n=88) agreed that not supplying spare parts needed or delayed supplying schedule may cause delay in the Palestinian construction projects, 35.2% (n=77) responded as "neutral".

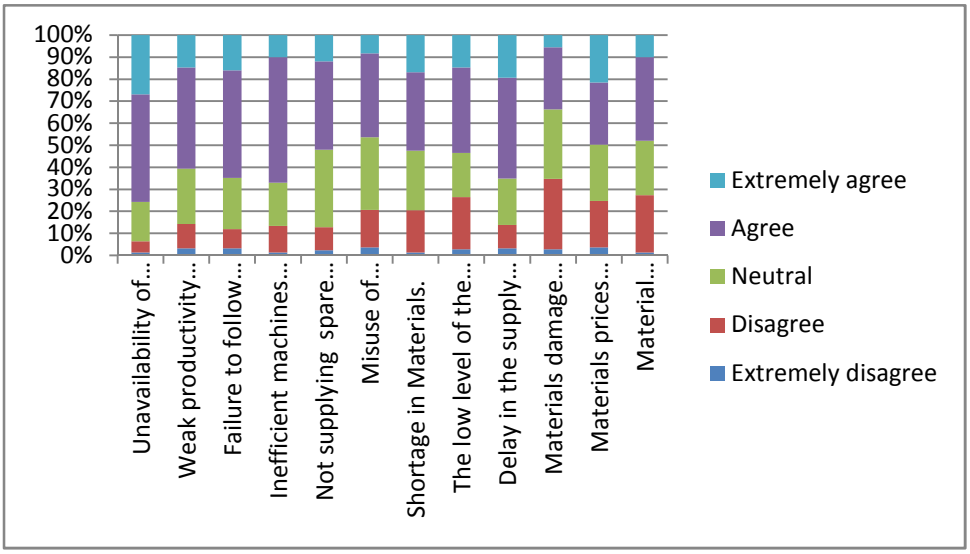

Figure (4.12): Machines, equipment, and materials of the contractors' causes.

By the 5-point Likert scale, the mean of machines, equipment, and materials of the contractors' causes equal 3.50, which means that it's of High effect on the delay of the Palestinian construction projects. Figure 4.12 shows "**Unavailability of required equipment when demanded or delayed availability behind schedule**", and "**Materials damage when stored or being exposed to theft or combustion**" are the most and the least effective causes of delay of the Palestinian construction projects respectively among machines, equipment, and materials of the contractors' causes.

4.2.2.3.4 The contractors' financial matters

This section included four questions to explore the contractors' financial matters effect of delay in Palestinian construction projects as seen in Figure (4.13). For example, 48.4% (n=106) agreed that contractor failure to regulate the cash flow of the project may cause delay in Palestinian construction projects, 37.9% (n=83) agreed that mismatching of the

financial efficiency for the contractor with the project may cause delay in Palestinian construction projects.

Regarding Incorrect and inappropriate bid pricing, 40.8% (n=89) of the participants extremely agreed that it may cause delay in the Palestinian construction projects, 33% (n=72) responded, “Agree”. For more details, see Figure 4.13.

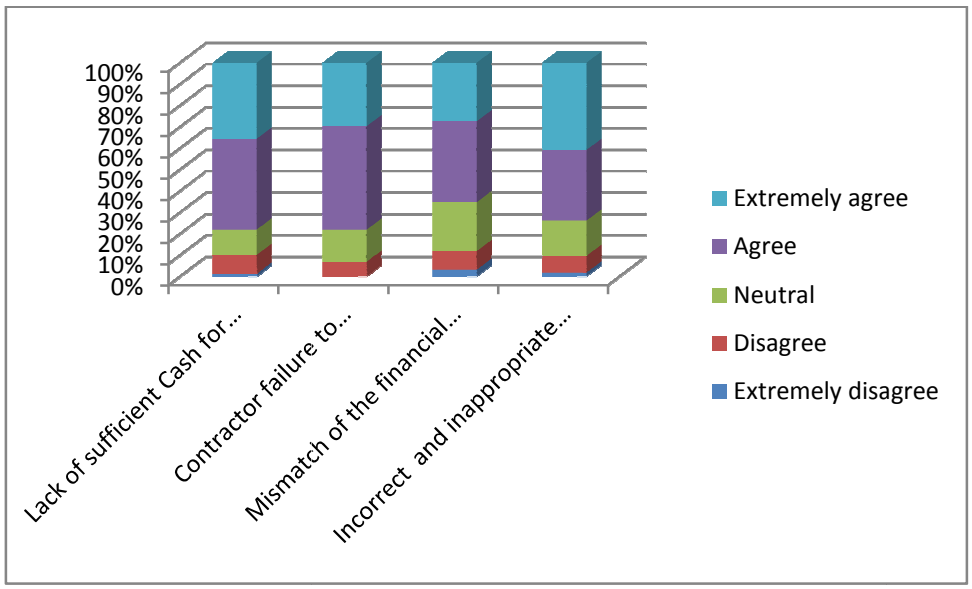

Figure (4.13): The contractors’ financial matters causes.

By the 5-point Likert scale, the mean of the contractor's financial matters causes equal 3.96 which means that it have a high effect on the delay of the Palestinian construction projects. Figure 4.13 shows that “Incorrect and inappropriate bid pricing” is the most effective cause on the delay of the Palestinian construction projects among the contractor's financial matters causes.

4.2.2.4 Causes Related to Contract Documents.

As seen in Figure (4.14), this section included four questions that assess the effect of causes related to contract documents on the delay of the

Palestinian construction projects. In general, the findings revealed that there is a high effect of the causes that are related to the contract documents on the delay of the Palestinian construction projects. For example, 44.7% (n=98) of the participants agreed that the existence of deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness may cause delay of the construction projects, 2.7% (n=6) reported that as “extremely disagree”.

Regarding the existence of problems in the context of the contract or its language, almost half of the participants (47.9%, n=105) of participants agreed that it may cause delay of the Palestinian construction projects. Further, 39.3% (n=86) of the participants agreed that insufficient procedures- in the contracts- needed to be taken to settle disputes if they occur. Whereas, 66% (n=198) of the participants stated that the doctor “rarely or never” hurried too much in order to finish the visit quickly only 13.3% (n=40) answered that by “always or often”, and 20.7% (n=62) responded as “sometimes”.

Furthermore, 86.3% (n=259) indicated that the doctor “always or often” allowed them to say anything, 8.3% (n=25) reported that as “sometimes”. Whereas, 41.6% (n=91) agreed that Duties, responsibilities, and rights of the parties undefined accurately in the contract may cause delay of the Palestinian construction projects, 21.5% (n=47) responded as “neutral”.

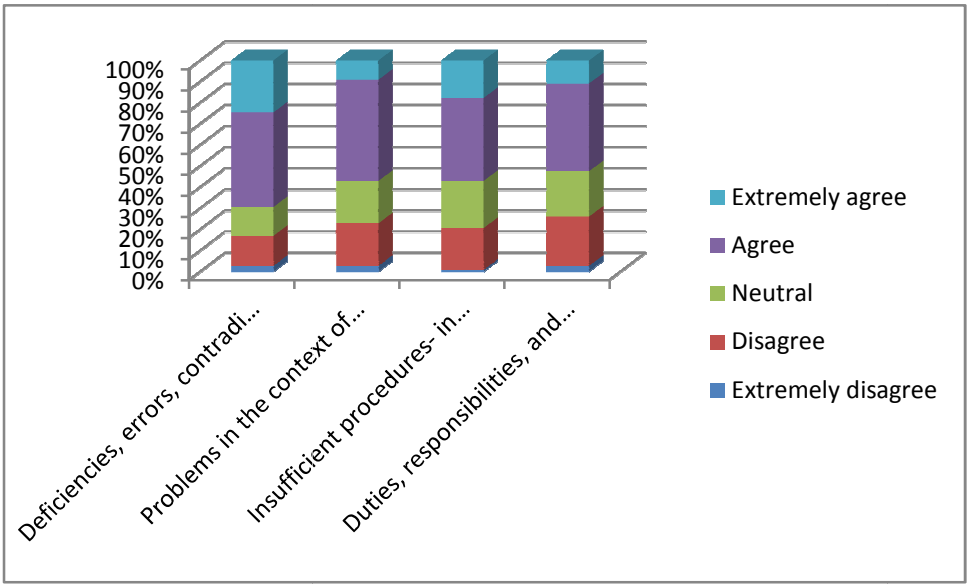

Figure (4.14): Causes Related to Contract Documents.

By the 5-point likert scale, the mean of the causes related to contract documents equal 3.51 which means that it have a high effect on the delay of construction projects. Figure 4.14 shows that "Deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness" is the most effective cause on the delay of the Palestinian construction projects. Among the causes which are related to the contract documents, and "Duties, responsibilities, and rights of the parties undefined accurately in the contract" is the least effective cause among them.

4.2.2.5 Causes related to the project

Eight questions were included in this section which discussed causes related to the project itself that may cause delay of the Palestinian construction projects as seen in Figure (4.15). For example, 32.9 %(n=72) disagreed that the project site or the difficulty in accessing it may cause delay of the Palestinian construction projects, 25.1% (n=55) indicated that

they “agree”, and only 5.5% (n=15) reported that they “extremely disagree” that it may cause delay of the Palestinian construction projects.

Regarding Problems with neighbours, 46.6% (n=102) said that they agree that it may cause delay of the Palestinian construction projects, 4.1% (n=9) responded, “Extremely disagree”. Further, 39.3% (n=86) of the participants stated that they agree that high level of quality requirements may cause delay of the Palestinian construction projects and 8.2% (n=18) reported they “extremely disagree” with that.

Furthermore, 37.4% (n=82) agreed that the specified period for the implementation of the project is very few, 2.7% (n=6) responded as “extremely disagree”. Finally, 45.2% (n=99) agreed that the kind of tenders in which the selection process to negotiate lower prices or other criteria may cause delay of the Palestinian construction projects, 6.8% (n=15) reported that as “disagree”.

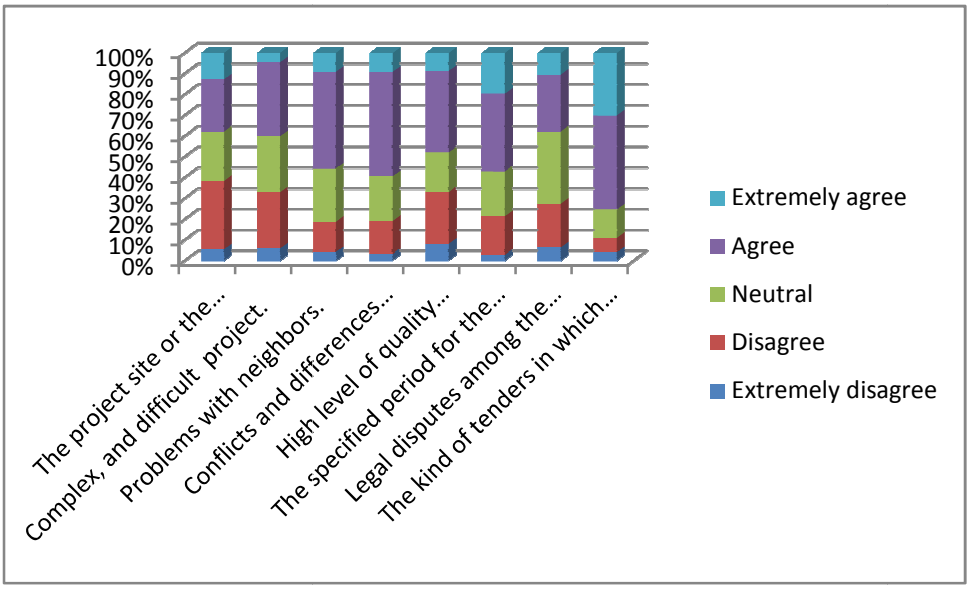

Figure (4.15): Causes related to the project.

By the 5-point Likert scale, the mean of the causes related to the project equal 3.34, which means that it, have a medium effect on the delay of the Palestinian construction projects. Figure 4.15 shows that “The kind of tenders in which the selection process to negotiate lower prices or other criteria” is the most effective cause on the delay of the Palestinian construction projects among the causes which are related to the project itself, and “Complex, and difficult project” is the least effective cause among them.

4.2.2.6 Other Causes (External)

Eleven questions discussed the effect of external causes on the delay of the Palestinian construction projects as shown in Figure (4.16). For example, the participants were asked if unexpected geological situation may cause delay of the construction projects and 44.5% (n=97) of the participants agreed on that, 15.1% (n=33) extremely agreed, and 2.8% (n=6) extremely disagreed about it.

Also, almost half of the participants (46.6%, n=102) reported that they agree that the wheatear condition may cause delay of the Palestinian construction projects, 1.8% (n=4) responded “extremely disagree”, and 45.2% (n=99) indicated that they agree that political instability, conflict, and war (the presence of the occupation) may cause delay of the Palestinian construction projects.

Furthermore, 36.1% (n=79) reported that they agree that the laws of government such as building permits, and other may cause delay of the

Palestinian construction projects, 35.2% (n=77) responded as “neutral”. Finally, 39.3% (n=86) of the participants agreed that accidents during execution may cause delay of the Palestinian construction projects, 7.8% (n=17) reported that as “extremely agree”. For full details, refer to figure (4.16).

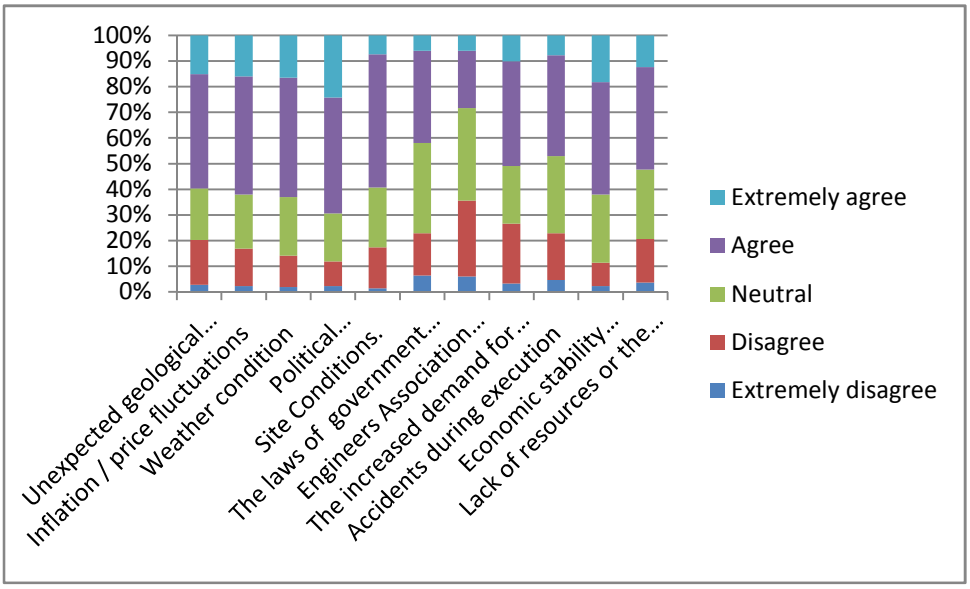

Figure (4.16): External causes of delay in the Palestinian construction projects.

By the 5-point Likert scale, the mean of the other external causes of delay in the Palestinian construction projects equal 3.44 which means that it have a high effect on the delay of the Palestinian construction projects. Figure 4.16 shows that “Political instability, conflict, and war (the presence of the occupation)” is the most effective cause on the delay of the Palestinian construction projects among the other external causes, and “Engineers Association requirements for licensing and other issues” is the least effective cause among them.

4.2.2.7 The degree and extent of the impact of these causes on the project

The degree and extent of the impact of these causes on the project that might affect the Palestinian construction projects. This section consisted of six questions to explore this variable as seen in Figure (4.17) below.

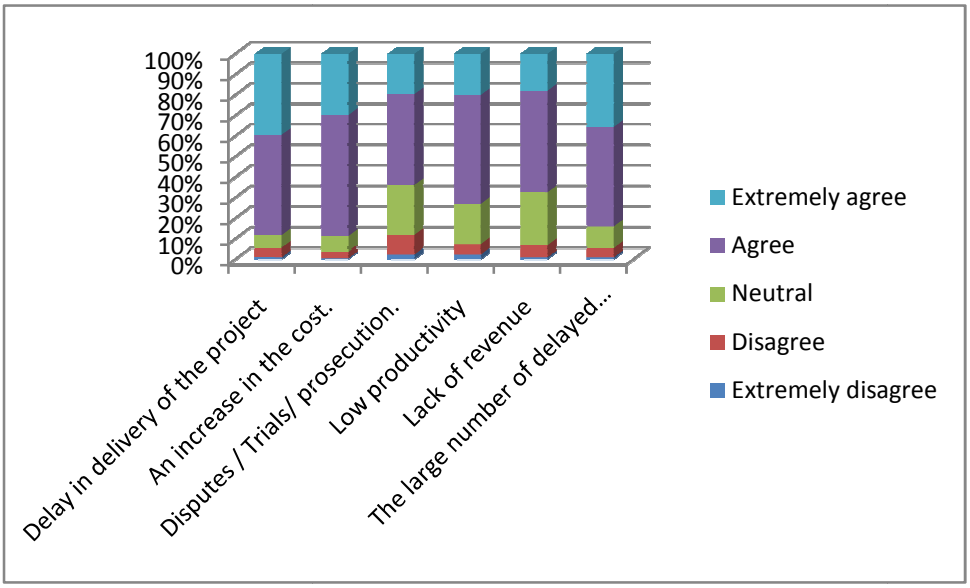

Figure (4.17): The degree and extent of the impact of these causes on the project.

By the 5-point Likert scale, the mean of the degree and extent of the impact of these causes on the project equal 3.96 which means that it have a high effect on the delay of the Palestinian construction projects. Figure 4.17 shows that "Delay in delivery of the project" is the most effective cause on the delay of the Palestinian construction projects among the degree and extent of the impact of these causes on the project.

4.2.2.8 Factors reduce the delay of the project

Thirteen questions were included in this section that discussed the factors that may reduce the delay of the construction projects as seen in

Figure (4.18). For example, more than half of the participants (55.3, n=121) extremely agreed that identification of the specialized project Manager to manage the project may reduce the delay of the project, 38.8% (n=85) indicated that they "agree", and only 1.4% (n=3) reported that they "extremely disagree" about it.

Regarding the accuracy of the project cost and time, 51.4% (n=112) said that they are extremely agree that it may reduce the delay of the project, 39.3% (n=87) responded, "Agree". Further, 44.7% (n=98) of the participants stated that they agree that the use of monitoring and follow-up system may reduce the delay of the project and 1.8% (n=4) reported they "extremely disagree" about it.

Furthermore, half of the participants (50% (n=109) agreed that the continuous use of monitoring systems for the project may reduce the delay of the project, 42.7% (n=93) responded as "extremely agree". Finally, 48.4% (n=106) extremely agreed that staff training to get skilled workers may reduce the delay of the project, 42.9% (n=94) reported that as "agree".

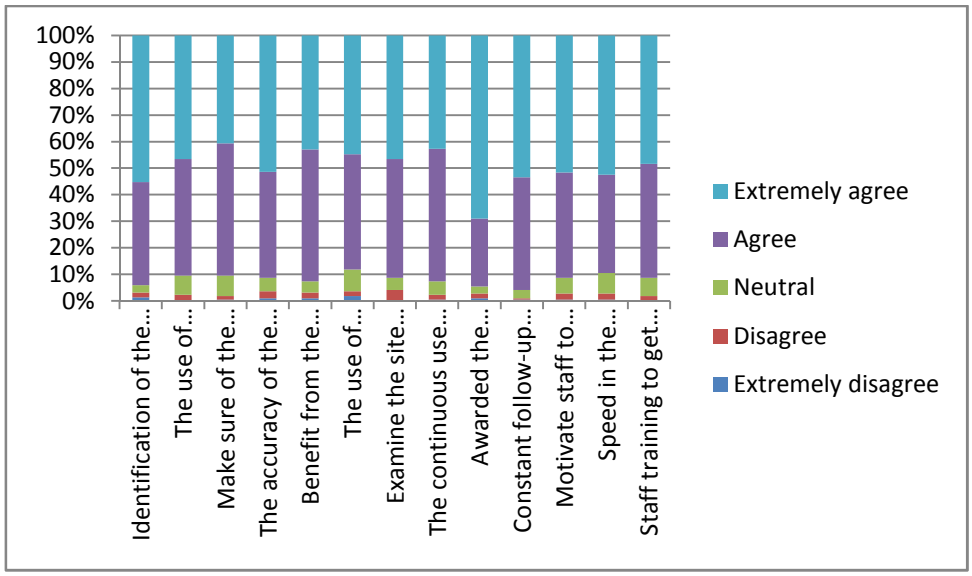

Figure (4.18): Factors reduce the delay of the project

According to Figure 4.18, “Awarded the contract to the contractor with competence and not to the least price tender” is the most effective way to reduce the delay of the project, and “The use of monitoring and follow-up system” is the least effective way among them.

Based on the research questions mentioned in chapter one results of analysis showed in the following table 4.8 that all groups have varying effects on the delay which have some high effect , and other low effect can possible to negligence. A five-point Likert scale, ranging from “very high effect” to “very low effect” was used. If the mean of the statement ranging from 1 to less than 1.8, it considered to be very low effect. 1.8 to less than 2.6 considered to be of low effect, 2.6 to less than 3.4 is of medium effect. 3.4 to less than 4.2 considered to be of high effect. In addition, 4.2 to less than 5 considered to be of very high effect.

From the previous analysis, we conclude that the degree of effect of the main filed causes of delay in the construction projects is as follows:

Financial matters for the contractor and the owner show in the first and second rank. Human resources for the contractor and the owner show in the third and fourth rank. Machines, equipment, and materials of the consultant it appears less impact on delays.

Table (4.8): The degree of effect of the main fields of the delay of the construction projects.

N	The field	The effect	Mean
1	The owners' administrative and technical causes.	High	3.55
2	The owner's financial matters.	High	3.74
3	Machines, equipment, and materials of the owner.	High	3.48
4	The owner's human resources.	High	3.62
5	The consultants' administrative and technical causes.	High	3.51
6	The consultants' human resources.	High	3.46
7	Machines, equipment, and materials of the consultant.	Medium	3.32
8	The contractors' administrative and technical causes.	High	3.59
9	The contractors' human resources.	High	3.72
10	Machines, equipment, and materials of the contractor.	High	3.50
11	The contractors' financial matters.	High	3.96
12	Causes Related to Contract Documents.	High	3.51
13	Causes related to the project.	Medium	3.34
14	Other Causes (External)	High	3.44

See table (20) in Appendix (E) appears the views of respondents about the various reasons for the delay has been reached important average per reason belonging to different parties of the project according to the points made by respondents (X). Also contains a summary of the data the ratio of the reasons for each parties. Due to the different number of reasons listed belonging to each party, and then calculate the average averages points to the importance of the reasons for each party (Y). Was calculated as the percentage contribution of the reasons for going to each party in the occurrence of the delay (R) appeared follows: Contractor that contributes to the occurrence of the delay is 17.28%. Owner contributes to the occurrence

of the delay is 17.2%. Consultant contributes to the occurrence of the delay is 16.5%. Contract document contributes to the occurrence of the delay is 16.76%. Project contributes to the occurrence of the delay is 15.94%. In addition, other causes contributes to the occurrence of the delay is 16.37%. Show a higher contribute percentage of delay resulting from the Contractor party.

