



Faculty of Business and Economics

Master of Business Administration Program

Research thesis Under the Title:

**“Causes of Cost and Time Overrun in Construction Projects
in the West Bank – Palestine”**

“أسباب تجاوز التكاليف والوقت في المشاريع الانشائية في الضفة الغربية – فلسطين”

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Table of Content

Table of content	i
List of tables	v
List of figures	vi
Abstract – English	vii
Abstract – Arabic	viii

Chapter One: Research General Framework

1.1 Introduction	2
1.2 Research Problem	4
1.3 Research Questions	5
1.4 Research Objectives	6
1.5 Research Significance	6

Chapter Two: Literature Review

2.1 Construction projects	9
2.2 Construction project classifications	10
2.3 Construction projects stakeholders	11
2.4 Construction project lifecycle	12
2.5 Cost overrun in construction projects	15
▪ Cost estimation	16
2.6 Time overrun in construction projects	18
▪ Delay types	18
2.7 Responsibility for cost and time overruns	20
▪ Cost and time overrun causes classification	21
2.8 Factors cause cost and time overruns	23
2.8.1 Owner’s related factors	23

2.8.1.1	Project planning factors.....	24
2.8.1.2	Contractual factors	25
2.8.1.3	Managerial factors	26
2.8.1.4	Financial factors	28
2.8.2	Consultant's related factors	30
2.8.2.1	Designer consultant related factors	31
2.8.2.2	Supervisor consultant related factors	32
2.8.3	Contractor's related factors	34
2.8.4	External related factors	40

Chapter Three: Research Methodology

3.1	Introduction	46
3.2	Scope of the research	46
3.3	Research Strategy	46
3.4	Research population	47
3.5	Research Sample	48
3.6	Data collection	52
3.7	Questionnaire evaluation and review	54
3.8	Data Analysis	56
3.8.1	Data Analysis Methods and Approaches.....	56
3.8.2	Data Analysis statistical tools	57

Chapter Four: Data Analysis & Results

4.1	Introduction	61
4.2	Sample characteristics	61
4.3	Ranking of overruns factor	63
4.3.1	All Sample participants analysis	64
4.3.1.1	Ranking of all groups overruns factors.....	64
4.3.1.2	Ranking overruns owners' related factors	66

4.3.1.3	Ranking overruns consultants' related factors	68
4.3.1.4	Ranking overruns contractors' related factors	69
4.3.1.5	Ranking of overruns' external factors.....	71
4.3.2	Analysis of the assessment of the owners participating in the study.....	72
4.3.2.1	Ranking of all overruns' causes according to owners' perspectives	73
4.3.2.2	Ranking of owners' related causes according to owners' perspectives	75
4.3.2.3	Ranking of consultants' related causes according to owners' perspectives	76
4.3.2.4	Ranking of contractors' related causes according to owners' perspectives	78
4.3.2.5	Ranking of external related causes according to owners' perspectives	79
4.3.3	Analysis of the assessment of the consultants participating in the study	81
4.3.3.1	Ranking of all overruns' causes according to consultants' perspectives	81
4.3.3.2	Ranking of owners' related causes according to consultants' perspectives	84
4.3.3.3	Ranking of consultants' related causes according to consultants' perspectives	86
4.3.3.4	Ranking of contractors' related causes according to consultants' perspectives	87
4.3.3.5	Ranking of external related causes according to consultants' perspectives	89
4.3.4	Analysis of the assessment of the contractors participating in the study	90
4.3.4.1	Ranking of all overruns' causes according to contractors' perspectives	91

4.3.4.2	Ranking of owners' related causes according to contractors' perspectives	93
4.3.4.3	Ranking of consultants' related causes according to contractors' perspectives	95
4.3.4.4	Ranking of contractors' related causes according to contractors' perspectives	97
4.3.4.5	Ranking of external related causes according to contractors' perspectives	98
4.4	Major stakeholders' results comparison	100
4.4.1	Respondents' comparison for all factors ranking	100
4.4.2	Respondents' comparison for all owners' related factors ranking	102
4.4.3	Respondents' comparison for all consultants' related factors ranking	104
4.4.4	Respondents' comparison for contractors' related factors ranking	106
4.5	Reliability of factor Analysis	107