See table (21) in Appendix (E) shows the averages of the views of respondents delay in descending order according to their importance.

Shows that the owner occupies four causes from the ten causes leading of delay, contractor occupies five causes from the ten causes leading of delay, and project occupies one cause from the ten causes leading of delay.

See table (19) in Appendix (E) shows the value of means and ranking the groups of the main causes of delay in the Palestinian construction projects from the point of view of the respondents (owners, contractors and consultants).

4.3 Test of Statistical Hypotheses

Hypotheses Analysis: Hypotheses were tested to determine the differences between groups of the main causes of delay in the Palestinian construction projects and the characteristics of the respondents and the institutions by using One-Way ANOVA test:

a) First hypotheses is : Type of Institution

There is no statistically significant difference at the level of significance (0.05) between the main causes of delay in the Palestinian construction projects due to the Type of Institution.

Table (4.9) shows that there were **statistical significant differences** (sig <0.05) between the Type of Institution and the following items:

- **Owner's Administrative and Technical Causes**
- **Owner's Machines ،equipment ،and Materials of the owner.**
- **Owner's Human Resources.**
- **Consultant's Administrative and technical causes of consultants.**
- **Consultant's Causes related to human resources.**
- **Consultant's Machines ،equipment ،and materials of the consultant.**
- **Causes Related to Contract Documents.**
- **Causes related to the project.**

For example, it means that the private, public and academic sectors institutions did not agree on the amount of effect of the owner's administrative and technical causes on the delay of the Palestinian construction projects. Therefore, the amount of effect on the owner's administrative and technical causes on the delay of the Palestinian construction projects is different regarding to the type of institutions.

Also Table (4.9), shows that there were **no statistical significant differences** (sig >0.05) between the respondent work type and the following items

- **Owner's Financial Matters**
- **Contractor's Administrative and technical causes.**
- **Contractor's Human Resources.**
- **Contractor’s Machines ،equipment ،and materials of the contractor.**
- **Contractor's Financial Matters.**
- **Other Causes(External)**
- **The degree and extent of the impact of these causes on the project.**
- **Factors reduce the delay of the project**.

For example, it means that the private public and academic sectors institutions agree on the amount of effect of the contractor's administrative and technical causes on the delay of the Palestinian construction projects.

Note: Abbreviations are listed in Table (4.9) symbolizes to the following: (Sig): significant value, (DF): degree of freedom and (F): ANOVA test.

Table (4.9): One-Way Anova for the first hypothesis "Type of Institution".

		Sum of squares	DF	Mean Square	F	Sig
Owner's Administrative and Technical Causes	Between Groups	12.283	2	6.142	20.008	.000
	Within groups	65.075	212	.307		
	Total	77.358	214			
Owner's Financial Matters.	Between Groups	4.078	2	2.039	2.402	.093
	Within groups	179.936	212	.849		
	Total	184.013	214			
Owner's Machines, equipment, and Materials of the owner.	Between Groups	17.595	2	8.798	11.946	.000
	Within groups	156.126	212	.736		
	Total	173.721	214			
Owner's Human Resources.	Between Groups	16.879	2	8.440	13.116	.000
	Within groups	136.417	212	.643		
	Total	153.296	214			
Consultant's Administrative and technical causes of consultants.	Between Groups	7.166	2	3.583	8.752	.000
	Within groups	86.783	212	.409		
	Total	93.948	214			
Consultant's Causes related to human resources.	Between Groups	9.439	2	4.719	7.580	.001
	Within groups	131.982	212	.623		
	Total	141.421	214			
Consultant's Machines, equipment, and materials of the consultant.	Between Groups	16.366	2	8.183	13.087	.000
	Within groups	132.552	212	.625		
	Total	148.918	214			
Contractor's Administrative and technical causes of the contractor.	Between Groups	.448	2	.224	.422	.656
	Within groups	112.503	212	.531		
	Total	112.951	214			
Contractor's Human Resources.	Between Groups	.497	2	.248	.430	.651
	Within groups	122.518	212	.578		
	Total	123.014	214			

		Sum of squares	DF	Mean Square	F	Sig
Contractor's Machines, equipments, and materials of the contractor.	Between Groups	.009	2	.005	.012	.988
	Within groups	80.085	212	.378		
	Total	80.094	214			
Contractor's Financial Matters.	Between Groups	.084	2	.042	.061	.941
	Within groups	145.824	212	.688		
	Total	145.909	214			
Causes Related to Contract Documents.	Between Groups	8.044	2	4.022	6.111	.003
	Within groups	139.516	212	.658		
	Total	147.559	214			
Causes related to the project.	Between Groups	2.823	2	1.412	3.537	.031
	Within groups	84.624	212	.399		
	Total	87.447	214			
Other Causes(External)	Between Groups	1.111	2	.555	1.380	.254
	Within groups	85.290	212	.402		
	Total	86.401	214			
The degree and extent of the impact of these causes on the project.	Between Groups	1.685	2	.842	2.482	.086
	Within groups	71.962	212	.339		
	Total	73.647	214			
Factors reduce the delay of the project	Between Groups	.703	2	.351	1.333	.266
	Within groups	55.877	212	.264		
	Total	56.580	214			

b) Second hypotheses is company location in the West Bank.

There is no statistically significant difference at the level of significance (0.05) between the main causes of delay in the Palestinian construction projects due to the company location in the West Bank.

Table (4.10) shows that there were **statistical significant differences** (sig <0.05) between the Type of Institution and the following items:

- **Consultant's Causes related to human resources.**
- **Causes related to the project.**

For example, it means that the south, north and medium region did not agree on the amount of effect of the consultant's causes related to human resources and causes related to the project on the delay of the Palestinian construction projects. Therefore, the amount of effect on the consultant's causes related to human resources and causes related to the project on the delay of the Palestinian construction projects is different regarding to the location of company.

Also Table (4.10), shows that there were **no statistical significant differences** (sig >0.05) between the respondent work type and the following items

- **Owner's Administrative and Technical Causes.**
- **Owner's Financial Matters.**
- **Owner's Machines, equipment, and Materials of the owner.**
- **Owner's Human Resources.**
- **Consultant's Administrative and technical causes of consultants.**

- **Consultant’s Machines, equipment, and materials of the consultant.**
- **Contractor's Administrative and technical causes of the contractor.**
- **Contractor's Human Resources**
- **Contractor’s Machines ،equipment ،and materials of the contractor.**
- **Contractor's Financial Matters.**
- **Causes Related to Contract Documents.**
- **Other Causes (External)**.
- **The degree and extent of the impact of these causes on the project.**
- **Factors reduce the delay of the project**

For example, it means that the south, north and medium region agree on the amount of effect of the owner's administrative and technical causes on the delay of the Palestinian construction projects.

Table (4.10): One-Way Anova for the second hypothesis "The company location in the West".

		Sum of squares	DF	Mean Square	F	Sig
Owner's Administrative and Technical Causes	Between Groups	.201	2	.101	.274	.760
	Within groups	78.491	214	.367		
	Total	78.692	216			
Owner's Financial Matters.	Between Groups	2.767	2	1.384	1.586	.207
	Within groups	186.684	214	.872		
	Total	189.451	216			
Owner's Machines, equipment, and Materials of the owner.	Between Groups	.562	2	.281	.343	.710
	Within groups	175.095	214	.818		
	Total	175.657	216			
Owner's Human Resources.	Between Groups	1.296	2	.648	.877	.417
	Within groups	158.036	214	.738		
	Total	159.332	216			
Consultant's Administrative and technical causes of consultants.	Between Groups	1.554	2	.777	1.751	.176
	Within groups	94.955	214	.444		
	Total	96.508	216			
Consultant's Causes related to human resources.	Between Groups	5.208	2	2.604	3.972	.020
	Within groups	140.304	214	.656		
	Total	145.512	216			
Consultant's Machines, equipment, and materials of the consultant.	Between Groups	3.840	2	1.920	2.751	.066
	Within groups	149.339	214	.698		
	Total	153.179	216			
Contractor's Administrative and technical causes of the contractor.	Between Groups	2.817	2	1.409	2.702	.069
	Within groups	111.575	214	.521		
	Total	114.392	216			

		Sum of squares	DF	Mean Square	F	Sig
Contractor's Human Resources.	Between Groups	1.064	2	.532	.921	.400
	Within groups	123.548	214	.577		
	Total	124.612	216			
Contractor's Machines, equipment, and materials of the contractor.	Between Groups	.199	2	.099	.260	.771
	Within groups	81.768	214	.382		
	Total	81.966	216			
Contractor's Financial Matters.	Between Groups	2.364	2	1.182	1.746	.177
	Within groups	144.841	214	.677		
	Total	147.205	216			
Causes Related to Contract Documents.	Between Groups	1.610	2	.805	1.163	.315
	Within groups	148.168	214	.692		
	Total	149.778	216			
Causes related to the project.	Between Groups	3.316	2	1.658	4.165	.017
	Within groups	85.185	214	.398		
	Total	88.501	216			
Other Causes (External)	Between Groups	.660	2	.330	.827	.439
	Within groups	85.377	214	.399		
	Total	86.037	216			
The degree and extent of the impact of these causes on the project.	Between Groups	.451	2	.225	.650	.523
	Within groups	74.173	214	.347		
	Total	74.623	216			
Factors reduce the delay of the project	Between Groups	.065	2	.033	.124	.884
	Within groups	56.533	214	.264		
	Total	56.598	216			

Note: To learn more about the results of other hypotheses and to view the results of the differences between each of the hypotheses relating to the groups of the main causes of delay in the Palestinian construction projects and the characteristics of the respondents and the institutions see tables (22-29) in appendix E, the results of the analysis. High mean indicates that there is a high degree of agreement between the groups of the main causes of delay and the characteristics of the respondents and the institutions.

4.4 Correlation Analysis

Correlation analysis using Spearmen's rank correlation coefficient to test the degree of agreement between the three groups of respondents as to the causes of delays (Assaf, 2006).

Table (4.11) gives the results of the analysis; High correlation indicates that there is a high degree of agreement between the respondents. When (significant (α) > 0.05) which means that there is no correlation between the respondents so there is an insignificant relationship between respondents and when (significant (α) < 0.05) so there is a significant relationship between respondents.

The correlation coefficient between consultant and owner equals to -.413with (Sig.) = 0.023. The (Sig.) is less than the level of significance, α = 0.05, so there is negative significant relationship between consultant and owner. The correlation coefficient between contractor and consultant

equals to 0.042 with (Sig.) = 0.824. The (Sig.) is more than the level of significance, α = 0.05, so there is an insignificant relationship between owner and contractor. In addition, the correlation coefficient between owner and contractor equals to 0.44 with (Sig.) = 0.015. The (Sig.) is less than the level of significance, α = 0.05, so there is a significant relationship between contractor and consultant.

Table (4.11): Spearman's rank correlation coefficients of the ranking of owners, consultants and contractors for causes of delay (top 30 causes).

Correlations

			contractor	consultant	owner
Spearman's rho	Contractor	Correlation Coefficient	1.000	.042	.440
		Sig. (2-tailed)	.	.824	.015
		N	30	30	30
	Consultant	Correlation Coefficient	.042	1.000	-.413-
		Sig. (2-tailed)	.824	.	.023
		N	30	30	30
	Owner	Correlation Coefficient	.440	-.413-	1.000
		Sig. (2-tailed)	.015	.023	.
		N	30	30	30

. Correlation is significant at the 0.05 level (2-tailed).

A correlation analysis was done to study the relationships between the categories of causes and effects. Table 4.12 gives the results of the analysis. For example, it shows high correlation coefficient between contractor's financial matters and delay in delivery of the project equal 0.323 and show less correlation coefficient between causes related to the project and delay in delivery of the project equal 0.112.

Table (4.12): Correlation between the categories of causes and effects of delays.

	Own Adm	Own Finan	Own Eqp	Own Hu.R	Cons Adm	Cons Hu.R	Cons Eqp	Cont Adm	Cont Hu.R	Cont Eqp	Cont Finan	Relat to Contract	relatto proj	Other
Delay in delivery of the project	**.246**	**.214**	**.177**	**.159**	**.247**	**.166**	**.227**	**.203**	**.238**	**.255**	**.323**	**.290**	.112	**.181**
An increase in the cost.	**.236**	**.219**	**.243**	**.275**	**.336**	**.295**	**.324**	.097	.102	**.181**	**.199**	**.274**	**.302**	**.302**
Disputes / Trials/ prosecution.	**.290**	**.339**	**.382**	**.305**	**.352**	**.310**	**.389**	**.269**	**.230**	**.422**	**.323**	**.349**	**.433**	**.408**
Low productivity	**.217**	**.262**	**.314**	.117	**.331**	**.254**	**.370**	**.358**	**.296**	**.500**	**.358**	**.250**	**.410**	**.403**
Lack of revenue	.073	.104	.063	.055	.125	**.141**	**.195**	**.183**	**.240**	**.338**	**.229**	**.302**	**.271**	**.390**
The large number of delayed projects affect the community	.114	**.234**	.059	.097	**.136**	.081	**.187**	**.136**	.080	**.258**	**.203**	**.231**	**.317**	**.386**

Highlighted coefficients are significant at 0.05 significance level.

4.5 Results validation and general discussion

Through work several of interviews with number of contractors, consultants and owners (see Appendix D) for checking the questionnaire outputs reliability , enrich the research results and to see their comment and point of view on the following:

1- Reasons leading to delays in completion of construction projects.

2- Factors lead to reduce delay.

3- Identify the negative effects caused by delays in the projects.

4- The top ten causes contributed to delays.

5- Research questions and their answers resulting from the analysis. obtained the following results:

4.5.1 Interviews analysis

4.5.1.1 Reasons for the delay related to the consultant:

a. Mistakes in design

b. Lack of full authority to resolve the important things like variation order (Lack or hesitation in the decision-making).

c. Works for the benefit of owner.

4.5.1.2 Reasons for the delay related to the owner

a. Delay in payment.

b. Referral bid to the lowest price leads to delay when the contractor price is too far from the estimated cost.

c. Failure to rapid response to variation order.

d. Carrying failure and mistakes in project to contractor

4.5.1.3 Reasons for the delay related to the contractor:

a. Lack of sufficient financing for the project

b. Lack of sufficient experience in similar projects

c. Contractor low prices in the pricing of tenders resulting from strong competition between contractors.

d. Problem during implementation.

4.5.1.4 Reasons for the delay related to the contract

a. Problems in the contract documents.

4.5.1.5 Reasons for the delay related to the project

a. Problems with neighbors.

4.5.1.6 Other reasons (external reasons)

a. Occupation and political obstacles

b. Weakness in authorities financial.

c. in general weak in construction market system

d. Problems in the contract documents.

e. Weather conditions

4.5.1.7 Factor dealing to reduce delays

a. Strong cash flow by the owner to the contractor

b. Refer bids to suitable contractor not to lower price.

c. Complete clarity in the drawings and bills of quantities and contracts.

d. Fast response and strong from owner party to variation order.

e. Preserving the rights of the contractor

f. Strong and enough financing by the Contractor

g. Staff with enough experienced

h. Use suitable system to following required works.

4.5.1.8 Negative impact produce from delays

a. Stumbled executing company

b. Disable the interests of the owner

c. late delivery the project and exceeded require cost.

d. Increased expenditures for all parties to the project

e. Lack of trust between the parties, leading to the occurrence of disputes and conflicts.

4.5.1.9 Comparison between the results of the short interviews and the questionnaires responses' assessments

Both agreed on the following:

A. Reason dealing delays:

1. Delay in payment.

2. Referral bid to the lowest price delay occur when the contractor price is too far from the cost estimation.

3. Failure to rapid response to variation order.
4. Lack of sufficient financing for the project
5. Contractor low prices in the pricing of tenders resulting from strong competition between contractors.
6. Problem during implementation.
7. Mistakes in design.
8. Occupation and political obstacles
9. Problems in the contract documents.
10. Weather conditions
11. Problems with neighbors.

B. factor dealing to reduce delays:

1. Strong cash flow by the owner to the contractor
2. Refer bids to suitable contractor not to lower price.
3. Complete clarity in the drawings and bills of quantities and contracts.
4. Staff with enough experienced
5. Use suitable system to following required works

C. Negative impact produce from delays :

a. Late delivery the project and exceeded require cost.

b. Increased expenditures for all parties to the project

c. Lack of trust between the parties, leading to the occurrence of disputes and conflicts.

4.5.2 The top ten causes contributed to delays.

After display the results of the analysis showed that the top ten causes leading delays on a number of experts that have been distributing the questionnaire for them to see their comments on the results has emerged following:

1- Most experts have agreed "referral of bids to the lowest price" is one of the major causes of the delay especially when lowest price too far from estimated cost, where many of the institutions awarding the tenders to the lowest prices even if it is too far from the estimated cost, as the bid evaluation often depends only on price without depend to other criteria.

2- Most experts have agreed that the most of the top ten causes lead to the problem of delays in construction projects, which include: "incorrect and inappropriate bid pricing" experts comment on this reason many contractors are not qualified and have insufficient experience in bidding pricing, as they're not doing to read the specifications of the tender documents and their dependence only on the bill of quantities when do pricing process, it gets them a lot of problems in the implementation phase, and as many of the institutions to adopt a lower price makes many contractors of the stiff competition in the bidding causing

improperly pricing in order to win the tender , "lack of sufficient cash for project implementation (financial difficulties)" experts comment on this reason many contractors subjected to this problem, especially when it gets delayed in payments by the owner, "contractor failure to regulate the cash flow of the project, "irregular cash flow for the project on owner's side", "delay of due payments (according to progress) "many institutions are delays in payments to the contractor at the time, but there is a disparity is considered less foreign donor in the payment delay compared with the Arab donor ,"the kind of tenders in which the selection process to negotiate lower prices or other criteria", "mistakes during the process of implementation (intentionally or unintentionally) require readjustment" is one of the common reasons for the occurrence of the delay by the contractor where the rigging and change in the contract specifications, leading to re-work again then this leads to taking the extra time , and also available large number of non-qualified contractors with mismanagement to implement required work.

3- Most experts agreed that the "unavailability of required equipment when demanded or delayed availability behind schedule" is not one of the main reasons for the delay because most of required equipment in construction work are available.

4- Most experts agreed that "the introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)" is not one of the

main reasons for the delay because any change of adding any new work or modify to the designs requires from the owner add appropriate time for the contractor to implement it.

4.5.3 Research questions and their answers resulting from the analysis.

Based on the research questions mentioned in chapter one results of analysis showed in the following:

The contractors' financial matters (Mean =3.96) high effect according Likert scale, the owner's financial matters (Mean =3.74) high effect, The contractors' human resources (Mean =3.72) high effect, The owner's human resources(Mean =3.61) high effect, The contractors' administrative and technical causes (Mean =3.59) high effect, The owners' administrative and technical causes (Mean =3.55) high effect, The consultants' administrative and technical causes (Mean =3.51) high effect, Causes Related to Contract Documents (Mean =3.51) high effect, Machines, equipment, and materials of the contractor (Mean =3.50) high effect, Machines, equipment, and materials of the owner (Mean =3.48) high effect, The consultants' human resources (Mean =3.46) high effect , Other Causes (External) (Mean =3.44) high effect, Causes related to the project (Mean =3.34) Medium effect, Machines, equipment, and materials of the consultant (Mean =3.32) Medium effect.

That all groups have varying effects on the delay which have some high effect, and other medium effect can possible to negligence.

After display the results by a number of experts mostly agreed that should be all groups have an impact on the delay by various percentages these are logical results, and emergence the contractors' financial matters and the owners' financial matters are very logical occurrence of delay because most of the problems that occur from lack of adequate flow of money needed for implementation, either by the contractor or the owner.

Chapter Five

Project Management Framework

Chapter Five
Project Management Framework

Delays can be minimized only when their causes are identified. Knowing the cause of any particular delay in a construction project would help avoiding it. Thus, in this chapter, suggested solutions and Procedures to minimize or avoid causes leading to delay. Then, roster of solutions and a framework will be implemented to identify and summarize the conducted proposals.

5.1 The top five causes leading to delay in construction projects

A) Key Causes from the Client perspective

1- Referral of bids to the lowest price

2- Irregular cash flow for the project on owner's side.

3- Delay of due payments (according to progress).

4- The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)

5- Lack of attention to the training and development of human elements in charge of the project.

B) Key Causes from the contractor

1- Incorrect and inappropriate bid pricing.

2- Lack of sufficient Cash for project implementation (financial difficulties)

3- Contractor failure to regulate the cash flow of the project

4- Unavailability of required equipment when demanded or delayed availability behind schedule

5- Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.

C) Key Causes from the consultant

1- Design changes during construction by the Owner.

2- Missing or lack of incentives for workers institution.

3- Changes and redesign many times during design phase.

4- Delays in the approval of adjustments during the execution phase

5- Weakness in the management of the project, and the estimation of the accurate needed period for completion.

D) Four key Causes from the contract

1- Deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness.

2- Insufficient procedures in the contracts needed to be taken to settle disputes if they occur.

3- Problems in the context of the contract or its language.

4- Duties, responsibilities, and rights of the parties undefined accurately in the contract.

E) Key Causes from the project

1- The kind of tenders in which the selection process to negotiate lower prices or other criteria.

2- The specified period for the implementation of the project is very few.

3- Conflicts and differences among the project documents

4- Problems with neighbors.

5- High level of quality requirements.

F) Key external Causes

1- Political instability, conflict, and war (the presence of the occupation).

2- Economic stability [unforeseen circumstances such as economic crises (financial crises)]

3- Weather condition

4- Inflation / price fluctuations

5- Unexpected geological situation

5.2 Top ten causes lead to construction projects exceeding time limit

Table 5.1 shows the top ten causes contributed to delays in the construction projects in W.B. from the project participant perspective.

Table (5.1): illustrate top ten causes contributed in delays

NO.	Delay causes	Mean	Responsibility for delay
1.	Referral of bids to the lowest price.	4.25	Owner
2.	Incorrect and inappropriate bid pricing.	4.03	Contractor
3.	Lack of sufficient Cash for project implementation (financial difficulties)	4.02	Contractor
4.	Contractor failure to regulate the cash flow of the project	4.01	Contractor
5.	Irregular cash flow for the project on owner's side.	3.97	Owner
6.	Delay of due payments (according to progress).	3.96	Owner
7.	Unavailability of required equipment when demanded or delayed availability behind schedule.	3.95	Contractor
8.	The kind of tenders in which the selection process to negotiate lower prices or other criteria.	3.90	Project
9.	The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)	3.87	Owner
10.	Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.	3.86	Contractor

From the results shown in Table (5.1), it is found in the first position and the most important reason for delay is, "Referral of bids to the lowest price". It is one of the factors linked to administrative and technical matters related to owner party. The causes of delay from the owner side could be

more important because decisions made by the owner significantly affect others. This cause shows a significant effect on exceed time because most of the owners are awarding bids on lower prices. This method in bids assessment process made many contractors prices the bid with illogical prices, and sometimes much less than the estimated cost. The reason behind this is the high number of construction companies which far outweigh the available business and projects, for one bid offer large number of contractors; the competition is intense and the least expensive is determined the winner of the tender. Resulting in many problems during the implementation phase, the most important one is that delay occurs in the timetable.

This reason "Referral bid to the lowest price" leads to delay when the contractor price is too far from the estimated cost.

In the second position came the "Incorrect and inappropriate bid pricing" lead to delay, linked to financial matter related to contractor. They are linked to the point one.

Appears in the third position the "Lack of sufficient Cash for project implementation (financial difficulties)" lead to delay. This is linked to financial matter related to contractor party, sometimes contractors submit to projects that are not commensurate with their financial capabilities, causing problems in the implementation phase such as delays in the supply of required materials and equipment, internal problems with employees and subcontractors, and the most important is delays in the specified time.

Comes in the fourth position the "Contractor failure to regulate the cash flow of the project" leading to delay, linked to financial matter related to contractor party. They are linked to the second and third points.

In the fifth, position the "Irregular cash flow for the project on owner's side." Lead to delay, linked to financial matter related to owner party. Delay in payments from the owner significantly disturbs the contractor’s cash flow. This in turn affects the payments to sub-contractors, who are obligated to purchase material from suppliers. Project execution will be consequently affected. This will be reflected in the work progress and it can cause major delay to the project.

In the sixth position the " Delay of due payments (according to progress)." lead to delay, linked to financial matter related to owner party. They are linked to the fifth point.

In the seventh position the "Unavailability of required equipment when demanded or delayed availability behind schedule." lead to delay, linked to machine, equipment and material related to contractor party. Due to two reasons:

1- Lack of required equipment because of the need to be imported from outside and thus cause a delay in the schedule.

2- Lack of money with the Contractor to provide the required equipment leading to the occurrence of delay.

Appears in the eight position, "The kind of tenders in which the selection process to negotiate lower prices or other criteria..." lead to delay, related to project causes. They are linked to the first and second points.

Appears in the ninth position the following factor " The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)." lead to delay, linked to administrative and technical matters related to owner party. In this case the owner changes in design documents in the implementation phase and this leads to the emergence of many problems, mainly delays in the schedule, the owner must determine what it takes to work in the design phase in order to avoid conflicts and problems between the various parties. Alternatively, owners working to add new work called (variation order) need for more time to implement.

Appears in the tenth position the following factor "Mistakes during the process of implementation (intentionally or unintentionally) require readjustment." lead to delay, linked to administrative and technical matters related to contractor party. With the high demand of workforce in the local construction market, the majority of the labors are without adequate training or limited experience. This often leads to poor workmanship. Some work has to be re-done or repaired before the Consultant or quality control engineers could accept them.

5.3 The degree and extent of the impact of these causes on the project.

Table 5.2 illustrate the degree and extent of the impact of causes on the project, shows that the most impact expected to occur is "Delay in

delivery of the project". in the second position," An increase in the cost", in the third position," The large number of delayed projects affect the community", in the fourth position ," Low productivity", in the fifth position ," Lack of revenue", in the sixth position," Disputes / Trials/ prosecution".

Table (5.2): Show the degree and extent of the impact of causes on the project.

No	Effect	Score
1.	Delay in delivery of the project	4.21
2.	An increase in the cost.	4.14
3.	The large number of delayed projects affect the community	4.13
4.	Low productivity	3.84
5.	Lack of revenue	3.78
6.	Disputes / Trials/ prosecution.	3.69

5.4 Proposed Solution for the top causes

A) Referral of bids to the lowest price and the kind of tenders in which the selection process to negotiate lower prices or other criteria.

Finding an appropriate mechanism for assessing and awarding of tenders where the referral lower price, especially if the price of the contractor is very far from the estimated cost (± 10% from estimated cost) and is not appropriate for the volume of work, it causes many problems the most one is occur delay in completing the project.

From experience of researcher in several sectors, and interviewed several experts was discuss appropriate solutions have been proposed ways to refer the bids, the best one is to refer the bids to the nearest price to estimated cost, and are available in a meeting opening bids the following:

1- To be announced the value of estimated cost at the beginning in meeting opening bids before opening the submitted bids to knowing the price.

2- Meeting opening bids are public will be opened in the presence of contractors applicants to compete for the tender, representatives of the owner and consultant.

3- Clarify the mechanism of the evaluation will be the owner to evaluate the tender for contractors in terms of defining certain ratios and clarifying ratio that will occupy the final price of the tender evaluation process before you start to open bids.

4- Check for resources and capabilities, before awarding the contract to the lowest bidder.

5- Stay away from bias in awarding tenders due to the presence of common personal interests and rely on clean mechanism in the evaluation and awarding bidding process.

PCU proposed method, which is that lower prices are excluded from all the bids and awarded the tender to the price at which followed.

B) Incorrect and inappropriate bid pricing

Must have enough experience for the contractor in the development of prices of items so that no problems in the future.

C) Lack of sufficient Cash for project implementation (financial difficulties) and Contractor failure to regulate the cash flow of the project.

Need to provide adequate source of finance during construction and Effective planning of project execution. Give an advanced payment to the contractor at the beginning of the project by the owner helps to end project on time.

D) Irregular cash flow for the project on owner's side and delay of due payments (according to progress).

Owner should make progress payments to contractors on time, because it impairs the contractors' ability to finance the work.

E) Unavailability of required equipment when demanded or delayed availability behind schedule.

Try to obtain new equipment for construction. In addition, prepare it before start in implementation phase.

F) The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)

Minimize change orders during construction to avoid delays, by reviewing and approving design documents: any dereliction in checking, reviewing and approving the design submittals prior to construction phase,

could delay the progress of the work. And owner's need to management of contracts documents to decrease the amount of design changes and additional works by employing more experienced professional persons to reviewing and approving project documents.

G) Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.

Must provide enough number of labors should be assigned and be motivated to improve productivity and recruit competent project manager. Provide sub- contractors with appropriate experience in similar projects. Moreover, Work according to the required specifications and drawings.

5.5 General factors help to avoid delays.

Table 5.3 illustrate the general factors shows that "Awarded the contract to the contractor with competence and not to the least price tender" is the most factor assist to reduce or avoid delays in the Palestinian construction projects.

Comes in second ranked "Constant follow-up with the main contractor and subcontractors", and shows that "Identification of the specialized project Manager to manage the project" in a third rank to reduce or avoid delays and show that 'The use of monitoring and follow-up system" is less factor helps to avoid delays.

Table (5.3): General Factors reduce the delay of the project

NO	Factors	Rank
1.	Awarded the contract to the contractor with competence and not to the least price tender	1
2.	Constant follow-up with the main contractor and subcontractors.	2
3.	Identification of the specialized project Manager to manage the project.	3
4.	Motivate staff to produce more.	4
5.	Speed in the decision-making process.	5
6.	The accuracy of the project cost and time	6
7.	Staff training to get skilled workers.	7
8.	The use of appropriate construction systems	8
9.	Examine the site before implementation of the works.	9
10.	The continuous use of monitoring systems for the project.	10
11.	Benefit from the experiences of others and the experience of other institutions	11
12.	Make sure of the existence of materials and their availability.	12
13.	The use of monitoring and follow-up system	13

5.6 Framework presentation

This section illustrates the framework that displays and summarizes proposed solutions and procedures for solving and avoiding delay causes. Figure 5.1 illustrates the steps and procedures recommended for action to resolve the problem of delay and avoid or minimize them, an aide to all parties to understand the current situation and how to solve it or prevent. Projects pass through different stages of their life cycle can be summarized and categorized in the following four main phases, each phase divided into three main steps:

1- Planning phase; it involves creating of a set of plans help to guide team through the execution and closure phases of the project this phase divided to:

A. Develop plan; create effective plan that establishes joint goals and objectives as well as steps for achieving them. Must develop an action plan for each construction project, updated according to the changes, must adhere in plan to meet objectives. Time spent on developing an effective plan will pay dividends later because it will provide a guiding tool for the team efforts, developing a plan involve formulating the plan. Creating an effective planning environment, and availability administrative support for the plan. The plans created during this phase will help you to manage time, cost, quality, change, risk and issues. They will also help you manage staff and external suppliers, to ensure that deliver the project on time and within budget.

B. Estimation required time and cost; it includes an estimate initial cost of the project and study the possibility of providing the necessary funding for its implementation. In addition, working on a timetable for the estimate of the period required for implementation.

C. Manage resources; it helps to identify all of the resources required to complete project successfully, will then create a resource schedule, which enables to plan the consumption of each type of resource, and will enough resources available to complete the project.

2- Design phase:

Design of a project where an architect/engineer prepares schematic diagrams giving a general view of the components and the scale of the

project after detailed discussions with the client (owner). At this stage is the preparation of tender documents by the consultancy office, this phase divided to:

A. Put alternatives designs:

Preparation preliminary designs for the project are selected appropriate design among several alternatives. show the importance of the presence of several alternatives when problems arise or obstacles in the implementation of one of the designs are immediately go to an alternative design which helps to save time and implement the required designs in a timely manner without the need for extra time for change, modification or re-design. However, this process need extra cost.

Or application term "value of engineering", value engineering mean choose the most appropriate design among more than designs in design phase, and can application value engineering by contractor party in implementation phase by provide new idea in execution method without change in architecture plans This term apply when need to save money to obtain price near to the estimated cost.

B. Use of appropriate design systems:

Adoption of a suitable system design fits the size, type and nature of the project in order to accomplish the desired designs required in appropriate ways, must adopt a suitable system for the design to avoid the mistakes and modifications that caused in wasting a lot of time in the

future. Must use software design suitable and customary with appropriate code in the design process within standards and requirements of the Engineers Associations.

C. Use of monitoring and follow-up system:

There must be a system of monitoring and control through the appointment of specialized person or a group of specialists mean (quality control unit) to do the follow-up audit and evaluation of all what has been accomplished schemes and documents related to a particular project. This helps to avoid mistakes in designs that cause problems in the implementation phase that has occurred, such as emergence of variation order or extra time for the project time or conflicts and disagreements among the parties in the project.

3- Contracting phase:

Agreement of at least two parties with purpose of creating legal obligation between the parties and capable of being enforced by the court of law. Contracts used in construction to describe scope of work, establish period, establish cost and payment provision, set forth obligations and relationship, minimize disputes, and improve economic return of investment, this phase divided to:

A. Work by specialist:

Prepare contracts and contract documents by specializing in contractual matters, the laws and regulations of the region, ethics etc.

B. Preparation contract documents:

Prepare contract documents includes legally enforceable requirements that become part of the contract , and include all construction documents except bidding forms , the content of the contract is identify the parties, promises and responsibilities , scope of work ,price and payment terms commercial terms and conditions Project execution plan.

C. Available ethics and regulars:

The contract must be written within certain laws and ethics, regulars and not be exceeded, must be fair to all parties and is not biased to a particular party.

4- Implementation phase

Details the process for the execution and delivery of the construction project after fulfillment all requirement such as implement project within specific time and cost, specific quality to meet require needs and goals of a particular project Divided to:

A. Use of appropriate construction systems.

Must use a particular system in the building varies from one project to another depends on the size, type, and complexity of the project through the organization divided implementation process into start-up stages to the termination stage in project. This require work of an action plan include the identification needed time and resources for each stage of the work to

organize the implementation process and avoid the shortage of resources, necessary to determine the mechanism of action, identify and appoint sub-contractors etc.

B. Good manage by use control and follow-up system:

There must be a system of monitoring, through the appointment of specialized persons to do the follow-up, supervision, control, audit and evaluation of all completion works related to a particular project. This helps to avoid mistakes in implementation, such as mistakes lead to need extra time to re-work resulted from deviation from the required specifications, weakness in project manage and communication between parties etc.

D. Use suitable documentation system.

Use specific documentation system for each project very important things for the success of the project, documenting all papers linked to the project incoming and issued between all project parties in order to preserve the rights of all parties, help each party to take responsibility conferred upon him, and what should be done do to solve problems. These things are achieved through adoption of appropriate documentation system.

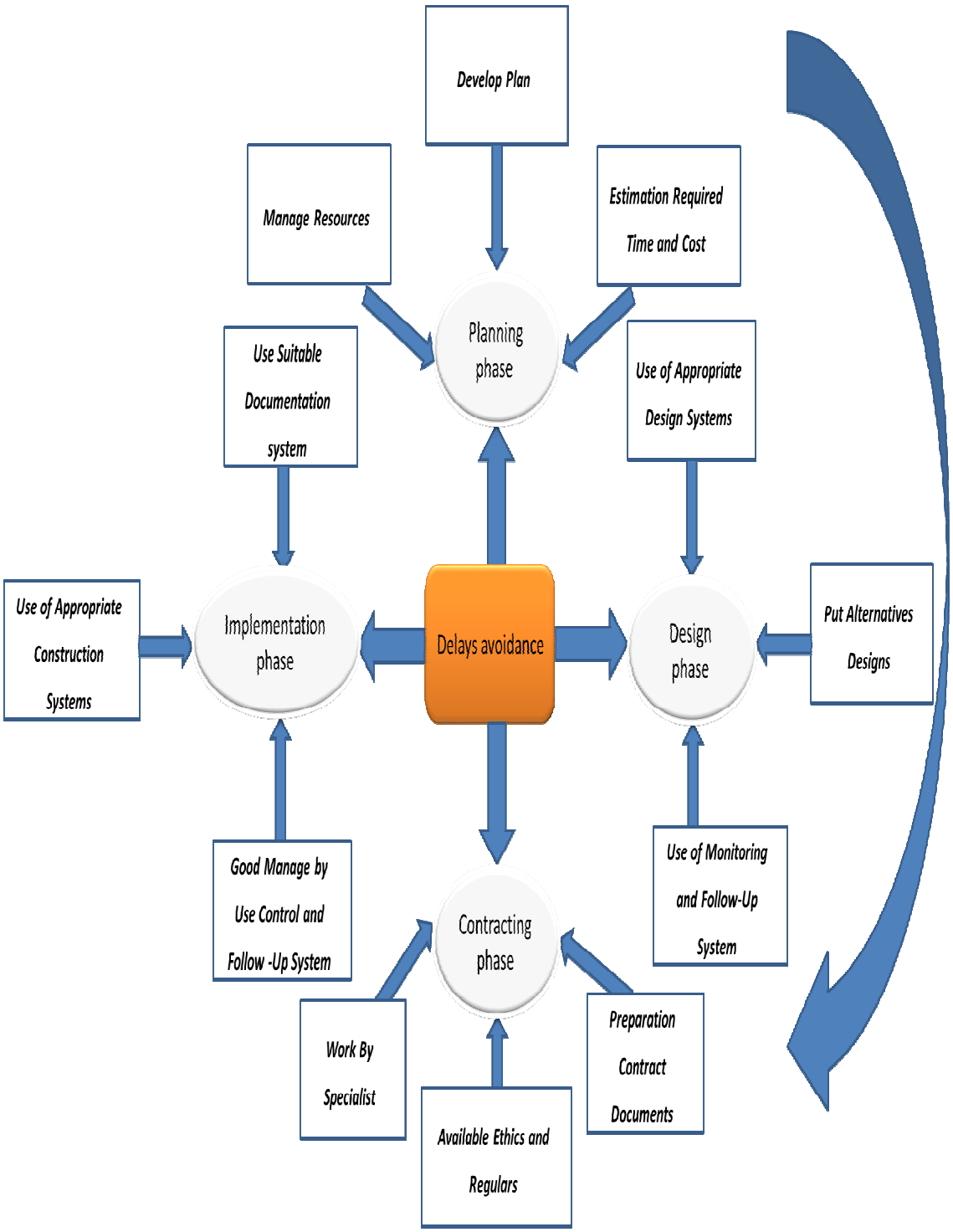

Figure (5.1): The Theoretical Framework

5.6.1 Validation and general discussion

After display, adopted framework in this research on a number of experts to know their opinion and comments were as follows:

1- The framework is applicable, effective tool and successful because it includes all parties and all stages of work on the project (the project life cycle).

2- When it is applied and adopted by parties, each party will perform its tasks, duties and responsibilities in the best way.

3- When the institutions, companies and parties, adopt it, many of the problems will be avoided and resolved, notably the problem of delays in construction projects.

Chapter Six

Conclusion and Recommendations

Chapter Six
Conclusion and Recommendations

6.1 Introduction

From the previous chapters, we have concluded many causes for delay in construction projects, few years ago; most construction projects in the West Bank were exposed to delay, so the continuation of this phenomenon affects the progress of the construction industry, as it may expose some relevant institutions to collapse.

Thus, this chapter will present a review to the summary and conclusions of this research and recommendations, recommendations will be presented to help in enhancing the Palestinian construction sector performance.

6.2 Summary and conclusions

The construction sector is one of the most important economic sectors in Palestine; this research discussed the importance of studying the construction sector through the identification of gaps between theory and practice associated with delays in the completion of construction projects. The main purpose of this study is to identify the most important factors that delay the completion of projects, by taking a representative sample from each of the engineering offices, the owners, and the contractors by distribution questionnaire contain 110 causes of delay to a representative sample to know delays causes in Palestinian construction projects from the opinion of project participant, and then analyze the results. Whenever a

delay occur, its implications on the future performance of the project can be immediately determined and corrective action can be taken to minimize any negative impact on project performance. This research will help to discover the causes of delay in construction projects and then reduce their effects.

The top ten causes contributed to delays in Palestinian construction projects from the viewpoint of project participant are: Referral of bids to the lowest price, incorrect and inappropriate bid pricing, lack of sufficient Cash for project implementation (financial difficulties), Contractor failure to regulate the cash flow of the project, Irregular cash flow for the project on owner's side, delay of due payments (according to progress), unavailability of required equipment when demanded or delayed availability behind schedule, the kind of tenders in which the selection process to negotiate lower prices or other criteria, the introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design), and Mistakes during the process of implementation (intentionally or unintentionally) which require readjustment. The most impacts expected to occur is Delay in delivery of the project, an increase in the cost, the large number of delayed projects affect the community, Low productivity, lack of revenue, and Disputes / Trials/ prosecution.

Proposed solutions and procedures for solving and avoiding these causes. A framework to illustrate the steps and procedures recommended

for action to resolve the problem of delay and avoid or minimize them, an aide to all parties to understand the current situation and how to solve or prevent it. Projects pass through different stages during their life cycle can be summarized and categorized in the following four main phases, each phase involve three main steps:

1- Planning phase divided to develop plan, Estimation required time and cost, and manage resources.

2- Design phase divided to put alternatives designs, Use of appropriate design systems, and use of monitoring and follow-up system.

3- Contracting phase divided to work by specialist, Preparation contract documents, and available ethics and regulars.

4- Implement phase divided to use of appropriate construction systems, good manage by use control and follow-up system, and use suitable documentation system.

6.3 General recommendation to the different parties

The following points are recommended to be taken into account by all parties in order to minimize and control delays in construction projects:

6.3.1 Recommendations to the owner

Owners should be given special attention due to the following factors:

A. Develop an action plan by the owner for the success of the project since the emergence of the idea of the project the plan must include the following:

1- Choosing a team to do and follow-up project with suitable competence and experience in similar projects. Mission begins since the emergence and identification of the idea phase until implementation phase, are choose a project manager with appropriate qualifications for the project.

2- Provide a mechanism for the parties to choose the project contractor and consultant.

3- Provide a mechanism to resolve disputes and clarified in the contract.

4- Activating the fines penalty if necessary when be the occurrence of the delay by the Contractor party without excuse.

5- Employee motivation in various position at the end of year or at the end of projects is given to those who carried out the project successfully.

6- The provision of suitable internal conditions for workers to help them work powerfully.

7- Minimizing follow the centralized decision-making and procedures with respect to projects because they hamper the proceedings and cause delays.

B. Ensure full value of the project when hiring in order to organize the flow of liquidity needed to workflow and ensure the provision of payments to the contractor at the time.

C. The need to complete the preparation and adoption of the design and tender documents and ensure clarity before the announcement of his hiring or to implement.

D. Frequent adjustments during implementation phase caused of the delay, is add a clause urging designed to give consultant the priority in overseeing the implementation, where the designer usually be more understanding of the project and have the ability to convince the owner of reducing modifications and thus less time needed to hold variation order.

E. Emphasis on not allowing a contractor who does not fit their financial and technical capacity submission of the tender, and make sure when the tender evaluation of the experience of the contractor and the financial and technical ability to implement the project.

6.3.2 Recommendations to the contractor

The contractor has the major responsibility for delays in Construction-Related Delays. Contractors should consider the following factors:

A. Abdelnaser et al. (2005) recommended proper planning factor must be considered in order to avoid delays during construction stage.

Developing an action plan by the owner for the success of the project since phase the emergence of the idea of the project plan include the following:

1. Organize payment and structured finance for the stages of work on the project.

2. Prepare (team work) with qualifications to work in the project and appoint a project manager for the development of an action plan through which to regulate , control, supervision and adjust things for the project, to avoid problems in the implementation or problems between workers or employees, and complete project on time.

3. Motivate employees and provide them awards in the case of the success of the project.

4. Provide a suitable environment for the work

5. Provide suitable suppliers and sub – contractors.

6. Develop a plan for the provision of materials, samples and machinery required on time.

B. Shortage and low productivity of labor: must provide enough number of labors should be assigned and be motivated to improve productivity.

C. Financial and cash flow problems: contractor should manage his financial resources and plan cash flow by utilizing progress payment.

D. Planning and scheduling: they are continuing processes during construction and match with the resources and time to develop the work to avoid cost overrun and disputes.

E. Site management and supervision: administrative and technical staff should be assigned as soon as project is awarded to arrange to achieve completion within specified time with the required quality, and estimated cost.

F. Should be priced in a way that won the tender to the contractor at least 20%, according to the Palestinian Contractors union.

G. Must have good financial size to finance the project.

6.3.3 Recommendations to the consultant

The consultants play a very important role in Design-Related Delays. Consultants should look to the following points:

A. Reviewing and approving design documents: any delay caused by the consultant engineer in checking, reviewing and approving the design submittals prior to construction phase, could delay the progress of the work.

B. Inflexibility: Consultants should be flexible in evaluating contractor works. Compromising between the cost and high quality should be considered.

C. Producing design documents on time: should set a schedule to complete design documents on time, otherwise result in a delay of work completion.

D. Avoid mistakes and discrepancies in design documents: They are common reasons for redoing designs and drawings and may take a long time to make necessary corrections.

6.3.4 Recommendations to Engineering Association

A. Provides a good system to audit the drawings to avoid and minimize mistakes in the design and avoid the contradiction in the drawings.

B. Work training help to raise the efficiency of designers.

C. Work training in preparation tender documents, which include specifications, conditions, executive drawings and training to calculate of the quantities to prepare suitable bill of quantities.

D. Provide a good system for the classification of engineering offices include certain laws and procedures.

6.3.5 Recommendations to Palestinian Contractor Union

A. Provide a good system for the classification of construction companies include certain laws and procedures.

B. Laws to protect Contractors.

C. Work training to define the rights, responsibilities, and duties of Contractors.

D. Work training to define contractors how pricing bidding and set minimum percentage of profit circulated to all Contractors.

E. Take strict action on anyone who does not follow the laws of the Union.

6.3.6 Recommendations for future studies

1- Another study about a specific type of construction projects, such as utility projects, road project, water and sanitation projects, etc.

2- Another study about evaluate the involvement and effect of a specific party or resource of construction project to the delay in construction projects.

3- Another study about investigate the effect of financing and cash flow problems on delays in the construction projects.

References

Abd El-Razek, M.,Bassioni,H., and Mobarak,A.,(2008).***Causes of Delay in Building Construction Projects in Egypt***. **Journal of Construction Engineering and Management***, 134*(11), 831-841.

Abdul Rahman, H., (1993).**The management and Cost of quality for civil engineering projects**. PhD Thesis, University of Manchester Institute of Science & Technology, Manchester, UK.

Abudul-Rahman, H., Berawi A., Mohamed O., Othman M. and Yahya I., (2006). ***Delay Mitigation in the Malaysian construction industry.*** **Journal of Construction Engineering and Management***, 132*(2), 126 -138.

Abdelnaser, O., Peter, N., Mahmood, A., Hussin, A., and Aziz, H., (2005). **Causes of construction delays: case studies in Langkawi Island, Malaysia, International Conference on built environmental in Kuala Lumpur, Malaysia**, organized by University of Malaya.

Aibinu, A. & Jagboro, G., (2002). ***The effects of construction delays on project in Nigeria Construction industry; Nigeria***. **International Journal of Project Management,** *20*(8), 593-599.

Alaghbari, M.W, Razali A. Khadir, Salim Azizah and Ernawati, (2007). ***The Significant factors causing delay of building construction projects in Malaysia***. **Journal of Engineering, Construction and Architectural Management***, 14*(2), 192-206.

Al Kass, S. and Mazeroll, M., (1996). ***Construction Delay Analysis Techniques***. **Journal of Construction Management and Economics,** *14*(5), 375-382.

Al-Momani, A., (2000). ***Construction Delay: a Quantitative Analysis***. **International Journal of Project Management***, 18*(1), 51-59.

Al-zubaydi, S., (2000). **Developing a knowlagement based expert system for Building management system for decision making of delays in construction Projects**. Thesis submitted to Almustanserriah University Iraq.

Al-Najjar, J., Enshassi,A., Kumaraswamy,M.,(2009). ***Delays and cost overruns in the construction projects in the Gaza Strip*. Journal of Financial Management of Property and Construction,** *14*(2), 126 – 151.

Alwi, S. and Hampson, k., (2002). Identifying the importance causes of delays in Building construction projects. In Proceedings the 9th East Asia – Pracific Conference on Structural Engineering and Construction, Bali, Indonesia, accessed through: https:/ eprints. Qut.edu.au/secure/00004156/01/Bali- Conference-2003.doc

Ahmed, S. M. Azhar, S., Kappagantula, P., and Gollapudi, D., (2003). Delays in: **A brief study of the Florida construction industry. Proceeding of the 39th Annual Conference of the Associated Schools of Construction. Clemson, South Carolina: Clemson University**. Final report, Miami, F1 33174, USA.

Assaf, S., AL-Khalil, M., and Al Hazmi, M., (1995). ***Causes of delay in large building construction projects in Saudi Arabia***. **Journal of Management in Engineering**, *11*(2), 45-62.

Assaf, S., and Al-Hejji, S., (2006). ***Causes of delay in large construction projects.*** **International Journal of Project Management**, *24(4), 349–357.*

Behboudi, S.F., (2009). **A Model to predict the impact of Excusable and Non-Excusable Delays on selected residential construction projects:** Master Thesis, Carleton University, Canada.

Braun, V., Victoria,C., (2006). **Using thematic analysis in psychology**. *Qualitative Research in Psychology, 3*(2), 83.

Chan, D., and Kumarswamy, M., (1998). **Contributors to Construction Delays.** *Construction Management and Economics, 16*(1), 17 – 29.

Chan, D., and Kumaraswamy, M., (1996). ***An evaluation of construction Time performance in the building industry***. **Journal of Building and Environmental,** *31*(6), 569-578.

Chesly, Ayers, P.E, (1983). **Specification for Architecture Engineering and construction**, 2nd edition Mc Graw-Hill book Company, New York.

Daly, K. and Gliksman, (1997). **The public health researcher: A methodological approach**. Melbourne, Australia: Oxford University Press. P.611–618.

Duran, O., (2006). **Current risk management applications in Turkish construction industry**, an unpublished Master thesis, Gaziantep University, Gaziantep.

El-Razek, M.E.A., H.A. Bassioni and A.M. Mobarak, (2008). ***Causes of delay in building construction projects in Egypt.*** **Journal of Construction Engineering and Management**. *134*(11), 831-841.

Elinwa, A. and Joshua, M., (2001). ***Time-Overrun Factors in Nigerian Construction Industry***. **Journal of Construction Engineering and Management.** *127*(5), 419-425.

Engineering Association, 2013. About consultant engineering office list. Palestine: west bank.

Enshassi, A., J. Al-Najjar and M. Kumaraswamy, (2009). ***Delays and cost overruns in the construction projects in the Gaza Strip***. **Journal of Financial Management of Property and Construction.** *14(*2), 126-151.

Enshassi A., Lisk R., Sawalhi I. and Radwan I., (2003). ***Contributors to construction Delays in Palestine***. **Journal of American institute of constructors,** *27*(2), 45-53.

Falqi,I., (2004). **Delays in Project Completion: A comparative study of construction delay factors in Saudi Arabia and the United Kingdom.** Master dissertation submitted to the Heriot-Watt University School of the Built Environment.

Faridi, A.S. and S.M. EL-Sayegh, (2006). **Significant factors causing delay in the UAE construction industry**. *Construction Management and Economics, 24*, 1167-1176.

Fereday, J. Elimear, M. (March 2006). ***Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development.*** **International Journal of Qualitative Methods.** *5*(1), 4.

FIDIC. Conditions of Contract for CONSTRUCTION. First Edition. **The Federation International of Consulting Engineers;** 1999.

Frimpongs, Y., Oluwoye, J., and Crawford, L., (2003). ***Causes of delay and cost overruns in construction of groundwater projects in a developing Countries; Ghana. As a case study.*** **International Journal of Project Management,** *21*(5), 321-326.

Fugar, F. D. & Agyakwah-Baah, A. B., (2010). ***Delays in building construction projects in Ghana***. **Australasian Journal of Construction Economics and Building***, 10* (1/2), 103 – 116.

Gkritza, K. and S. Labi, (2008). ***Estimating cost discrepancies in highway contracts: Multistep econometric approach***. **Journal of Construction Engineering and Management.** *134*(12), 953-962.

Guest, G., (2012). **Applied thematic analysis**. Thousand Oaks, California: Sage. p. 11.

Health and safety authority, (2012) available in: http://www.hsa.ie/eng/Publications_and_Forms/Publications/Construction/Definition_of_Construction_Final.pdf.

Hindawi, G., Awad, H., (2007). **Causes of delay in Iraq construction projects.** Master thesis.

Hussein, H., (2002). ***Causes of Construction Delays***. **International Journal of Project Management,** *20*, 67-73.

Ibironke,O. T., Oladinrin,T. O., Adeniyi, o., and Eboreime, I. V., (2013). ***Analyses of non-excusable delay factors influencing contractors. Performance in Lagos State, Nigeria,*** **Journal of Construction in Developing Countries,** *18*(1), 53-72

Ishweiki, I., (2013). **Construction Contracting Management Obstacles in Palestine,** Master Thesis. Al Najah University –Palestine.

Kaming Peter, Olomolaiye Paul, Holt gary, and Harris Frank C., (1997). ***Factors Influencing construction time and cost overruns on high-rise projects in Indonesia***, **Journal of Construction Management and Economic,** *15*(1), 83-94.

Kaliba, C., M. Muya and K. Mumba, (2009)***. Cost escalation and schedule delays in road construction projects in Zambia*.** **International Journal of Project Management,** *27, 522-531.*

Karkh, and Majeed,A., (2000). **Evaluation of the efficiency of the economic units**; Baghdad, Iraq.

Kikwasi, G. J. (2012). ***Causes and Effects of Delays and Disruptions in Construction Projects in Tanzania***. **Australasian Journal of Construction Economics and Building:** Conference Series*, 1* (2), 52-59.

Kloppenborg T. J., (1987). **Trade of Objectives over Project Life Cycles** .Ph.D. Dissertation, University of Clincinnati.

Koushki, A., Al-Rashid, K. and Kartam, N., (2005). **Delays and cost increase in the construction of private Residential projects in Kuwait**. *Construction Management and Economics, 23*, 285-294.

Likert, Rensis , (1932). **A Technique for the Measurement of Attitudes**. Archives of Psychology, *140*, 1–55.

Le-Hoai, L., Y.D. Lee and J.Y. Lee, (2008). ***Delay and cost overruns in Vietnam large construction Projects: A Comparison with Other Selected Countries.*** **Journal of Civil Engineering***, 12*(6), 367-377.

Lim, C.S. and M.Z. Mohamed, (2000). ***An exploratory study into recurring construction problems.*** **International Journal of Project Management,** *18*(4), 267-73.

Lo, T.Y., I.W.H. Fung and K.F.C. Tung, (2006). ***Construction delays in Hong Kong civil engineering projects*****. Journal of construction Engineering and management,** *(6*), 636-649.

Long, N.D., S. Ogunlana, T. Quang and K.C. Lam, (2004). ***Large construction projects in developing countries: a case study from***

Vietnam. **International Journal of Project Management,** *22* (7), 553-61.

Luu, V., Kim, S., Van Tuan, N., & Ogunlana, S., (2009). **Quantifying schedule risk in construction projects using Bayesian belief networks. International Journal of Project Management,** *27*, 39-50.

Majid, I. A., (2006). **Causes and effect of delays in Aceh construction industry; Malaysia.** Master thesis, University Technology Malaysia.

Meeampol, S. and S.O. Ogunlana, (2006). ***Factors affecting cost and time performance on highway Construction projects: evidence from Thailand***. **Journal of Financial Management of Property and Construction***,11(*1), 3-20.

Mezher,T. and Tawil,W., (1996). **Causes of delays in the construction industry in Lebanon.** ***Engineering, Construction and Architectural Management,*** *5*(3), 252 – 260.

Mohammed, k., Isah, A., (2012). ***Causes of delay in Nigeria construction industry***. **Interdisciplinary journal of contemporary research in business,** *4*(2), 785-794.

Motaleb, O. & Kishk, M., (2010)**. An investigation into causes and effects of construction delays in UAE: Robert Gordon University**.

Mulenga, M., Clinton, A., and Wellington, T., (2013). **A Theoretical Assessment of the Causes and Effects of Construction Project**

Delay. International Conference on Civil and Environmental Engineering (CEE'2013) Nov. 27-28, 2013 Johannesburg (South Africa), p.174 – 177.

Najmi, H., (2011). **Construction Management. Master Thesis**. AL Najah University, Palestine.

Naoum, S. G., (1998). **Dissertation writing for construction students Oxford Butterworth**.

Oberlender, G., (2000). **Project management for engineering and construction,** (2nd ed) McGraw-Hill Companies, Inc, New York, p.6-7.

Odeh, A., Battaineh, H., (2002). ***Causes of construction delay: (traditional contracts).*** **International Journal of Project Management***, 20*(1), 67-73.

Ogunlana, S., promkuntong, K., and Jearkjirm, V., (1996). ***Construction delays in a fast-growing economy: comparing Thailand with other economics*****. International Journal of Project Management,** *14(*1), 37-45.

Osaily, N., (2010).**The key Barriers to Implementing Sustainable Construction in West Bank – Palestine**.UK: University of Wales. p. 63.

Palestinian Central bureau of Static (PCBS), 2010. Labour Force Survey*;* available: http://www.pcbs.gov.ps.2010.

Palestinian Central Bureau of Statistics (PCBS), 2010. Economic activities contribution percentage of the GDP for the years (1994 – 2008) Palestine: Ramallah, PCBS; 13.DEC.2010; Available from: http://www.pcbs.gov.ps/Portals/_pcbs/NationalAccounts/Per%20Const.htm

Palestinian Central Bureau of Statistics (PCBS), 2013a. Economic activities contribution percentage of the GDP for the years (1994 – 2012) Palestine: Ramallah; pp.17. Available: http://www.pcbs.gov.ps/portals/_pcbs/PressRelease/Press_Ar_QNAQ42012A.pdf

Palestinian Central Bureau of Statistics (PCBS), 2013b. The Palestinian economy performance. Palestine: Ramallah; pp.14. Available: http://www.pcbs.gov.ps/portals/_pcbs/PressRelease/Press_Ar_QNAQ42012A.pdf

Palestinian Contractors Union (PCU), 2003. **Construction Sector Profile.** Palestine: West Bank.

Palestinian Contractors Union (PCU), 2013. **Members lists**. Mar. 31. 2013. Palestine: West Bank.

Palestinian federation of industries, 2009.

Palestinian Economic Council for Development and Reconstruction (PICDAR), 2012.Specification document, p4.

Peter W.G. Morris & George H. Hough, (1979). **The Anatomy of Major Projects. A study of the Reality of Project management**, John Wiley & Sons, UK.

Poilt, D., and Hungler, B., (1985). **Essentials of nursing research; Methods and Applications**, J. B. Lippincott Company.

Pourrostam,T., and Ismail,A.,(2011).***Significant Factors Causing and Effects of Delay in Iranian Construction Projects***. **Australian Journal of Basic and Applied Sciences.**

Rashed,K. , (March 9, 2008). Contractual aspects of construction projects. Available: http://www.alqabas.com.kw/node/346199 . Article in ALqabas newspaper, Kuwait.

Robins, P., Stephen and Robinsturt kotze, (1988)**.Management Concepts and Application**. 2nd edition, Prentice Hall.

Rider, R.J. & Long, R.J., (2013). **Analysis of Concurrent/Pacing Delay.** New York: Long International Inc.

Sambasivan,M., Soon,Y.,(2007). ***Causes and effects of delays in Malaysian construction industry***. **International Journal of Project Management,** *25*(5), 517-526.

Scott, S., (1991) .**Project plans and Record - Keeping Construction sites in the United Kingdom. A thesis submitted for the degree of Doctor of Philosophy in Engineering, Department of Civil**

Engineering University of New Castle - upon - Tyne Department of Civil Engineering, UK.

Scott, S., (1997). ***Delay Claims in U.K. Contracts***. **Journal of Construction Engineering and Management***, 123*(3), 238-244.

Sekaran, U., (2000). **Research methods for business: a skill building approach,** (3rd ed). New York: John Wiley.

Soon, T. K., (2010). **Dispute resolution in relation to delay of Construction projects. Master's project report submitted to faculty of Civil engineering,** University Technology, Malaysia.

Sweis, G., R. Sweis, Abu A. Hammad and A. Shboul, (2008). ***Delays in construction projects: The case of Jordan.*** **International Journal of Project Management,** *26*, 665-674.

Sunjka, B. P. & Jacob, U., (2013). **Significant causes and effects of project delays in the Niger delta region, Nigeria: SAIIE25 Proceedings: Stellenbosch,** South Africa.

Twort, A. C., (1975). **Supervision and management, 2nd edition, Civil Engineering.**

Takim, R., & Akintoye, A. (2002). **A conceptual model for successful construction project performance. Paper presented at 2nd International Postgraduate Research Conference in Built and Human Environment**

Theodore, T. (2009). **Types of Construction Delays. Understanding them clearly, analysing them correctly**. 2nd Edition. Oxford: Elsevier Inc,P. 25-36.

Toor, S.U.R. and S.O. Ogunlana, 2008. **Problems causing delay in major construction projects in Thailand.** ***Construction Management and Economics,*** *26*,395–408.

Tumi, S., Omran, A., Pakir, A., (2009). Causes of delay in construction industry in Libya. The International Conference on Economics and Administration, Faculty of Administration and Business, University of Bucharest, Romania ICEA – FAA Buchares, 14-15th November. http://itchannel.ro/faa-sesiune/content/papers-icea-faa-conference-2009-0.

Vidalis, M.S and Najafi, T.F., (2002) **Cost and time overruns in highway construction4th transportation specially conference of the Canadian Society for civil Engineering**, Montreal, Quebec, Canada June 5-8 (2002).

Wickwire, J. M. and Smith, R. F., (1974). ***The use of Critical Path Method techniques in contract claims***. **Public Contract Law Journal (USA), 7(1).**

Wideman, R. Max., (1990). **Managing the project environment. In: GPM state-of-the-art book Dimension of project management,** H. Reschke & H. Schelle, springer- verlog, chapter (5).

Wiguna and Scott, (July 2005). **International Journal of Project Management***, 25*(5).

Zaneldin, E.K., (2006). ***Construction claims in United Arab Emirates: Types, causes, and frequency***. **International Journal of Project Management,** *24, 453-459.*

Zou, P., Zhang, G., & Wang, J., (2007). ***Understanding the key risks in construction projects in China***. **International Journal of Project Management,** *25*, 601-614.

Zack, J. G., (2003). **Schedule delay analysis; Proceedings of PMI-CPM College of Performance Spring Conference, Project Management Institute,** New Orleans, USA.

المراجع العربية

الساعاتي .أمين ، (1993). **تبسيط كتابة البحث العلمي** . المركز السعودي للدراسات الاستراتيجية .

الكميشي. بدرية، عواطف الرقيعي، (2004). **ادارة الجودة الشاملة في المؤسسات الخدمية والانتاجية** . المؤتمر الوطني الاول للتقييس ،المركز الوطني للمواصفات والمعايير- طرابلس-ليبيا.

بوسنينة .محمد ، (2010). **دراسة التاخيرات في المشاريع الانشائية بسبب المالك في ليبيا** .استكمالا لمتطلبات نيل شهادة الدكتوراه من الاكاديمية العربية البريطانية للتعليم العالي.

جديدو .خالد ،(1999).**نموذج تقييم اهلية عروض المقاولين لاعمال الهندسة المدنية.** اطروحة لنيل درجة الماجستير- كلية الهندسة -جامعة الفاتح-طرابلس- ليبيا.

جماز. طارق ،(2010). **تقييم العوامل الإدارية المسببة في تأخير إنجاز المشاريع الإنشـــائية من واقع البيئة الداخلية لشركات المقاولات بدولة قطر**. استكمالا لمتطلبـــات نيـــل شـــهادة الدكتوراه من الأكاديمية العربية المفتوحة بالدانمرك.

Appendices

Appendix (A)

استبيان حول تقييم عوامل تاخر انجاز المشاريع الانشائية في الضفة الغربية

حضرت المقاولين والاستشاريين والملاكين تحية طيبة وبعد :

تقوم الباحثة بإعداد دراسة تهدف إلى التعرف على" تقيم عوامل تأخر انجاز المشـــاريع الإنشائية في فلسطين (الضفة الغربية) "، وتأتي هذه الدراسة استكمالاً لمتطلبات الحصول على درجة الماجستير في برنامج الإدارة الهندسية من جامعة النجاح الوطنية – نـــابلس ، لـــذا أرجو من حضرتكم الإجابة على فقرات الاستبانة بدقة وموضوعيـــة، علماً بأن البيانات التـــي سيتم الحصول عليها ستعامل بسريّة تامة، ولن تستخدم إلا لأغراض البحث العلمي فقط .

مع الشكر الجزيل لكم

إعداد الطالبة: نـهال جواد البطش

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& د.منذر دويكات

القسم الأول: معلومات عن وضع المجيب وعن المؤسسة التي يعمل بها.

ضع علامة (√) عند اختيارك الإحدى الإجابات.

اسم الشركة / مؤسسة /مكتب

(اختياري).....

1. نوع الأعمال التي تقوم بها الشركة؟

أ. ( ) مباني ب. ( ) طرق ج.( ) مياه ومجاري د. ( ) كهروميكانيك

2. طبيعة عمل المؤسسة التي تعمل بها؟

أ. ( ) استشاري ب .( ) مقاول ج .( ) مالك المشروع

3.نوع المؤسسة.

أ. ( ) قطاع عام ب. ( ) قطاع خاص ج .( ) قطاع أكاديمي (جامعة)

4.حجم المؤسسة المالي؟

أ .( ) من 0 إلى 2 مليون دولار ب. ( ) من 2 مليون إلى 4 مليون دولار

ج. ( ) من 4 مليون إلى 14 مليون دولار د. ( ) من 14 مليون إلى 54 مليون دولار

ه. ( ) أكثر من 54 مليون دولار. و. ( ) أخرى

5. موقع المؤسسة/الشركة/المكتب؟

أ. ( ) جنوب الضفة الغربية ب. ( ) شمال الضفة الغربية ج. ( ) منطقة الوسط

6. تصنيف شركة المقاولات (للمقاولين فقط).

أ. ( ) درجة أولى أ & ب ب . ( ) درجة ثانية ج .( ) درجة ثالثة.

7. موقع عملك في المؤسسة؟

أ. ( ) صاحب الشركة/المكتب ب .( ) مدير المشاريع

ج .( ) مهندس مقاول د .( ) مهندس مكتب

8.المستوى التعليمي.

أ. ( ) دبلوم ب. ( ) بكالوريوس

ج. ( ) ماجستير فأكثر د. ( ) غير ذلك

9.عدد سنوات الخبرة للمجيب.

أ. ( ) من 1 إلى 5 سنوات ب. ( ) من 5 إلى 10 سنوات

ج. ( ) من 10 سنوات فأكثر

القسم الثاني: فقرات الاستبانة:

الرجاء وضع إشارة (X) تحت الخيار المناسب.

الرقم	الفقرة	موافق بشدة	موافق	محايد	معارض	معارض بشدة
	المجال الأول: أسباب التأخير المتعلقة بالمالك **المحور الأول: الأسباب الإدارية والفنية المتعلقة بالمالك**					
.1	تردد في عملية اتخاذ القرارات					
.2	ضعف في عملية التواصل والتنسيق الداخلي والخارجي (المالك مع الأطراف الأخرى)					
.3	طول السلسلة التي تمر فيها عملية اتخاذ القرارات أو تعقدها					
.4	ضعف الاستقرار الإداري للجهة المالكة					
.5	قلة الحوافز للعاملين في مؤسسة المالك					
.6	عدم فهم متطلبات المالك من قبل الاستشاري					
.7	المدة المحددة للتنفيذ غير كافية (خطة العمل)					
.8	عدم وجود منهجية مناسبة لاختيار الأطراف الأخرى اللازمة لإتمام المشروع مثل (الاستشاري والمقاول ذوي الكفاءات المناسبة لمشاريع مشابهة)					
.9	عدم وجود خبرة كافية لجهة المالك بالمشاريع الإنشائية					
.10	عدم وجود منهجية واضحة لتوثيق البيانات ومتابعة المشروع					
.11	الافتقار لعملية التخطيط والرقابة والجدولة والمتابعة للمشروع بشكل صحيح ومناسب					
.12	عمل تغييرات كبيرة على المشروع من قبل المالك بعد البدء بمرحلة التنفيذ للمشروع (أعمال إضافية، تعديلات على التصميم)					
.13	تعليق العمل من قبل المالك بدون أسباب					
.14	الافتقار لآلية حل النزاعات والخلافات أو التأخير في حل النزاعات القضائية والتحكيم					

15.	إحالة العطاءات على اقل الأسعار					
16.	عدم فعالية الغرامات المالية للتأخير					
17.	تأخير في مراجعة واعتماد وثائق التصميم					
	المحور الثاني: الأمـــور الماليـــة المتعلقـــة بالمالك					
18.	عدم انتظام تدفق السيولة النقديـــة الخاصـــة بالمشروع لدى المالك					
19.	ارتفاع سعر الفائدة					
20.	تأخير الدفعات المرحلية المستحقة					
	المحور الثالث: الآلات والتجهيزات والمواد المتعلقة بالمالك					
21.	تغيير مواصفات المواد المطلوبة					
22.	عدم استخدام برمجيات حديثـــة فـــي اتخـــاذ قرارات وإجراءات المشروع					
	المحور الرابع: موارد بشرية متعلقة بالمالك					
23.	قلة العناصر البشرية المؤهلـــة ذات الكفـــاءة والخبرة اللازمة للتعامل مع نوعيات مماثلـــة من المشاريع الإنشائية.					
24.	عدم وجود منهجية محددة لاختيار العناصـــر البشرية اللازمة لإتمام المشروع مـــع عـــدم وجود ممثل قوي للمشروع					
25.	مشاكل في التوظيف					
26.	عدم الاهتمام بتـــدريب وتطـــوير العناصـــر البشرية المكلفة بالمشروع					
	المجال الثاني: أســـباب التـــأخير المتعلقـــة بالاستشاري **المحور الأول: الأسباب الإداريـــة والفنيـــة المتعلقة بالاستشاري**					
27.	ضعف في عملية التواصل والتنسيق الداخلي والخارجي					
28.	التأخر في اعتماد التعديلات أثنـــاء مرحلـــة التنفيذ					
29.	تأخر استلام المشرف للمراحل المنفذة					
30.	تأخر اعتماد المستحقات المالية للجهة المنفذة					

.31	تغييرات التصميم أثناء التنفيذ من قبل جهة المالك					
.32	خطأ في فحوصات التربة					
.33	عدم تناسب خبرة وكفاءة الاستشاري مع المشروع					
.34	وجود قصور أو أخطاء في التصميم أو عدم وضوح التصميم أو وثائق العطاء					
.35	الافتقار لعملية التخطيط والمراقبة والمتابعة والفحص الدوري من قبل الإشراف في مرحلة التنفيذ					
.36	التأخر في اعتماد التصميمات والوثائق وجدول الكميات للمشروع					
.37	عدم إكمال المخططات والوثائق حسب الجدول الزمني					
.38	ضعف في إدارة المشروع وتقدير المدة الزمنية الفعلية للمشروع					
.39	تغيير وإعادة التصميم مرات عديدة في مرحلة التصميم					
	المحور الثاني: أسباب لها علاقة بالموارد البشرية					
.40	قلة كفاءة وخبرة ومهارة الموظفين بأمور التصميم					
.41	قلة كفاءة وخبرة ومهارة الموظفين بأمور الإشراف.					
.42	ضعف الاتصال بين الموظفين					
.43	نقص وقلة الحوافز للعاملين بالمؤسسة					
	المحور الثالث: الآلات والتجهيزات والمواد المتعلقة بالاستشاري					
.44	تأخر اعتماد العينات المقدمة من قبل المقاول					
.45	اشتراط استخدام مواد يصعب الحصول عليها					
.46	اشتراط مواد لا تتوفر محليا وتحتاج إلى استيراد من الخارج					
.47	تغيير مواصفات المواد					
.48	عدم استخدام برمجيات وتجهيزات حديثة في عملية التصميم والإشراف					

	المجال الثالث: أسباب التأخير المتعلقة بالمقاول **المحور الأول: الأسباب الإدارية والفنية المتعلقة بالمقاول**					
.49	ضعف في متابعة وإدارة الموقع					
.50	ارتكاب أخطاء أثناء عملية التنفيذ (بقصد أو بدون قصد) تتطلب إعادة تعديل					
.51	ضعف في إدارة المؤسسة					
.52	ضعف في عملية التواصل والتنسيق الداخلي والخارجي					
.53	ضعف عملية التنسيق مع مقاولي الباطن					
.54	ضعف الخبرة في مشاريع مشابهة					
.55	تأخر المقاول في بدء العمل					
.56	قصور في عملية التخطيط والجدولة والرقابة والمتابعة والتنسيق من قبل المقاول					
.57	العلاقة السيئة بين الإدارة العليا للمقاول والعاملين في الموقع					
.58	عدم وجود خطة عمل لتنفيذ المشروع أو عدم إتباعها					
.59	توقف العمل والتنفيذ بدون سبب مقبول					
.60	عدم التأكد من سلامة التصميمات والوثائق للمشروع قبل البدء بالتنفيذ					
.61	تأخر المقاول في إعداد المخططات التنفيذية (shop drawings)					
.62	دراسة غير كافية للموقع وظروفه من قبل المقاول					
.63	عدم تناسب خبرة وكفاءة المقاول مع المشروع (من الناحيتين المالية والفنية)					
.64	خلافات وصراعات بسبب اختلاف وجهات النظر بين المقاول والاستشاري					
.65	تأخر الفحوصات المخبرية اللازمة للمواد					
	المحور الثاني: الموارد البشرية المتعلقة بالمقاول					
.66	نقص في الموظفين والعمال ذوي الخبرة والمهارة والتدريب					

.67	تغيير مستمر لمقاولي الباطن لعدم كفاءتهم أو تقصيرهم فيه					
.68	نقص إنتاجية القوى العاملة وضعفها					
.69	التخطيط غير الجيد لعمالة المقاول					
.70	نقص تحفيز العمالة					
.71	أداء ضعيف لمهندسي المقاول (عادة خريج جديد)					
	المحور الثالث: الآلات والتجهيزات والمواد المتعلقة بالمقاول					
.72	عدم توفر المعدات المطلوبة حين الطلب أو تأخر توفرها عن الموعد المحدد					
.73	ضعف إنتاجية المعدات					
.74	عدم إتباع تقنيات حديثة أثناء التنفيذ					
.75	عدم كفاءة الآلات للعمل ونقص عددها					
.76	عدم توريد قطع الغيار اللازمة أو تأخر توريدها عن الموعد المحدد					
.77	سوء استخدام الآلات والأدوات والمعدات(استخدام خاطئ)					
.78	نقص المواد					
.79	تدني مستوى جودة المواد المستخدمة أو عدم مطابقتها للمواصفات					
.80	التأخر في توريد المواد أو تجهيزها في الموقع أو استلامها					
.81	تلف المواد عند تخزينها أو تعرضها للسرقة أو الاحتراق					
.82	تغيير أسعار المواد بسرعة خلال تنفيذ في المشروع					
.83	تغيير مواصفات المواد أثناء التنفيذ					
	المحور الرابع: الأمور المالية المتعلقة بالمقاول					
.84	عدم وجود السيولة الكافية لتنفيذ المشروع (صعوبات مالية)					
.85	عدم تنظيم المقاول لتدفق السيولة النقدية الخاصة بالمشروع					

.86	عدم تناسب كفاءة المالية للمقاول مع المشروع					
.87	تسعير العطاء بشكل غير صحيح وغير مناسب					
	المجال الرابع الأسباب المتعلقة بالعقد					
.88	قصور وأخطاء وتناقضات وغموض أو اختلاف في وثائق العقد أو نقصها وعدم اكتمالها					
.89	مشاكل في سياق أو لغة العقد					
.90	عدم كفاية الإجراءات في العقود اللازم اتخاذها لتسوية النزاعات في حال حدوثها					
.91	واجبات ومسؤوليات وحقوق الأطراف غير معروفة بدقة في العقد					
	المجال الخامس: الأسباب المتعلقة بالمشروع					
.92	موقع المشروع أو صعوبة الوصول إليه.					
.93	تعقيد وصعوبة المشروع					
.94	مشاكل مع الجيران					
.95	تضارب واختلاف بين وثائق المشروع					
.96	درجة عالية من متطلبات الجودة					
.97	المدة المحددة للتنفيذ في العقد قليلة جدا					
.98	منازعات قضائية بين الأطراف المختلفة					
.99	نوعية المناقصات التي تجري فيها عملية الاختيار على اقل الأسعار أو التفاوض وغيرها					
	المجال السادس: الأسباب الأخرى(خارجية)					
100	حالة جيولوجية غير متوقعة					
101	التضخم / تذبذب الأسعار					
102	حالة الطقس					
103	عدم الاستقرار السياسي الصراع، والحرب (وجود احتلال)					
104	ظروف الموقع					
105	قوانين الحكومة من تصاريح بناء وغيره					
106	متطلبات نقابة المهندسين لأمور الترخيص وغيرها					

107	زيادة الطلب على المواد/ زيادة تكلفة المواد					
108	حوادث أثناء التنفيذ					
109	الاستقرار الاقتصادي [ظروف غير متوقعة مثل الأزمات الاقتصادية(المالية)]					
110	عدم توفر الموارد أو توفر نوعية سيئة من الموارد					
	المجال السابع: درجة ومدى تأثير هذه الأسباب على المشروع					
111	تأخير في تسليم المشروع					
112	زيادة في التكلفة					
113	النزاعات/ تحاكم /تقاضي					
114	ضعف الإنتاجية					
115	عدم وجود إيرادات					
116	كثرة المشاريع المتأخرة توثر على المجتمع					
	المجال الثامن: عوامل تقلل من تأخير المشروع					
117	تحديد المدير المتخصص لإدارة المشروع					
118	استخدام أنظمة البناء المناسبة					
119	التأكد من وجود المواد ومدى توفرها					
120	مدى دقة تكلفة المشروع والوقت					
121	الاستفادة من تجارب الآخرين وخبرة المؤسسات الأخرى					
122	استخدام نظام المتابعة والرصد					
123	تفحص الموقع قبل تنفيذ الإعمال					
124	استخدام انظمه مراقبة باستمرار للمشروع					
125	ترسيه العقد علي المقاول ذو الكفاءة وليس لأقل عطاء					
126	المتابعة المستمرة مع المقاول الرئيسي ومقاولي الباطن					
127	تحفيز العاملين لإنتاج المزيد					
128	سرعة اتخاذ القرار					
129	تدريب العاملين للحصول علي عمال مهرة					

Appendix (B)

Questioner for Assessment of delay causes in completion the Palestinian construction projects in the West Bank

Dear Contractors, Consultants, and Owners best Greetings;

The researcher is doing a study that is intended to "Assessment of delay causes in Palestinian Construction projects " Palestine/(West Bank), this study comes as a partial fulfillment to get the degree of "Master in Construction Management from AlNajah National University-Nablus", so Please Answer each and every Question of the following Questionnaire precisely and Objectivity, please be informed that the Information and data taken here will be treated Confidentially and used solely for scientific research purposes.

Thank you

Done by: Nihal Jawad Albatsh

eng_nihal83@yahoo.com

Superviser: D. Mohammad Othman

D.Monther Dweikat.

Part one: Information about the Respondent and about the institution he is working in.

Please put (√) bedside's your choice.

Name of the Company/ Institution/ Office (Optional)……

1. What Type(s) of works you are performing?

A. ( ) Construction B. ( ) Roads

C. ( ) Water &Wastewater D. ( ) Electro mechanic

2. The Nature of your business?

A. ( ) Consultant. B. ( ) Contractor. C. ( ) Owner.

3. Type of Institution.

A. ( ) Public Sector. B. ( ) Private Sector. C. ( ) Academic Sector.

4. Financial Size of the Institution.

A. ( ) From 0 to 2 Million $. B. ( ) From 2 to 4 Million$.

C. ( ) From 4 to 14 Million $. D. ( ) From 14 to 54 Million $.

E. ( ) More than 54 Million $. F. ( ) Other.

5. Site organization / company / office?

A. ( ) South West Bank. B. ( ) North West Bank, C. ( ) Medium region

6. Classification contracting company (for contractors only).

A. ( ) First class A & B B. ( ) Second class C. ( ) Third class

7. Your Position within the institution.

A. ( ) Institution's Owner. B. ( ) Projects Manager.

C. ( ) Contractor's Engineer. D. ( ) Office Engineer.

8. Education.

A. ( ) Diploma. B. ( ) Bachelor. C. ( ) Master or More. D. ( ) Other.

9. Years of experience.

A. ( ) from 1 to 5 years. B. ( ) from 5 to 10 years. C. ( )10 years or More

Part Two: Paragraphs of the Questionnaire;

Please put (X) under the suitable Choice.

NO.	Paragraph	Fully agree	Agree	Neutral	Disagree	Fully Disagree
	First Field: Causes related to owners. **Section One: Owner's Administrative and Technical Causes.**					
1.	Hesitation in decision making process.					
2.	Weakness in the Communication and coordination(both internal and external)(the owner with the other parties)					
3.	The Chain of Decision making process is too long or complicated.					
4.	Weakness in the administrative stability of the Owner's side.					
5.	The lack of incentives for workers in the Owner's institution.					
6.	The owner's demands are not understood by the consultant.					
7.	The time for completion is not enough.					
8.	The lack of suitable methodology for choosing the other parties (Consultants, contractors etc.).					
9.	Lack of Sufficient experience on Owner's side in construction Projects					
10.	Missing of clear Documentation and follow up Policies.					
11.	Lack of process of planning and control, scheduling and monitoring of the project correctly and appropriately					
12.	The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)					
13.	The suspension of the work by the owner without actual reasons.					
14.	The lack of a mechanism to resolve conflicts and disputes or delays in the resolution of legal disputes and arbitration					
15.	Referral of bids to the lowest price.					
16.	Ineffectiveness of Late completion penalties.					

17.	Delay in the review and approval of design documents.					
	Section two: Owner's Financial Matters.					
18.	Irregular cash flow for the project on owner's side.					
19.	High rates of interest.					
20	Delay of due payments (according to progress).					
	Section three: Machines, equipment, and Materials of the owner.					
21.	Change the specifications of requested materials.					
22.	Not using modern software in making decisions and procedures regarding the project.					
	Section Four: Owner's Human Resources.					
23.	Lack of qualified human resources with competence and experience needed to deal with similar types of construction projects.					
24.	Missing of specific methodology for the selection of the human elements necessary to complete the project with no strong representative for the project.					
25.	Problems in Employment					
26.	Lack of attention to the training and development of human elements in charge of the project					
	Second Field: Cause related to Consultants. **Section one: Administrative and technical causes of consultants.**					
27.	Weakness in the communication and coordination (Both externally and internally).					
28.	Delays in the approval of adjustments during the execution phase					
29.	Delays in receiving the executed works by the consultant.					
30.	Delays in the adoption of financial dues of the executing contractors.					
31.	Design changes during construction by the Owner.					
32.	Fault in soil testing					
33.	The experiences and competences of the consultant does not suit the scale of the project.					

34.	The existence of deficiencies or errors in the design documents or lack of clarity in the design or tender documents					
35.	Lack of planning, monitoring and follow-up processes and periodic inspection by supervision during implementation phase.					
36.	Delays in the approval of the designs, documents, and the BOQ of the project.					
37.	Unfinished Plans or Documents as per the Project time schedule.					
38.	Weakness in the management of the project, and the estimation of the accurate needed period for completion.					
39.	Changes and redesign many times during design phase.					
	Section Two: Causes related to human resources.					
40.	Lack of efficient, experienced and skilled staffs in design matters.					
41.	Lack of efficient, experienced and skilled staffs in Supervision Matters.					
42.	Lack of communication between employees.					
43.	Missing or lack of incentives for workers institution.					
	Section three: Machines, equipments, and materials of the consultant.					
44.	Delay in the approval of samples submitted from the contractor.					
45.	The requirement of using materials that are hard to obtain.					
46.	Requiring Materials that are missing locally and needs to be imported from outside.					
47.	Change in the Materials specifications.					
48.	Not using modern software, and equipment in both the process of design and supervision of the project.					
	Third Field: Causes Related to contractor. **Section one: Administrative and technical causes of the contractor.**					
49.	Weakness in the follow-up and site management.					

50.	Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.					
51.	Weakness in the institution's Management.					
52.	Weakness in the communication and coordination (Both externally and internally).					
53.	Lack in the coordination with the subcontractors.					
54.	Lack of experience in Projects of the same scale.					
55.	Contractor delay in starting works.					
56.	Incompetence in the planning, monitoring and follow-up processes by the Contractor.					
57.	Bad relationship between contractor's high management and workers in the site.					
58.	Missing of a plan for the execution of works or not following it.					
59.	Stopping of works without any acceptable reasons.					
60.	Not checking the design plans and documentation of the project before starting execution.					
61.	Late in preparing shop drawings by the contractor.					
62.	Insufficient study of the conditions of the site by the contractor.					
63.	The experiences and competences of the consultant does not suit the scale of the project.					
64.	Disagreement and struggles between the contractor and the consultant caused by different point of views.					
65.	Delayed the necessary laboratory tests of materials					
	Section two: Contractor's Human Resources.					
66.	Shortage in skilled, trained and experienced employees and workers.					
67.	Continues change of subcontractors; due to lack in their experience', and competence.					
68.	Deficiency and weakness in productivity of workers.					
69.	Insufficient Planning for the contractor's workers.					
70.	Shortage in labors stimulation.					

71.	Weakness in Contractor's Engineer Performance(normally Newly graduated)					
	Section three: Machines, equipment, and materials of the contractor.					
72.	Unavailability of required equipment when demanded or delayed availability behind schedule.					
73.	Weak productivity of the equipment.					
74.	Failure to follow modern techniques during execution.					
75.	Inefficient machines for work and the lack in their numbers					
76.	Not supplying spare parts needed or delayed supplying schedule.					
77.	Misuse of machinery, tools and equipment (wrong use)					
78.	Shortage in Materials.					
79.	The low level of the quality of materials used or using materials which does not meet specifications					
80.	Delay in the supply of materials, or their availability on-site, or receiving them.					
81.	Materials damage when stored or being exposed to theft or combustion.					
82.	Materials prices change rapidly during the implementation of the project					
83.	Material specifications change during execution					
	Section four: Contractor's Financial Matters.					
84.	Lack of sufficient Cash for project implementation (financial difficulties)					
85.	Contractor failure to regulate the cash flow of the project					
86.	Mismatch of the financial efficiency for the contractor with the project					
87.	Incorrect and inappropriate bid pricing.					
	Fourth Field: Causes Related to Contract Documents.					
88.	Deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness.					

89.	Problems in the context of the contract or its language.					
90.	Insufficient procedures- in the contracts- needed to be taken to settle disputes if they occur.					
91.	Duties, responsibilities, and rights of the parties undefined accurately in the contract.					
	Fifth Field: Causes related to the project.					
92.	The project site or the difficulty in accessing it.					
93	Complex, and difficult project.					
94.	Problems with neighbors.					
95.	Conflicts and differences among the project documents					
96.	High level of quality requirements.					
97.	The specified period for the implementation of the project is very few.					
98.	Legal disputes among the various parties.					
99.	The kind of tenders in which the selection process to negotiate lower prices or other criteria.					
	Sixth Field: Other Causes(External)					
100.	Unexpected geological situation					
101.	Inflation / price fluctuations					
102.	Weather condition					
103.	Political instability, conflict, and war (the presence of the occupation)**.**					
104.	Site Conditions**.**					
105.	The laws of government such as building permits, and other.					
106.	Engineers Association requirements for licensing and other issues.					
107.	The increased demand for materials / increase cost of materials**.**					
108.	Accidents during execution					
109.	Economic stability [unforeseen circumstances such as economic crises (financial crises)]					
110.	Lack of resources or the availability of poor quality resources**.**					

	Seventh Field: The degree and extent of the impact of these causes on the project.					
111.	Delay in delivery of the project					
112.	An increase in the cost.					
113.	Disputes / Trials/ prosecution.					
114.	Low productivity					
115.	Lack of revenue					
116.	The large number of delayed projects affect the community					
	Eighth Field: Factors reduce the delay of the project					
117.	Identification of the specialized project Manager to manage the project.					
118.	The use of appropriate construction systems					
119.	Make sure of the existence of materials and their availability.					
120.	The accuracy of the project cost and time					
121.	Benefit from the experiences of others and the experience of other institutions					
122.	The use of monitoring and follow-up system					
123.	Examine the site before implementation of the works.					
124.	The continuous use of monitoring systems for the project.					
125.	Awarded the contract to the contractor with competence and not to the least price tender.					
126.	Constant follow-up with the main contractor and subcontractors.					
127.	Motivate staff to produce more.					
128.	Speed in the decision-making process.					
129.	Staff training to get skilled workers.					

Thank you

Appendix (C)

Arbitrators List

D. Nafez Naser AL-Deen	Palestine Polytechnic University
D. Belal Al-fallah	Palestine Polytechnic University
D. Ali Abd AL-Hameed	AL-Najah National University
P. Sameer Abuisheh	AL-Najah National University
Miss. Tagreed AL-Tamemi	Palestine Polytechnic University
Miss. Lubna Amer	Palestine Polytechnic University
Mr. Jawad Al-Batsh	AL-Jawad contracting company.
Eng. Zafer Siaj	New vision Consultant office
Eng. Gassan Dofish	Consultant office
Eng. Gassan Idres	Al -Tanfez contracting company.
Eng. Feras Abu AL-Kbash	CHF-donor Institution.
Eng. Awaad Al-Jobeh	Hebron Municipality

Appendix (D)

Research Interviewers' List

First interviews:

For collecting causes of delay in Palestinian construction projects.

PCU secretary	PCU- Hebron Branch.
Mr. Jawad AL-Batsh	Contracting Company.
Mr. Waleed Gresheh	Contracting Company.
Eng. Gassan Dofish	Consultant office.
Eng. Awaad Al-Jobeh	Hebron Municipality.
D. Hussam Amro	CHF – Donor Institution.

Second interviews:

For checking, the questionnaire outputs reliability and enrich the research results.

Eng. Gassan Idres	Al -Tanfez contracting company.
Eng. Mosa qdemat	Consultant office.
Mr. khalel abu Zahra	PCU - Hebron Branch.
Mr. Fayez Al-Amleh	Construction and equipment Contracting company
Eng. Feras Abu AL-Kbash	CHF- Donor Institution.
D. Hussam Amro	CHF - Donor Institution

Appendix (E)

Tables of the collected data

Table (1): The institution work type.

		Responses		Percent of Cases
		N	Percent	
The institution work type	Construction	203	53.8%	92.7%
	Roads	68	18.0%	31.1%
	Water &Wastewater	74	19.6%	33.8%
	Electro mechanic	32	8.5%	14.6%
		377	100.0%	172.1%
Total				

Table (2): The finance al size of the institution.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	From 0 to 2 Million $	98	44.7	45.2	45.2
	From 2 to 4 Million $	20	9.1	9.2	54.4
	From 4 to 14 Million $	13	5.9	6.0	60.4
	From 14 to 54 Million $	8	3.7	3.7	64.1
	More than 54 Million $	19	8.7	8.8	72.8
	Other	59	26.9	27.2	100.0
	Total	217	99.1	100.0	
Missing	System	2	.9		
Total		219	100.0		

Table (3): Location of the company in the West Bank.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	South West Bank	80	36.5	36.9	36.9
	North West Bank	64	29.2	29.5	66.4
	Medium region	73	33.3	33.6	100.0
	Total	217	99.1	100.0	
Missing	System	2	.9		
Total		219	100.0		

Table (4): the respondent position in the company.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Institution's Owner.	61	27.9	28.0	28.0
	Projects Manager.	67	30.6	30.7	58.7
	Contractor's Engineer.	32	14.6	14.7	73.4
	Office Engineer.	58	26.5	26.6	100.0
	Total	218	99.5	100.0	
Missing	System	1	.5		
Total		219	100.0		

Table (5): Owner's administrative and technical causes.

N			Count	Layer N %	Mean	Ranking
1	Hesitation in decision making process.	Extremely disagree	9	4.1%	3.67	5
		Disagree	38	17.4%		
		Neutral	19	8.7%		
		Agree	104	47.5%		
		Extremely agree	49	22.4%		
2	Weakness in the Communication and coordination(both internal and external)(the owner with the other parties)	Extremely disagree	8	3.7%	3.47	12
		Disagree	36	16.4%		
		Neutral	44	20.1%		
		Agree	107	48.9%		
		Extremely agree	24	11.0%		
3	The Chain of Decision making process is too long or complicated.	Extremely disagree	5	2.3%	3.73	3
		Disagree	37	16.9%		
		Neutral	26	11.9%		
		Agree	96	43.8%		
		Extremely agree	55	25.1%		
4	Weakness in the administrative stability of the Owner's side.	Extremely disagree	7	3.2%	3.21	16
		Disagree	64	29.2%		
		Neutral	54	24.7%		
		Agree	63	28.8%		
		Extremely agree	31	14.2%		
5	The lack of incentives for workers in the Owner's institution.	Extremely disagree	5	2.3%	3.58	9
		Disagree	34	15.7%		
		Neutral	43	19.8%		
		Agree	101	46.5%		
		Extremely agree	34	15.7%		
6	The owner's demands are not understood by the consultant.	Extremely disagree	4	1.8%	3.33	14
		Disagree	55	25.2%		
		Neutral	52	23.9%		
		Agree	79	36.2%		
		Extremely agree	28	12.8%		
7	The time for completion is not enough.	Extremely disagree	8	3.7%	3.49	11
		Disagree	45	20.6%		
		Neutral	39	17.9%		
		Agree	84	38.5%		
		Extremely agree	42	19.3%		
8	The lack of suitable methodology for choosing the other parties (Consultants, contractors etc.).	Extremely disagree	4	1.8%	3.67	4
		Disagree	32	14.6%		
		Neutral	38	17.4%		
		Agree	104	47.5%		
		Extremely agree	41	18.7%		
9	Lack of Sufficient experience on Owner's side in construction Projects	Extremely disagree	15	6.8%	3.22	15
		Disagree	58	26.5%		
		Neutral	38	17.4%		
		Agree	79	36.1%		
		Extremely agree	29	13.2%		
10	Missing of clear	Extremely disagree	13	5.9%	3.37	13

	Documentation and follow up Policies.	Disagree	43	19.6%		
		Neutral	42	19.2%		
		Agree	93	42.5%		
		Extremely agree	28	12.8%		
11	Lack of process of planning and control, scheduling and monitoring of the project correctly and appropriately	Extremely disagree	11	5.0%	3.54	10
		Disagree	41	18.7%		
		Neutral	27	12.3%		
		Agree	98	44.7%		
		Extremely agree	42	19.2%		
12	The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)	Extremely disagree	4	1.8%	3.87	2
		Disagree	24	11.1%		
		Neutral	34	15.7%		
		Agree	90	41.5%		
		Extremely agree	65	30.0%		
13	The suspension of the work by the owner without actual reasons.	Extremely disagree	33	15.1%	2.97	17
		Disagree	55	25.1%		
		Neutral	46	21.0%		
		Agree	56	25.6%		
		Extremely agree	29	13.2%		
14	The lack of a mechanism to resolve conflicts and disputes or delays in the resolution of legal disputes and arbitration	Extremely disagree	9	4.1%	3.66	6
		Disagree	28	12.8%		
		Neutral	48	21.9%		
		Agree	77	35.2%		
		Extremely agree	57	26.0%		
15	Referral of bids to the lowest price.	Extremely disagree	5	2.3%	4.25	1
		Disagree	15	6.9%		
		Neutral	22	10.1%		
		Agree	54	24.8%		
		Extremely agree	122	56.0%		
16	Ineffectiveness of Late completion penalties.	Extremely disagree	9	4.1%	3.63	7
		Disagree	36	16.6%		
		Neutral	32	14.7%		
		Agree	89	41.0%		
		Extremely agree	51	23.5%		
17	Delay in the review and approval of design documents.	Extremely disagree	8	3.7%	3.63	8
		Disagree	34	15.5%		
		Neutral	30	13.7%		
		Agree	107	48.9%		
		Extremely agree	40	18.3%		
The mean of Owner's administrative and technical causes = 3.55						

Table (6): Owner's human resources causes.

N			Count	Layer N %	Mean	Ranking
1	Lack of qualified human resources with competence and experience needed to deal with similar types of construction projects.	Extremely disagree	10	4.6%	3.55	3
		Disagree	39	17.8%		
		Neutral	32	14.6%		
		Agree	96	43.8%		
		Extremely agree	42	19.2%		
2	Missing of specific methodology for the selection of the human elements necessary to complete the project with no strong representative for the project.	Extremely disagree	9	4.1%	3.61	2
		Disagree	33	15.1%		
		Neutral	30	13.7%		
		Agree	109	49.8%		
		Extremely agree	38	17.4%		
3	Problems in Employment	Extremely disagree	9	4.1%	3.50	4
		Disagree	34	15.6%		
		Neutral	57	26.1%		
		Agree	76	34.9%		
		Extremely agree	42	19.3%		
4	Lack of attention to the training and development of human elements in charge of the project	Extremely disagree	7	3.2%	3.81	1
		Disagree	21	9.7%		
		Neutral	34	15.7%		
		Agree	100	46.1%		
		Extremely agree	55	25.3%		
The mean of Owner's human resources causes = 3.62						

Table (7): consultants' administrative and technical causes.

N			Count	Layer N %	Mean	Ranking
1	Weakness in the communication and coordination (Both externally and internally).	Extremely disagree	6	2.7%	3.55	6
		Disagree	34	15.5%		
		Neutral	49	22.4%		
		Agree	94	42.9%		
		Extremely agree	36	16.4%		
2	Delays in the approval of adjustments during the execution phase	Extremely disagree	2	.9%	3.68	3
		Disagree	37	16.9%		
		Neutral	33	15.1%		
		Agree	104	47.5%		
		Extremely agree	43	19.6%		
3	Delays in receiving the executed works by the consultant.	Extremely disagree	5	2.3%	3.33	12
		Disagree	65	29.8%		
		Neutral	32	14.7%		
		Agree	85	39.0%		
		Extremely agree	31	14.2%		
4	Delays in the adoption of financial dues of the executing contractors.	Extremely disagree	11	5.0%	3.49	9
		Disagree	46	21.0%		
		Neutral	29	13.2%		
		Agree	91	41.6%		
		Extremely agree	42	19.2%		

5	Design changes during construction by the Owner.	Extremely disagree	2	.9%	3.79	1
		Disagree	24	11.0%		
		Neutral	43	19.6%		
		Agree	98	44.7%		
		Extremely agree	52	23.7%		
6	Fault in soil testing	Extremely disagree	12	5.5%	3.00	13
		Disagree	66	30.1%		
		Neutral	64	29.2%		
		Agree	63	28.8%		
		Extremely agree	14	6.4%		
7	The experiences and competences of the consultant does not suit the scale of the project.	Extremely disagree	13	5.9%	3.37	10
		Disagree	47	21.5%		
		Neutral	44	20.1%		
		Agree	75	34.2%		
		Extremely agree	40	18.3%		
8	The existence of deficiencies or errors in the design documents or lack of clarity in the design or tender documents	Extremely disagree	3	1.4%	3.61	5
		Disagree	37	16.9%		
		Neutral	47	21.5%		
		Agree	87	39.7%		
		Extremely agree	45	20.5%		
9	Lack of planning, monitoring and follow-up processes and periodic inspection by supervision during implementation phase.	Extremely disagree	8	3.7%	3.37	11
		Disagree	47	21.5%		
		Neutral	52	23.7%		
		Agree	80	36.5%		
		Extremely agree	32	14.6%		
10	Delays in the approval of the designs, documents, and the BOQ of the project.	Extremely disagree	3	1.4%	3.53	7
		Disagree	44	20.2%		
		Neutral	37	17.0%		
		Agree	102	46.8%		
		Extremely agree	32	14.7%		
11	Unfinished Plans or Documents as per the Project time schedule.	Extremely disagree	7	3.2%	3.53	8
		Disagree	35	16.1%		
		Neutral	42	19.4%		
		Agree	103	47.5%		
		Extremely agree	30	13.8%		
12	Weakness in the management of the project, and the estimation of the accurate needed period for completion.	Extremely disagree	7	3.2%	3.68	4
		Disagree	35	16.1%		
		Neutral	29	13.3%		
		Agree	97	44.5%		
		Extremely agree	50	22.9%		
13	Changes and redesign many times during design phase.	Extremely disagree	8	3.7%	3.70	2
		Disagree	27	12.4%		
		Neutral	35	16.1%		
		Agree	101	46.3%		
		Extremely agree	47	21.6%		
The mean of administrative and technical causes of consultants = 3.51						

Table (8): The consultants' human resources causes.

N			Count	Layer N %	Mean	Ranking
1	Lack of efficient, experienced and skilled staffs in design matters.	Extremely disagree	9	4.1%	3.41	2
		Disagree	50	22.8%		
		Neutral	34	15.5%		
		Agree	95	43.4%		
		Extremely agree	31	14.2%		
2	Lack of efficient, experienced and skilled staffs in Supervision Matters.	Extremely disagree	12	5.5%	3.39	3
		Disagree	50	22.9%		
		Neutral	28	12.8%		
		Agree	97	44.5%		
		Extremely agree	31	14.2%		
3	Lack of communication between employees.	Extremely disagree	10	4.6%	3.26	4
		Disagree	49	22.4%		
		Neutral	54	24.7%		
		Agree	85	38.8%		
		Extremely agree	21	9.6%		
4	Missing or lack of incentives for workers institution.	Extremely disagree	4	1.8%	3.76	1
		Disagree	21	9.6%		
		Neutral	45	20.5%		
		Agree	103	47.0%		
		Extremely agree	46	21.0%		
The mean of consultants' causes related to human resources = 3.46						

Table (9): Machines, equipment, and materials of the consultant causes.

N			Count	Layer N %	Mean	Ranking
1	**Delay in the approval of samples submitted from the contractor.**	Extremely disagree	3	1.4%	3.67	1
		Disagree	37	16.9%		
		Neutral	36	16.4%		
		Agree	96	43.8%		
		Extremely agree	47	21.5%		
2	**The requirement of using materials that are hard to obtain.**	Extremely disagree	11	5.0%	3.30	2
		Disagree	58	26.5%		
		Neutral	37	16.9%		
		Agree	80	36.5%		
		Extremely agree	33	15.1%		
3	**Requiring Materials that are missing locally and needs to be imported from outside.**	Extremely disagree	12	5.5%	3.24	4
		Disagree	63	28.8%		
		Neutral	46	21.0%		
		Agree	57	26.0%		
		Extremely agree	41	18.7%		

4	Change in the Materials specifications.	Extremely disagree	5	2.3%	3.26	3
		Disagree	57	26.0%		
		Neutral	51	23.3%		
		Agree	88	40.2%		
		Extremely agree	18	8.2%		
5	Not using modern software, and equipment in both the process of design and supervision of the project.	Extremely disagree	8	3.7%	3.12	5
		Disagree	66	30.1%		
		Neutral	61	27.9%		
		Agree	60	27.4%		
		Extremely agree	24	11.0%		
The mean of machines, equipment, and materials of the consultant = 3.32						

Table (10): contractors' administrative and technical causes.

N			Count	Layer N %	Mean	Ranking
1	Weakness in the follow-up and site management.	Extremely disagree	10	4.6%	3.68	8
		Disagree	29	13.2%		
		Neutral	36	16.4%		
		Agree	89	40.6%		
		Extremely agree	55	25.1%		
2	Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.	Extremely disagree	2	0.9%	3.86	1
		Disagree	21	9.6%		
		Neutral	32	14.7%		
		Agree	113	51.8%		
		Extremely agree	50	22.9%		
3	Weakness in the institution's Management.	Extremely disagree	5	2.3%	3.70	5
		Disagree	29	13.2%		
		Neutral	43	19.6%		
		Agree	92	42.0%		
		Extremely agree	50	22.8%		
4	Weakness in the communication and coordination (Both externally and internally).	Extremely disagree	9	4.1%	3.53	11
		Disagree	25	11.4%		
		Neutral	58	26.5%		
		Agree	94	42.9%		
		Extremely agree	33	15.1%		
5	Lack in the coordination with the subcontractors.	Extremely disagree	8	3.7%	3.47	13
		Disagree	42	19.2%		
		Neutral	46	21.0%		

		Agree	84	38.4%		
		Extremely agree	39	17.8%		
6	Lack of experience in Projects of the same scale.	Extremely disagree	14	6.5%	3.43	15
		Disagree	31	14.4%		
		Neutral	53	24.7%		
		Agree	83	38.6%		
		Extremely agree	34	15.8%		
7	Contractor delay in starting works.	Extremely disagree	9	4.1%	3.49	12
		Disagree	45	20.6%		
		Neutral	34	15.6%		
		Agree	91	41.7%		
		Extremely agree	39	17.9%		
8	Incompetence in the planning, monitoring and follow-up processes by the Contractor.	Extremely disagree	5	2.3%	3.78	2
		Disagree	23	10.5%		
		Neutral	38	17.4%		
		Agree	102	46.6%		
		Extremely agree	51	23.3%		
9	Bad relationship between contractor's high management and workers in the site.	Extremely disagree	8	3.7%	3.47	14
		Disagree	41	18.7%		
		Neutral	53	24.2%		
		Agree	74	33.8%		
		Extremely agree	43	19.6%		
10	Missing of a plan for the execution of works or not following it.	Extremely disagree	6	2.8%	3.68	9
		Disagree	33	15.1%		
		Neutral	38	17.4%		
		Agree	89	40.8%		
		Extremely agree	52	23.9%		
11	Stopping of works without any acceptable reasons.	Extremely disagree	13	5.9%	3.31	16
		Disagree	56	25.6%		
		Neutral	37	16.9%		
		Agree	76	34.7%		
		Extremely agree	37	16.9%		
12	Not checking the design plans and documentation of the project before starting execution.	Extremely disagree	2	0.9%	3.74	4
		Disagree	43	19.6%		
		Neutral	27	12.3%		
		Agree	86	39.3%		
		Extremely agree	61	27.9%		

13	Late in preparing shop drawings by the contractor.	Extremely disagree	7	3.2%	3.63	10
		Disagree	39	17.8%		
		Neutral	31	14.2%		
		Agree	93	42.5%		
		Extremely agree	49	22.4%		
14	Insufficient study of the conditions of the site by the contractor.	Extremely disagree	5	2.3%	3.76	3
		Disagree	28	12.8%		
		Neutral	21	9.6%		
		Agree	125	57.1%		
		Extremely agree	40	18.3%		
15	The experiences and competences of the consultant does not suit the scale of the project.	Extremely disagree	10	4.6%	3.69	6
		Disagree	19	8.7%		
		Neutral	51	23.4%		
		Agree	87	39.9%		
		Extremely agree	51	23.4%		
16	Disagreement and struggles between the contractor and the consultant caused by different point of views.	Extremely disagree	5	2.3%	3.68	7
		Disagree	31	14.2%		
		Neutral	30	13.7%		
		Agree	115	52.5%		
		Extremely agree	38	17.4%		
17	Delayed the necessary laboratory tests of materials	Extremely disagree	4	1.8%	3.17	17
		Disagree	62	28.3%		
		Neutral	61	27.9%		
		Agree	77	35.2%		
		Extremely agree	15	6.8%		
The mean of contractors' administrative and technical causes = 3.59						

Table (11): The contractors' human resources causes.

N			Count	Layer N %	Mean	Ranking
1	Shortage in skilled, trained and experienced employees and workers.	Extremely disagree	6	2.8%	3.85	1
		Disagree	26	11.9%		
		Neutral	26	11.9%		
		Agree	96	44.0%		
		Extremely agree	64	29.4%		
2	Continues change of subcontractors; due to lack in their experience', and competence.	Extremely disagree	5	2.3%	3.74	3
		Disagree	22	10.0%		
		Neutral	46	21.0%		
		Agree	99	45.2%		

		Extremely agree	47	21.5%		
3	Deficiency and weakness in productivity of workers.	Extremely disagree	4	1.8%	3.56	6
		Disagree	42	19.3%		
		Neutral	38	17.4%		
		Agree	97	44.5%		
		Extremely agree	37	17.0%		
4	Insufficient Planning for the contractor's workers.	Extremely disagree	7	3.2%	3.69	5
		Disagree	27	12.3%		
		Neutral	33	15.1%		
		Agree	111	50.7%		
		Extremely agree	41	18.7%		
5	Shortage in labors stimulation.	Extremely disagree	6	2.7%	3.79	2
		Disagree	21	9.6%		
		Neutral	34	15.5%		
		Agree	111	50.7%		
		Extremely agree	47	21.5%		
6	Weakness in Contractor's Engineer Performance(normally Newly graduated)	Extremely disagree	11	5.0%	3.72	4
		Disagree	20	9.2%		
		Neutral	40	18.3%		
		Agree	96	44.0%		
		Extremely agree	51	23.4%		
The mean of contractor's human resources = 3.72						

Table (12): Machines, equipment, and materials of the contractors' causes.

N			Count	Layer N %	Mean	Ranking
1	Unavailability of required equipment when demanded or delayed availability behind schedule.	Extremely disagree	3	1.4%	3.95	1
		Disagree	11	5.0%		
		Neutral	39	17.8%		
		Agree	107	48.9%		
		Extremely agree	59	26.9%		
2	Weak productivity of the equipment.	Extremely disagree	7	3.2%	3.58	5
		Disagree	24	11.0%		
		Neutral	55	25.2%		
		Agree	100	45.9%		
		Extremely agree	32	14.7%		
3	Failure to follow modern techniques during execution.	Extremely disagree	7	3.2%	3.66	3
		Disagree	19	8.7%		

		Neutral	51	23.3%		
		Agree	107	48.9%		
		Extremely agree	35	16.0%		
4	Inefficient machines for work and the lack in their numbers	Extremely disagree	3	1.4%	3.62	4
		Disagree	26	11.9%		
		Neutral	43	19.7%		
		Agree	124	56.9%		
		Extremely agree	22	10.1%		
5	Not supplying spare parts needed or delayed supplying schedule.	Extremely disagree	5	2.3%	3.49	6
		Disagree	23	10.5%		
		Neutral	77	35.2%		
		Agree	88	40.2%		
		Extremely agree	26	11.9%		
6	Misuse of machinery, tools and equipment (wrong use)	Extremely disagree	8	3.7%	3.30	10
		Disagree	37	17.0%		
		Neutral	72	33.0%		
		Agree	83	38.1%		
		Extremely agree	18	8.3%		
7	Shortage in Materials.	Extremely disagree	3	1.4%	3.47	7
		Disagree	42	19.2%		
		Neutral	59	26.9%		
		Agree	78	35.6%		
		Extremely agree	37	16.9%		
8	The low level of the quality of materials used or using materials which does not meet specifications	Extremely disagree	6	2.7%	3.39	9
		Disagree	52	23.7%		
		Neutral	44	20.1%		
		Agree	85	38.8%		
		Extremely agree	32	14.6%		
9	Delay in the supply of materials, or their availability on-site, or receiving them.	Extremely disagree	7	3.2%	3.67	2
		Disagree	23	10.6%		
		Neutral	46	21.1%		
		Agree	100	45.9%		
		Extremely agree	42	19.3%		
10	Materials damage when stored or being exposed to theft or combustion.	Extremely disagree	6	2.7%	3.02	12
		Disagree	70	32.0%		
		Neutral	69	31.5%		
		Agree	62	28.3%		
		Extremely agree	12	5.5%		

11	Materials prices change rapidly during the implementation of the project	Extremely disagree	8	3.7%	3.43	8
		Disagree	46	21.0%		
		Neutral	56	25.6%		
		Agree	62	28.3%		
		Extremely agree	47	21.5%		
12	Material specifications change during execution	Extremely disagree	3	1.4%	3.29	11
		Disagree	57	26.0%		
		Neutral	54	24.7%		
		Agree	83	37.9%		
		Extremely agree	22	10.0%		
The mean of Machines, equipment, and materials of the contractor= 3.50						

Table (13): The contractors' financial matters causes

N			Count	Layer N %	Mean	Ranking
1	Lack of sufficient Cash for project implementation (financial difficulties)	Extremely disagree	3	1.4%	4.02	2
		Disagree	19	8.7%		
		Neutral	26	11.9%		
		Agree	93	42.5%		
		Extremely agree	78	35.6%		
2	Contractor failure to regulate the cash flow of the project	Extremely disagree	0	0.0%	4.01	3
		Disagree	15	6.8%		
		Neutral	33	15.1%		
		Agree	106	48.4%		
		Extremely agree	65	29.7%		
3	Mismatch of the financial efficiency for the contractor with the project	Extremely disagree	7	3.2%	3.78	4
		Disagree	19	8.7%		
		Neutral	50	22.8%		
		Agree	83	37.9%		
		Extremely agree	60	27.4%		
4	Incorrect and inappropriate bid pricing.	Extremely disagree	4	1.8%	4.03	1
		Disagree	17	7.8%		
		Neutral	36	16.5%		
		Agree	72	33.0%		
		Extremely agree	89	40.8%		
The mean of contractor's financial matters= 3.96						

Table (14): Causes Related to Contract Documents.

N			Count	Layer N %	Mean	Ranking
1	Deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness.	Extremely disagree	6	2.7%	3.74	1
		Disagree	31	14.2%		
		Neutral	30	13.7%		
		Agree	98	44.7%		
		Extremely agree	54	24.7%		
2	Problems in the context of the contract or its language.	Extremely disagree	6	2.7%	3.41	3
		Disagree	44	20.1%		
		Neutral	44	20.1%		
		Agree	105	47.9%		
		Extremely agree	20	9.1%		
3	Insufficient procedures- in the contracts- needed to be taken to settle disputes if they occur.	Extremely disagree	2	0.9%	3.53	2
		Disagree	43	19.6%		
		Neutral	49	22.4%		
		Agree	86	39.3%		
		Extremely agree	39	17.8%		
4	Duties, responsibilities, and rights of the parties undefined accurately in the contract.	Extremely disagree	6	2.7%	3.35	4
		Disagree	51	23.3%		
		Neutral	47	21.5%		
		Agree	91	41.6%		
		Extremely agree	24	11.0%		
The mean of causes related to contract documents = 3.51						

Table (15): Causes related to the project.

N			Count	Layer N %	Mean	Ranking
1	The project site or the difficulty in accessing it.	Extremely disagree	12	5.5%	3.07	7
		Disagree	72	32.9%		
		Neutral	52	23.7%		
		Agree	55	25.1%		
		Extremely agree	28	12.8%		
2	Complex, and difficult project.	Extremely disagree	13	5.9%	3.06	8
		Disagree	59	26.9%		
		Neutral	59	26.9%		
		Agree	78	35.6%		
		Extremely agree	10	4.6%		
3	Problems with neighbors.	Extremely disagree	9	4.1%	3.42	4
		Disagree	32	14.6%		
		Neutral	56	25.6%		
		Agree	102	46.6%		
		Extremely agree	20	9.1%		

4	Conflicts and differences among the project documents	Extremely disagree	7	3.2%	3.46	3
		Disagree	35	16.0%		
		Neutral	47	21.5%		
		Agree	110	50.2%		
		Extremely agree	20	9.1%		
5	High level of quality requirements.	Extremely disagree	18	8.2%	3.16	5
		Disagree	54	24.7%		
		Neutral	42	19.2%		
		Agree	86	39.3%		
		Extremely agree	19	8.7%		
6	The specified period for the implementation of the project is very few.	Extremely disagree	6	2.7%	3.53	2
		Disagree	41	18.7%		
		Neutral	47	21.5%		
		Agree	82	37.4%		
		Extremely agree	43	19.6%		
7	Legal disputes among the various parties.	Extremely disagree	14	6.4%	3.15	6
		Disagree	46	21.0%		
		Neutral	76	34.7%		
		Agree	60	27.4%		
		Extremely agree	23	10.5%		
8	The kind of tenders in which the selection process to negotiate lower prices or other criteria.	Extremely disagree	9	4.1%	3.90	1
		Disagree	15	6.8%		
		Neutral	30	13.7%		
		Agree	99	45.2%		
		Extremely agree	66	30.1%		
The mean of causes related to the project = 3.34						

Table (16): External causes of delay in the Palestinian construction projects.

N			Count	Layer N %	Mean	Ranking
1	Unexpected geological situation	Extremely disagree	6	2.8%	3.52	5
		Disagree	38	17.4%		
		Neutral	44	20.2%		
		Agree	97	44.5%		
		Extremely agree	33	15.1%		
2	Inflation / price fluctuations	Extremely disagree	5	2.3%	3.59	4
		Disagree	32	14.6%		
		Neutral	46	21.0%		
		Agree	101	46.1%		
		Extremely agree	35	16.0%		
3	Weather condition	Extremely disagree	4	1.8%	3.63	3
		Disagree	27	12.3%		
		Neutral	50	22.8%		
		Agree	102	46.6%		
		Extremely agree	36	16.4%		

4	Political instability, conflict, and war (the presence of the occupation).	Extremely disagree	5	2.3%	3.79	1
		Disagree	21	9.6%		
		Neutral	41	18.7%		
		Agree	99	45.2%		
		Extremely agree	53	24.2%		
5	Site Conditions.	Extremely disagree	3	1.4%	3.48	6
		Disagree	35	16.0%		
		Neutral	51	23.3%		
		Agree	114	52.1%		
		Extremely agree	16	7.3%		
6	The laws of government such as building permits, and other.	Extremely disagree	14	6.4%	3.19	10
		Disagree	36	16.4%		
		Neutral	77	35.2%		
		Agree	79	36.1%		
		Extremely agree	13	5.9%		
7	Engineers Association requirements for licensing and other issues.	Extremely disagree	13	5.9%	2.93	11
		Disagree	65	29.7%		
		Neutral	79	36.1%		
		Agree	49	22.4%		
		Extremely agree	13	5.9%		
8	The increased demand for materials / increase cost of materials.	Extremely disagree	7	3.2%	3.31	8
		Disagree	51	23.4%		
		Neutral	49	22.5%		
		Agree	89	40.8%		
		Extremely agree	22	10.1%		
9	Accidents during execution	Extremely disagree	10	4.6%	3.27	9
		Disagree	40	18.3%		
		Neutral	66	30.1%		
		Agree	86	39.3%		
		Extremely agree	17	7.8%		
10	Economic stability [unforeseen circumstances such as economic crises (financial crises)]	Extremely disagree	5	2.3%	3.67	2
		Disagree	20	9.1%		
		Neutral	58	26.5%		
		Agree	96	43.8%		
		Extremely agree	40	18.3%		
11	Lack of resources or the availability of poor quality resources.	Extremely disagree	8	3.7%	3.40	7
		Disagree	37	17.0%		
		Neutral	59	27.1%		
		Agree	87	39.9%		
		Extremely agree	27	12.4%		
The mean of other causes(external)= 3.44						

Table (17): The degree and extent of the impact of these causes on the project.

N			Count	Layer N %	Mean	Ranking
1	Delay in delivery of the project	Extremely disagree	2	0.9%	4.21	1
		Disagree	10	4.7%		
		Neutral	13	6.1%		
		Agree	104	48.8%		
		Extremely agree	84	39.4%		
2	An increase in the cost.	Extremely disagree	1	0.5%	4.14	2
		Disagree	7	3.2%		
		Neutral	17	7.8%		
		Agree	129	58.9%		
		Extremely agree	65	29.7%		
3	Disputes / Trials/ prosecution.	Extremely disagree	5	2.3%	3.69	6
		Disagree	21	9.6%		
		Neutral	53	24.2%		
		Agree	97	44.3%		
		Extremely agree	43	19.6%		
4	Low productivity	Extremely disagree	5	2.3%	3.84	4
		Disagree	11	5.0%		
		Neutral	43	19.6%		
		Agree	116	53.0%		
		Extremely agree	44	20.1%		
5	Lack of revenue	Extremely disagree	2	0.9%	3.78	5
		Disagree	13	6.0%		
		Neutral	56	25.7%		
		Agree	108	49.5%		
		Extremely agree	39	17.9%		
6	The large number of delayed projects affect the community	Extremely disagree	2	0.9%	4.13	3
		Disagree	10	4.6%		
		Neutral	23	10.5%		
		Agree	106	48.4%		
		Extremely agree	78	35.6%		
The mean of the degree and extent of the impact of these causes on the project = 3.96						

Table (18): Factors reduce the delay of the project.

N			Count	Layer N %	Mean	Ranking
1	Identification of the specialized project Manager to manage the project.	Extremely disagree	3	1.4%	4.45	3
		Disagree	4	1.8%		
		Neutral	6	2.7%		
		Agree	85	38.8%		
		Extremely agree	121	55.3%		

2	The use of appropriate construction systems	Extremely disagree	0	0.0%	4.35	8
		Disagree	5	2.3%		
		Neutral	16	7.3%		
		Agree	96	43.8%		
		Extremely agree	102	46.6%		
3	Make sure of the existence of materials and their availability.	Extremely disagree	1	0.5%	4.29	12
		Disagree	3	1.4%		
		Neutral	17	7.8%		
		Agree	109	49.8%		
		Extremely agree	89	40.6%		
4	The accuracy of the project cost and time	Extremely disagree	2	0.9%	4.38	6
		Disagree	6	2.8%		
		Neutral	11	5.0%		
		Agree	87	39.9%		
		Extremely agree	112	51.4%		
5	Benefit from the experiences of others and the experience of other institutions	Extremely disagree	2	0.9%	4.32	11
		Disagree	5	2.3%		
		Neutral	9	4.1%		
		Agree	109	49.8%		
		Extremely agree	94	42.9%		
6	The use of monitoring and follow-up system	Extremely disagree	4	1.8%	4.27	13
		Disagree	4	1.8%		
		Neutral	18	8.2%		
		Agree	95	43.4%		
		Extremely agree	98	44.7%		
7	Examine the site before implementation of the works.	Extremely disagree	0	0.0%	4.34	9
		Disagree	9	4.1%		
		Neutral	10	4.6%		
		Agree	98	44.7%		
		Extremely agree	102	46.6%		
8	The continuous use of monitoring systems for the project.	Extremely disagree	1	0.5%	4.33	10
		Disagree	4	1.8%		
		Neutral	11	5.0%		
		Agree	109	50.0%		
		Extremely agree	93	42.7%		
9	Awarded the contract to the contractor with competence and not to the least price tender.	Extremely disagree	2	0.9%	4.60	1
		Disagree	4	1.8%		
		Neutral	6	2.7%		
		Agree	56	25.6%		
		Extremely agree	151	68.9%		
10	Constant follow-up with the main contractor and subcontractors.	Extremely disagree	1	0.5%	4.48	2
		Disagree	1	0.5%		
		Neutral	7	3.2%		
		Agree	93	42.5%		
		Extremely agree	117	53.4%		

11	Motivate staff to produce more.	Extremely disagree	1	0.5%	4.40	4
		Disagree	5	2.3%		
		Neutral	13	5.9%		
		Agree	87	39.7%		
		Extremely agree	113	51.6%		
12	Speed in the decision-making process.	Extremely disagree	1	0.5%	4.39	5
		Disagree	5	2.3%		
		Neutral	17	7.8%		
		Agree	81	37.0%		
		Extremely agree	115	52.5%		
13	Staff training to get skilled workers.	Extremely disagree	0	0.0%	4.38	7
		Disagree	4	1.8%		
		Neutral	15	6.8%		
		Agree	94	42.9%		
		Extremely agree	106	48.4%		

Table (19): the value of means and ranking the groups of the main causes of delay.

	consultant		contractor		owner		overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
The owners' administrative and technical causes.	3.66	6	3.72	9	3.12	9	3.55	6
The owner's financial matters.	3.67	5	4.05	1	3.31	5	3.74	2
Machines, equipment, and materials of the owner.	3.58	8	3.73	6	2.92	13	3.47	10
The owner's human resources.	3.69	4	3.89	3	3.06	10	3.62	4
The consultants' administrative and technical causes.	3.39	10	3.78	5	3.19	7	3.51	7
The consultants' human resources.	3.32	13	3.73	7	3.14	8	3.46	11
Machines, equipment, and materials of the consultant.	3.19	14	3.72	8	2.77	14	3.32	14
The contractors' administrative and technical causes.	3.73	3	3.49	13	3.61	3	3.59	5
The contractors' human resources.	3.87	2	3.64	10	3.71	2	3.72	3
Machines, equipment, and materials of the contractor.	3.59	7	3.46	14	3.43	4	3.49	9

The contractors' financial matters.	4.02	1	3.90	2	4.00	1	3.96	1
Causes Related to Contract Documents.	3.44	9	3.83	4	3.03	11	3.51	8
Contract Causes related to the project.	3.38	11	3.52	12	3.00	12	3.34	13
contract Other Causes (External)	3.38	12	3.61	11	3.21	6	3.44	12

Table (20): shows the participant different parties in delays occur.

Domain	Delay causes related to owner	X	Y	% R
Administrative and Technical	Hesitation in decision-making process.	3.67	3.58	17.2
	Weakness in the Communication and coordination(both internal and external)(the owner with the other parties)	3.47		
	The Chain of Decision making process is too long or complicated.	3.73		
	Weakness in the administrative stability of the Owner's side.	3.21		
	The lack of incentives for workers in the Owner's institution.	3.58		
	The owner's demands are not understood by the consultant.	3.33		
	The time for completion is not enough.	3.49		
	The lack of suitable methodology for choosing the other parties (Consultants, contractors etc.).	3.67		
	Lack of Sufficient experience on Owner's side in construction Projects	3.22		
	Missing of clear Documentation and follow up Policies.	3.37		
	Lack of process of planning and control, scheduling and monitoring of the project correctly and appropriately	3.54		
	The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)	3.87		
	The suspension of the work by the owner without actual reasons.	2.97		
	The lack of a mechanism to resolve conflicts and disputes or delays in the resolution of legal disputes and arbitration	3.66		
	Referral of bids to the lowest price.	4.25		
	Ineffectiveness of Late completion penalties.	3.63		
	Delay in the review and approval of design documents.	3.63		

Financial	Irregular cash flow for the project on owner's side.	3.97		
	High rates of interest.	3.34		
	Delay of due payments (according to progress).	3.96		
Machines, equipment, and materials	Change the specifications of requested materials.	3.41		
	Not using modern software in making decisions and procedures regarding the project.	3.54		
Human Resources.	Lack of qualified human resources with competence and experience needed to deal with similar types of construction projects.	3.55		
	Missing of specific methodology for the selection of the human elements necessary to complete the project with no strong representative for the project.	3.61		
	Problems in Employment	3.50		
	Lack of attention to the training and development of human elements in charge of the project	3.81		
Domain	**Delay causes related to consultant**	**X**	**Y**	**R %**
Administrative and technical	Weakness in the communication and coordination (Both externally and internally).	3.55	3.46	16.5
	Delays in the approval of adjustments during the execution phase	3.68		
	Delays in receiving the executed works by the consultant.	3.33		
	Delays in the adoption of financial dues of the executing contractors.	3.49		
	Design changes during construction by the Owner.	3.79		
	Fault in soil testing	3		
	The experiences and competences of the consultant does not suit the scale of the project.	3.37		
	The existence of deficiencies or errors in the design documents or lack of clarity in the design or tender documents	3.61		
	Lack of planning, monitoring and follow-up processes and periodic inspection by supervision during implementation phase.	3.37		
	Delays in the approval of the designs, documents, and the BOQ of the project.	3.53		
	Unfinished Plans or Documents as per the Project time schedule.	3.53		
	Weakness in the management of the project, and the estimation of the accurate needed period for completion.	3.68		
	Changes and redesign many times during design phase.	3.70		

Human resources	Lack of efficient, experienced and skilled staffs in design matters.	3.41		
	Lack of efficient, experienced and skilled staffs in Supervision Matters.	3.39		
	Lack of communication between employees.	3.26		
	Missing or lack of incentives for workers institution.	3.76		
Machines, equipment, and materials	Delay in the approval of samples submitted from the contractor.	3.67		
	The requirement of using materials that are hard to obtain.	3.3		
	Requiring Materials that are missing locally and needs to be imported from outside.	3.24		
	Change in the Materials specifications.	3.26		
	Not using modern software, and equipment in both the process of design and supervision of the project.	3.12		
Domain	**Delay causes related to contractor**	X	Y	R %
Administrative and technical	Weakness in the follow-up and site management.	3.68	3.62	17.28
	Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.	3.86		
	Weakness in the institution's Management.	3.7		
	Weakness in the communication and coordination (Both externally and internally).	3.53		
	Lack in the coordination with the subcontractors.	3.47		
	Lack of experience in Projects of the same scale.	3.43		
	Contractor delay in starting works.	3.49		
	Incompetence in the planning, monitoring and follow-up processes by the Contractor.	3.78		
	Bad relationship between contractor's high management and workers in the site.	3.47		
	Missing of a plan for the execution of works or not following it.	3.68		
	Stopping of works without any acceptable reasons.	3.31		
	Not checking the design plans and documentation of the project before starting execution.	3.74		
	Late in preparing shop drawings by the contractor.	3.63		
	Insufficient study of the conditions of the site by the contractor.	3.76		
	The experiences and competences of the consultant does not suit the scale of the project.	3.69		
	Disagreement and struggles between the contractor and the consultant caused by different point of views.	3.68		
	Delayed the necessary laboratory tests of materials	3.17		
Human Resources.	Shortage in skilled, trained and experienced employees and workers.	3.85		
	Continues change of subcontractors; due to lack in their experience', and competence.	3.74		
	Deficiency and weakness in productivity of workers.	3.56		

	Insufficient Planning for the contractor's workers.	3.69		
	Shortage in labors stimulation.	3.79		
	Weakness in Contractor's Engineer Performance(normally Newly graduated)	3.72		
Machines, equipment, and materials	Unavailability of required equipment when demanded or delayed availability behind schedule.	3.95		
	Weak productivity of the equipment.	3.58		
	Failure to follow modern techniques during execution.	3.66		
	Inefficient machines for work and the lack in their numbers	3.62		
	Not supplying spare parts needed or delayed supplying schedule.	3.49		
	Misuse of machinery, tools and equipment (wrong use)	3.30		
	Shortage in Materials.	3.47		
	The low level of the quality of materials used or using materials which does not meet specifications	3.39		
	Delay in the supply of materials, or their availability on-site, or receiving them.	3.67		
	Materials damage when stored or being exposed to theft or combustion.	3.02		
	Materials prices change rapidly during the implementation of the project	3.43		
	Material specifications change during execution	3.29		
Financial Matters	Lack of sufficient Cash for project implementation (financial difficulties)	4.02		
	Contractor failure to regulate the cash flow of the project	4.01		
	Mismatch of the financial efficiency for the contractor with the project	3.78		
	Incorrect and inappropriate bid pricing.	4.03		
Causes Related to Contract Documents.		**X**	**Y**	**R%**
Deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness.		3.74	3.51	16.76
Problems in the context of the contract or its language.		3.41		
Insufficient procedures- in the contracts- needed to be taken to settle disputes if they occur.		3.53		
Duties, responsibilities, and rights of the parties undefined accurately in the contract.		3.35		
Causes related to the project.		**X**	**Y**	**R %**
The project site or the difficulty in accessing it.		3.07	3.34	15.94
Complex and difficult project.		3.06		
Problems with neighbors.		3.42		
Conflicts and differences among the project documents		3.46		
High level of quality requirements.		3.16		
The specified period for the implementation of the project is very few		3.53		

Legal disputes among the various parties.	3.15		
The kind of tenders in which the selection process to negotiate lower prices or other criteria.	3.90		
Other Causes(External)	**X**	**Y**	**% R**
Unexpected geological situation	3.52	3.43	16.37
Inflation / price fluctuations	3.59		
Weather condition	3.63		
Political instability, conflict, and war (the presence of the occupation)**.**	3.79		
Site Conditions**.**	3.48		
The laws of government such as building permits, and other.	3.19		
Engineers Association requirements for licensing and other issues.	2.93		
The increased demand for materials / increase cost of materials**.**	3.31		
Accidents during execution	3.27		
Economic stability [unforeseen circumstances such as economic crises (financial crises)]	3.67		
Lack of resources or the availability of poor quality resources**.**	3.40		
			100 %

Table (21): Represents the reasons for the delay in descending order according to their importance.

NO.	Delay causes	X	Responsibility for delay
1.	Referral of bids to the lowest price.	4.25	Owner
2.	Incorrect and inappropriate bid pricing.	4.03	Contractor
3.	Lack of sufficient Cash for project implementation (financial difficulties)	4.02	Contractor
4.	Contractor failure to regulate the cash flow of the project	4.01	Contractor
5.	Irregular cash flow for the project on owner's side.	3.97	Owner
6.	Delay of due payments (according to progress).	3.96	Owner
7.	Unavailability of required equipment when demanded or delayed availability behind schedule.	3.95	Contractor
8.	The kind of tenders in which the selection process to negotiate lower prices or other criteria.	3.90	Project
9.	The introduction of significant changes to the project by the owner after starting the implementation phase of the project (additional work, modifications to the design)	3.87	Owner
10.	Mistakes during the process of implementation (intentionally or unintentionally) require readjustment.	3.86	Contractor
11.	Shortage in skilled, trained and experienced employees and workers.	3.85	Contractor
12.	Lack of attention to the training and development of human elements in charge of the project	3.81	Owner

13.	Design changes during construction by the Owner.	3.79	Consultant
14.	Shortage in labors stimulation.	3.79	Contractor
15.	Political instability, conflict, and war (the presence of the occupation)**.**	3.79	External
16.	Incompetence in the planning, monitoring and follow-up processes by the Contractor.	3.78	Contractor
17.	Mismatch of the financial efficiency for the contractor with the project	3.78	Contractor
18.	Missing or lack of incentives for workers institution.	3.76	Consultant
19.	Insufficient study of the conditions of the site by the contractor.	3.76	Contractor
20.	Not checking the design plans and documentation of the project before starting execution.	3.74	Contractor
21.	Continues change of subcontractors; due to lack in their experience', and competence.	3.74	Contractor
22.	Deficiencies, errors, contradictions, and ambiguity or variation in the contract documents or their incompleteness.	3.74	Contract
23.	The Chain of Decision making process is too long or complicated.	3.73	Owner
24.	Weakness in Contractor's Engineer Performance(normally Newly graduated)	3.72	Contractor
25.	Weakness in the institution's Management.	3.70	Contractor
26.	Changes and redesign many times during design phase.	3.70	Consultant
27.	Insufficient Planning for the contractor's workers.	3.69	Contractor
28.	The experiences and competences of the consultant does not suit the scale of the project.	3.69	Contractor
29.	Delays in the approval of adjustments during the execution phase	3.68	Consultant
30.	Weakness in the management of the project, and the estimation of the accurate needed period for completion.	3.68	Consultant
31.	Weakness in the follow-up and site management.	3.68	Contractor
32.	Missing of a plan for the execution of works or not following it.	3.68	Contractor
33.	Disagreement and struggles between the contractor and the consultant caused by different point of views.	3.68	Contractor
34.	Hesitation in decision-making process.	3.67	Owner
35.	The lack of suitable methodology for choosing the other parties (Consultants, contractors etc.).	3.67	Owner
36.	Economic stability [unforeseen circumstances such as economic crises (financial crises)]	3.67	External
37.	Delay in the approval of samples submitted from the contractor.	3.67	Consultant
38.	Delay in the supply of materials, or their availability on-site, or receiving them.	3.67	Contractor
39.	The lack of a mechanism to resolve conflicts and disputes or delays in the resolution of legal disputes and arbitration	3.66	Owner

40.	Failure to follow modern techniques during execution.	3.66	Contractor
41.	Delay in the review and approval of design documents.	3.63	Owner
42.	Ineffectiveness of Late completion penalties.	3.63	Owner
43.	Late in preparing shop drawings by the contractor.	3.63	Contractor
44.	Weather condition	3.63	External
45.	Inefficient machines for work and the lack in their numbers	3.62	Contractor
46.	Missing of specific methodology for the selection of the human elements necessary to complete the project with no strong representative for the project.	3.61	Owner
47.	The existence of deficiencies or errors in the design documents or lack of clarity in the design or tender documents	3.61	Consultant
48.	Inflation / price fluctuations	3.59	External
49.	The lack of incentives for workers in the Owner's institution.	3.58	Owner
50.	Weak productivity of the equipment.	3.58	Contractor
51.	Deficiency and weakness in productivity of workers.	3.56	Contractor
52.	Weakness in the communication and coordination (Both externally and internally).	3.55	Consultant
53.	Lack of qualified human resources with competence and experience needed to deal with similar types of construction projects.	3.55	Owner
54.	Lack of process of planning and control, scheduling and monitoring of the project correctly and appropriately	3.54	Owner
55.	Not using modern software in making decisions and procedures regarding the project.	3.54	Owner
56.	Delays in the approval of the designs, documents, and the BOQ of the project.	3.53	Consultant
57.	The specified period for the implementation of the project is very few.	3.53	Project
58.	Unfinished Plans or Documents as per the Project time schedule.	3.53	Consultant
59.	Insufficient procedures- in the contracts- needed to be taken to settle disputes if they occur.	3.53	Contract
60.	Weakness in the communication and coordination (Both externally and internally).	3.53	Contractor
61.	Unexpected geological situation	3.52	External
62.	Problems in Employment	3.50	Owner
63.	The time for completion is not enough.	3.49	Owner
64.	Delays in the adoption of financial dues of the executing contractors.	3.49	Consultant
65.	Contractor delay in starting works.	3.49	Contractor
66.	Not supplying spare parts needed or delayed supplying schedule.	3.49	Contractor
67.	Site Conditions**.**	3.48	External

68.	Weakness in the Communication and coordination(both internal and external)(the owner with the other parties)	3.47	Owner
69.	Lack in the coordination with the subcontractors.	3.47	Contractor
70.	Bad relationship between contractor's high management and workers in the site.	3.47	Contractor
71.	Shortage in Materials.	3.47	Contractor
72.	Conflicts and differences among the project documents	3.46	Project
73.	Lack of experience in Projects of the same scale.	3.43	Contractor
74.	Materials prices change rapidly during the implementation of the project	3.43	Contractor
75.	Problems with neighbors.	3.42	Project
76.	Change the specifications of requested materials.	3.41	Owner
77.	Lack of efficient, experienced and skilled staffs in design matters.	3.41	Consultant
78.	Problems in the context of the contract or its language.	3.41	Contract
79.	Lack of resources or the availability of poor quality resources**.**	3.40	External
80.	Lack of efficient, experienced and skilled staffs in Supervision Matters.	3.39	Consultant
81.	The low level of the quality of materials used or using materials which does not meet specifications	3.39	Contractor
82.	Missing of clear Documentation and follow up Policies.	3.37	Owner
83.	The experiences and competences of the consultant does not suit the scale of the project.	3.37	Consultant
84.	Lack of planning, monitoring and follow-up processes and periodic inspection by supervision during implementation phase.	3.37	Consultant
85.	Duties, responsibilities, and rights of the parties undefined accurately in the contract.	3.35	Contract
86.	High rates of interest.	3.34	Owner
87.	The owner's demands are not understood by the consultant.	3.33	Owner
88.	Delays in receiving the executed works by the consultant.	3.33	Consultant
89.	Stopping of works without any acceptable reasons.	3.31	Contractor
90.	The increased demand for materials / increase cost of materials**.**	3.31	External
91.	The requirement of using materials that are hard to obtain.	3.30	Consultant
92.	Misuse of machinery, tools and equipment (wrong use)	3.30	Contractor
93.	Material specifications change during execution	3.29	Contractor
94.	Accidents during execution	3.27	External
95.	Lack of communication between employees.	3.26	Consultant
96.	Change in the Materials specifications.	3.26	Consultant

97.	Requiring Materials that are missing locally and needs to be imported from outside.	3.24	Consultant
98.	Lack of Sufficient experience on Owner's side in construction Projects	3.22	Owner
99.	Weakness in the administrative stability of the Owner's side.	3.21	Owner
100.	The laws of government such as building permits, and other.	3.19	External
101.	Delayed the necessary laboratory tests of materials	3.17	Contractor
102.	High level of quality requirements.	3.16	Project
103.	Legal disputes among the various parties.	3.15	Project
104.	Not using modern software, and equipment in both the process of design and supervision of the project.	3.12	Consultant
105.	The project site or the difficulty in accessing it.	3.07	Project
106.	Complex, and difficult project.	3.06	Project
107.	Materials damage when stored or being exposed to theft or combustion.	3.02	Contractor
108.	Fault in soil testing	3.0	Consultant
109.	The suspension of the work by the owner without actual reasons.	2.97	Owner
110.	Engineers Association requirements for licensing and other issues.	2.93	External

Table (22): One-Way Anova for the third hypothesis of the Financial Size of the Institution.

		Sum of squares	**DF**	**Mean Square**	**F**	**Sig**
Owner's Administrative and Technical Causes	Between Groups	8.654	5	1.731	5.293	.000
	Within groups	69.002	211	.327		
	Total	77.656	216			
Owner's Financial Matters.	Between Groups	7.991	5	1.598	1.890	.097
	Within groups	178.437	211	.846		
	Total	186.428	216			
Owner's Machines, equipment, and Materials of the owner.	Between Groups	9.915	5	1.983	2.554	.029
	Within groups	163.806	211	.776		
	Total	173.721	216			
Owner's Human Resources.	Between Groups	14.569	5	2.914	4.314	.001
	Within groups	142.506	211	.675		
	Total	157.075	216			
Consultant's Administrative and technical causes of consultants.	Between Groups	4.089	5	.818	1.903	.095
	Within groups	90.662	211	.430		
	Total	94.751	216			
Consultant's Causes related to human resources.	Between Groups	7.568	5	1.514	2.364	.041
	Within groups	135.076	211	.640		
	Total	142.644	216			

Consultant's Machines, equipment, and materials of the consultant.	Between Groups	22.221	5	4.444	7.254	.000
	Within groups	129.274	211	.613		
	Total	151.495	216			
Contractor's Administrative and technical causes of the contractor.	Between Groups	7.767	5	1.553	3.090	.010
	Within groups	106.070	211	.503		
	Total	113.838	216			
Contractor's Human Resources.	Between Groups	11.124	5	2.225	4.195	.001
	Within groups	111.908	211	.530		
	Total	123.033	216			
Contractor's Machines, equipment, and materials of the contractor.	Between Groups	3.772	5	.754	2.076	.070
	Within groups	76.675	211	.363		
	Total	80.447	216			
Contractor's Financial Matters.	Between Groups	9.046	5	1.809	2.787	.018
	Within groups	136.961	211	.649		
	Total	146.007	216			
Causes Related to Contract Documents.	Between Groups	21.416	5	4.283	7.156	.000
	Within groups	126.292	211	.599		
	Total	147.709	216			
Causes related to the project.	Between Groups	17.270	5	3.454	10.280	.000
	Within groups	70.899	211	.336		
	Total	88.169	216			
Other Causes(External)	Between Groups	12.611	5	2.522	7.212	.000
	Within groups	73.790	211	.350		
	Total	86.401	216			
The degree and extent of the impact of these causes on the project.	Between Groups	2.132	5	.426	1.257	.284
	Within groups	71.554	211	.339		
	Total	73.686	216			
Factors reduce the delay of the project	Between Groups	1.361	5	.272	1.038	.396
	Within groups	55.329	211	.262		
	Total	56.690	216			

Table (23): One-Way Anova for the fifth hypothesis of the Contractor's company classification.

		Sum of squares	**DF**	**Mean Square**	**F**	**Sig**
Owner's Administrative and Technical Causes	Between Groups	.604	2	.302	1.014	.367
	Within groups	28.576	96	.298		
	Total	29.180	98			
Owner's Financial Matters.	Between Groups	.546	2	.273	.369	.692
	Within groups	71.011	96	.740		
	Total	71.558	98			

Owner's Machines, equipment, and Materials of the owner.	Between Groups	.622	2	.311	.395	.675
	Within groups	75.565	96	.787		
	Total	76.187	98			
Owner's Human Resources.	Between Groups	.338	2	.169	.382	.684
	Within groups	42.458	96	.442		
	Total	42.795	98			
Consultant's Administrative and technical causes of consultants.	Between Groups	.484	2	.242	.622	.539
	Within groups	37.311	96	.389		
	Total	37.795	98			
Consultant's Causes related to human resources.	Between Groups	2.594	2	1.297	2.421	.094
	Within groups	51.420	96	.536		
	Total	54.014	98			
Consultant's Machines, equipment, and materials of the consultant.	Between Groups	1.570	2	.785	1.692	.190
	Within groups	44.539	96	.464		
	Total	46.109	98			
Contractors' Administrative and technical causes of the contractor.	Between Groups	.284	2	.142	.183	.833
	Within groups	74.691	96	.778		
	Total	74.975	98			
Contractor's Human Resources.	Between Groups	1.020	2	.510	.604	.549
	Within groups	81.063	96	.844		
	Total	82.083	98			
Contractor's Machines, equipments, and materials of the contractor.	Between Groups	.589	2	.295	.608	.547
	Within groups	46.530	96	.485		
	Total	47.120	98			
Contractor's Financial Matters.	Between Groups	1.902	2	.951	1.125	.329
	Within groups	81.141	96	.845		
	Total	83.043	98			
Causes Related to Contract Documents.	Between Groups	.768	2	.384	.716	.491
	Within groups	51.438	96	.536		
	Total	52.206	98			
Causes related to the project.	Between Groups	.706	2	.353	1.213	.302
	Within groups	27.951	96	.291		
	Total	28.658	98			
Other Causes(External)	Between Groups	.417	2	.208	.867	.423
	Within groups	23.074	96	.240		
	Total	23.491	98			
The degree and extent of the impact of these causes on the project.	Between Groups	.474	2	.237	.706	.496
	Within groups	32.267	96	.336		
	Total	32.741	98			
Factors reduce the delay of the project	Between Groups	.674	2	.337	1.006	.370
	Within groups	32.190	96	.335		
	Total	32.864	98			

Table (24): One way Anova for the seventh hypothesis of the respondent level of education

		Sum of squares	DF	Mean Square	F	Sig
Owner's Administrative and Technical Causes	Between Groups	1.467	3	.489	1.321	.269
	Within groups	79.571	215	.370		
	Total	81.037	218			
Owner's Financial Matters.	Between Groups	9.048	3	3.016	3.533	.016
	Within groups	183.521	215	.854		
	Total	192.569	218			
Owner's Machines, equipments, and Materials of the owner.	Between Groups	4.110	3	1.370	1.693	.170
	Within groups	174.002	215	.809		
	Total	178.112	218			
Owner's Human Resources.	Between Groups	1.759	3	.586	.785	.503
	Within groups	160.593	215	.747		
	Total	162.352	218			
Consultant's Administrative and technical causes of consultants.	Between Groups	5.413	3	1.804	4.169	.007
	Within groups	93.053	215	.433		
	Total	98.466	218			
Consultant's Causes related to human resources.	Between Groups	3.107	3	1.036	1.531	.207
	Within groups	145.411	215	.676		
	Total	148.518	218			
Consultant's Machines, equipments, and materials of the consultant.	Between Groups	8.681	3	2.894	4.252	.006
	Within groups	146.319	215	.681		
	Total	155.001	218			
Contractors' Administrative and technical causes of the contractor.	Between Groups	.378	3	.126	.232	.874
	Within groups	116.765	215	.543		
	Total	117.143	218			
Contractor's Human Resources.	Between Groups	2.388	3	.796	1.363	.255
	Within groups	125.539	215	.584		
	Total	127.927	218			
Contractor's Machines, equipments, and materials of the contractor.	Between Groups	1.740	3	.580	1.516	.211
	Within groups	82.241	215	.383		
	Total	83.980	218			
Contractor's Financial Matters.	Between Groups	1.860	3	.620	.906	.439
	Within groups	147.103	215	.684		
	Total	148.963	218			
Causes Related to Contract Documents.	Between Groups	3.539	3	1.180	1.705	.167
	Within groups	148.759	215	.692		
	Total	152.299	218			
Causes related to the project.	Between Groups	7.306	3	2.435	6.419	.000
	Within groups	81.572	215	.379		
	Total	88.878	218			

Other Causes(External)	Between Groups	4.313	3	1.438	3.760	.012
	Within groups	82.218	215	.382		
	Total	86.531	218			
The degree and extent of the impact of these causes on the project.	Between Groups	1.644	3	.548	1.605	.189
	Within groups	73.380	215	.341		
	Total	75.024	218			
Factors reduce the delay of the project	Between Groups	2.871	3	.957	3.819	.011
	Within groups	53.876	215	.251		
	Total	56.747	218			

Table (25-29): The results of the differences between each of the hypotheses relating to the groups of the main causes of delay:

Table (25): The results of the differences between "type of institution" hypotheses relating to the groups of the main causes of delay

	Type of Institution		
	Public sector Mean	private sector Mean	Academic Sector Mean
Owner. admin	**3.09**	**3.67**	**4.06**
Owner's Financial Matters.	**3.50**	**3.84**	**4.00**
Machines, equipment, and Materials of the owner	**2.94**	**3.63**	**4.50**
Owner's Human Resources.	**3.08**	**3.76**	**4.50**
Administrative and technical causes of consultants	**3.16**	**3.61**	**3.85**
causes related to human resources	**3.06**	**3.57**	**4.00**
Machines, equipment, and materials of the consultant.	**2.80**	**3.48**	**3.60**
Administrative and technical causes of the contractor.	**3.52**	**3.63**	**3.76**
Contractor's Human Resources.	**3.64**	**3.76**	**3.83**
Machines, equipment, and materials of the contractor.	**3.50**	**3.51**	**3.58**
Contractor's Financial Matters.	**3.98**	**3.97**	**4.25**
Causes Related to Contract Documents	**3.17**	**3.62**	**2.75**
Causes related to the project.	**3.17**	**3.40**	**4.38**
Other Causes(External)	**3.35**	**3.46**	**4.27**
The degree and extent of the impact of these causes on the project.	**3.80**	**4.02**	**4.17**
Factors reduce the delay of the project	**4.28**	**4.41**	**4.69**

Table (26): The results of the differences between "Financial Size of the Institution" hypothesis relating to the groups of the main causes of delay.

	Financial Size of the Institution					
	From 0 to 2 Million $	From 2 to 4 Million $	From 4 to 14 Million $	From 14 to 54 Million $	More than 54 Million $	other
	Mean	Mean	Mean	Mean	Mean	Mean
Owner. admin	3.72	3.57	3.75	3.62	3.15	3.36
Owner's Financial Matters.	3.92	3.97	3.62	3.79	3.54	3.52
Machines, equipment, and Materials of the owner	3.65	3.63	3.58	3.69	3.03	3.28
Owner's Human Resources.	3.84	3.89	3.71	3.34	3.49	3.27
Administrative and technical causes of consultants	3.62	3.66	3.68	3.39	3.44	3.33
causes related to human resources	3.58	3.34	3.97	3.50	3.30	3.28
Machines, equipment, and materials of the consultant.	3.63	3.38	3.43	3.28	2.92	2.93
Administrative and technical causes of the contractor.	3.61	3.57	3.12	4.24	3.38	3.70
Contractor's Human Resources.	3.76	3.61	2.97	4.33	3.82	3.80
Machines, equipment, and materials of the contractor.	3.54	3.62	3.08	3.76	3.33	3.51
Contractor's Financial Matters.	4.04	3.89	3.23	4.38	3.96	4.00
Causes Related to Contract Documents	3.78	3.38	4.02	2.91	2.99	3.30
Causes related to the project.	3.61	3.22	3.55	2.72	2.89	3.14
Other Causes(External)	3.65	3.47	3.57	3.52	3.01	3.17
The degree and extent of the impact of these causes on the project.	4.07	3.94	3.86	3.98	3.91	3.85
Factors reduce the delay of the project	4.41	4.34	4.19	4.60	4.50	4.33

Table (27): The results of the differences between "location of the organization / company / office" hypotheses relating to the groups of the main causes of delay.

	location of the organization / company / office		
	South West Bank Mean	North West Bank Mean	Medium region Mean
Owner. admin	3.54	3.60	3.53
Owner's Financial Matters.	3.82	3.85	3.59
Machines, equipment, and Materials of the owner	3.43	3.55	3.47
Owner's Human Resources.	3.71	3.62	3.53
Administrative and technical causes of consultants	3.57	3.58	3.40
causes related to human resources	3.55	3.60	3.25
Machines, equipment, and materials of the consultant.	3.35	3.48	3.15
Administrative and technical causes of the contractor.	3.51	3.77	3.53
Contractor's Human Resources.	3.64	3.82	3.74
Machines, equipment, and materials of the contractor.	3.46	3.54	3.49
Contractor's Financial Matters.	3.84	3.97	4.09
Causes Related to Contract Documents	3.59	3.55	3.39
Causes related to the project.	3.42	3.44	3.17
Other Causes(External)	3.45	3.49	3.36
The degree and extent of the impact of these causes on the project.	3.99	4.01	3.90
Factors reduce the delay of the project	4.39	4.35	4.39

Table (28): The results of the differences between "Classification contracting company (for contractors only)." hypotheses relating to the groups of the main causes of delay.

	Classification contracting company (for contractors only).		
	First class A & B Mean	Second class Mean	Third class Mean
Owner. admin	3.60	3.73	3.82
Owner's Financial Matters.	4.17	3.99	4.05
Machines, equipment, and Materials of the owner	3.61	3.81	3.76
Owner's Human Resources.	3.85	3.86	3.98
Administrative and technical causes of consultants	3.67	3.79	3.87
causes related to human resources	3.45	3.84	3.80
Machines, equipment, and materials of the consultant.	3.59	3.64	3.90

Administrative and technical causes of the contractor.	3.55	3.44	3.55
Contractor's Human Resources.	3.81	3.61	3.54
Machines, equipment, and materials of the contractor.	3.58	3.46	3.36
Contractor's Financial Matters.	4.13	3.79	3.84
Causes Related to Contract Documents	3.98	3.76	3.83
Causes related to the project.	3.62	3.43	3.59
Other Causes(External)	3.58	3.55	3.70
The degree and extent of the impact of these causes on the project.	4.21	4.05	4.17
Factors reduce the delay of the project	4.30	4.32	4.49

Table (29): The results of the differences between "Education" hypotheses relating to the groups of the main causes of delay.

	Education			
	Diploma.	Bachelor	Master or More.	other
	Mean	Mean	Mean	Mean
Owner. Admin	3.83	3.50	3.61	3.55
Owner's Financial Matters.	4.36	3.72	3.57	4.44
Machines, equipment, and Materials of the owner	3.42	3.40	3.71	3.75
Owner's Human Resources.	3.85	3.56	3.73	3.56
Administrative and technical causes of consultants	3.98	3.42	3.63	3.90
causes related to human resources	3.88	3.39	3.53	3.63
Machines, equipment, and materials of the consultant.	4.12	3.30	3.17	3.27
Administrative and technical causes of the contractor.	3.76	3.58	3.58	3.58
Contractor's Human Resources.	4.00	3.68	3.84	3.44
Machines, equipment, and materials of the contractor.	3.83	3.48	3.48	3.25
Contractor's Financial Matters.	4.29	3.97	3.87	3.79
Causes Related to Contract Documents	3.96	3.52	3.38	3.29
Causes related to the project.	4.04	3.34	3.17	3.35
Other Causes(External)	3.66	3.50	3.18	3.32
The degree and extent of the impact of these causes on the project.	4.19	3.99	3.83	3.92
Factors reduce the delay of the project	4.47	4.41	4.34	3.73

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إشراف
د. محمد عثمان
د. منذر دويكات

قدمت هذه الأطروحة استكمالا لمتطلبات الحصول على درجـــة الماجســـتير فـــي الإدارة الهندسية بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين
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الملخص

التأخير في صناعة البناء والتشييد هي ظاهرة عالمية وصناعة البناء والتشييد في فلسطين ليست استثناء. قطاع البناء والتشييد يعد من أهم القطاعات الاقتصادية في فلسطين، ويناقش هذا البحث أهمية دراسة قطاع البناء والتشييد من خلال التعرف على الفجوات بين النظرية والممارسة المرتبطة بتأخر استكمال مشاريع البناء، تأتي أهمية هذا البحث لما ظهر في السنوات الماضية من تعرض معظم المشاريع الإنشائية في الضفة الغربية للتأخير أو لزيادة التكلفة أو كلا الأمرين، لذلك فان استمرار هذه الظاهرة يؤثر في تقدم صناعة الإنشاءات، كما أنها قد تعرض العديد من المؤسسات المعنية بالإنشاءات إلى الانهيار.

الغرض الرئيسي من هذه الدراسة هو التعرف على أهم العوامل التي تؤخر انجاز المشاريع، من خلال أخذ عينة تمثيلية من كل من المكاتب الهندسية، والجهات المالكة، والمقاولون ثم القيام بعملية التحليل للحصول على النتائج التي تساعد في تحقيق أهداف البحث. تمت هذه الدراسة خلال فترة (2012-2014).

وتم تحقيق أهداف الدراسة من خلال الاطلاع على العديد من البحوث والمراجع للدراسات السابقة التي شملت دراسة هذه العوامل في العديد من الدول ومن خلال عمل مقابلات مع عدد من أطراف العقد ، بناءا عليه تم تصميم استبانه جرى توزيعها على عينة البحث تشمل كل من شركات المقاولات، المكاتب الاستشارية والمؤسسات المالكة تم توزيعها في ثلاث مدن رئيسية في الضفة الغربية تشمل: (الخليل في الجنوب، رام الله في الوسط ونابلس في شمال) لتقييم درجة أهمية هذه الأسباب.

أظهرت نتائج هذه الدراسة أن "إحالة العطاءات على اقل الأسعار" من قبل الجهة المالكة تحتل المرتبة الأولى وهي من أهم الأسباب المسببة للتأخير، وظهرت " تسعير العطاء بشكل غير صحيح وغير مناسب" من قبل المقاولين في المرتبة الثانية، وظهرت " عدم وجود السيولة الكافية لتنفيذ المشروع (صعوبات مالية)" في المرتبة الثالثة ، كما احتلت المرتبة الرابعة " عدم تنظيم المقاول لتدفق السيولة النقدية الخاصة بالمشروع" ، واحتلت " عدم انتظام تدفق السيولة النقدية الخاصة بالمشروع لدى المالك" المرتبة الخامسة من الأسباب المسببة للتأخير. كما واستنتجت العديد من الآثار المترتبة على التأخير منها: تأخير في تسليم المشروع، زيادة في التكلفة، كثرة المشاريع المتأخرة توثر على المجتمع، ضعف الإنتاجية، عدم وجود إيرادات، النزاعات/ تحاكم/ تقاضي بين أطراف التعاقد.

بناءً على نتائج الدراسة قامت الباحثة بوضع بعض من الحلول المقترحة التي تساعد في تجنب أو التقليل من مسببات التأخير ، من هذه المقترحات إيجاد طريقة وآلية مناسبة لعملية تقييم وترسية العطاءات دون اللجوء دوما إلى اقل الأسعار، يجب أن تتوفر لدى المقاول خبرة كافية في مجال تسعير العطاءات، توفر الموارد المالية الكافية لدى المقاول لتغطية نفقات المشروع، يجب توفر الدفعات المالية من قبل المالك للمقاول في وقتها دون حدوث تأخير يسبب عقبات في سير العمل، مراعاة عمل وثائق العطاء من قبل الاستشاري بشكل صحيح لتفادي حدوث الأوامر التغيرية و المشاكل الناتجة بسبب الأخطاء، توفير مدير للمشروع ذو خبرة كافية لإدارة المشروع. كما تم تطوير إطار عمل ليكون أداة فاعلة لمساعدة جميع أطراف التعاقد في تجنب مسببات التأخير والمساعدة على أن يقوم كل طرف بمعرفة وتحمل المسؤولية الواقعة عليه لتفادي حصول التأخير، أخيراً تم وضع توصيات لكل من أطراف التعاقد (المالك، الاستشاري، المقاول)، نقابة المهندسين، اتحاد المقاولين الفلسطينيين للمساعدة في تفادي وتجنب الأسباب المسببة للتأخير والحصول على مشاريع منجزة ضمن الجدول الزمني المخطط لها.