Chapter Five: Conclusion and Recommendations

5.1	Introduction	110
5.2	Conclusion	110
5.3	Recommendations to owners	112
5.4	Recommendations to consultants	114
5.5	Recommendations to contractors	115
5.6	General recommendations	116
	References	119
	Appendix	125

List of Tables

No.	Table Title	Page.
2.1	Owners' overruns related factors	29
2.2	Consultants' overruns related factors	33
2.3	Contractors' overruns related factors	37
2.4	Overruns' externally related factors	43
3.1	Research sample size	51
3.2	Questionnaire reviewer information	54
3.3	Cronbach Alpha values and the internal consistency classification	58
4.1	Sample demographic characteristics	62
4.2	Analysis of all respondents' evaluations for all overruns factors	65
4.3	Analysis of all respondents' evaluations of owners' overruns related factors	67
4.4	Analysis of all respondents' evaluations of consultants' overruns related factors	68
4.5	Analysis of all respondents' evaluations of contractors' overruns related factors	70
4.6	Analysis of all respondents' evaluations of overruns' external factors	71
4.7	Ranking of all overruns' causes according to owners' perspectives	74
4.8	Owners respondents' analysis of owners' related factors	76
4.9	Owners' respondents' analysis for consultants' related factors	77
4.10	Owners' respondents' analysis for contractors' related factors	79
4.11	Owners' respondents' analysis for overruns' external factors	80
4.12	Consultants' respondents' analysis for all overruns' factors	83
4.13	Consultants' respondents' analysis for owners' related factors	85
4.14	Consultants' respondents' analysis for consultants' related factors	87
4.15	Consultants' respondents' analysis for contractors' related factors	88
4.16	Consultants' respondents' analysis for overrun's external factors	90

4.17	Contractors' respondents' analysis for all overruns factors	92
4.18	Contractors' respondents' analysis for owners' related factors	94
4.19	Contractors' respondents' analysis for consultants' related factors	96
4.20	Contractors' respondents' analysis for contractors' related factors	98
4.21	Contractors' respondents' analysis for overruns' external factors	99
4.22	Cronbach Alpha analysis results	108

List of Figures

No.	Figure Title	Page.
1.1	Construction sector quarterly contribution in Palestinian GDP	2
2.1	Integrated relation between construction project parties	12
3.1	Sample size calculator for specified population	50
3.2	Sample size calculator for unspecified population	51
3.3	Research analysis approaches and different analysis methods	57
4.1	Top 10 factors classification according to respondents' category	101
4.2	RII Values ranges according respondents' category	102
4.3	Top 5 owners related factors classification according to respondent category	103
4.4	RII value ranges for owner-related factors	104
4.5	Top 5 consultants' related factors classification according to respondent category	105
4.6	RII value ranges for consultants'-related factors	106
4.7	RII value ranges for contractors'-related factors	107

ABSTRACT

In this thesis, the researcher aims to investigate the causes of cost and time overruns in construction projects in Palestine and ranks them according to their contribution to overrun occurrences. The study collects and classifies overrun causes into four major groups which are: owners, consultants, contractors, and external causes. The research sample size is 242, while the participants are 146, with a response rate of 60%. The participants evaluation of the questionnaire is analyzed using different approaches via Excel in order to get a deeper understanding of overrun causes. The general approach, which is wider in coverage, includes analyzing data in five ways which are: analyzing evaluations for all factors, analyzing owners' related factors, analyzing consultants' related factors, analyzing contractors' related factors, and analyzing external factors separately. Other analysis approaches are also used, such as analyzing the perspectives of owners, consultants, and contractors separately to understand each category's priorities. The research analysis concludes that the lack of sufficient financing for projects by owners is the most common effect factor that causes overruns, according to all sample analyses. Furthermore, the research finds that the designer's reliance on an unqualified team to complete the design is the highest consultant's related factor. Poor performance by the contractor's subcontractors has the highest impact between contractor's related factors. Finally, the Israeli occupation of the Palestinian territories has the highest impact between external related factors. The research concludes and discusses owners, consultants, and contractors' perspectives toward the highest impact causes and categorizes their assessments for each major cause group.

ملخص

تهدف هذه الدراسة الى دراسة أسباب ارتفاع التكلفة والزيادة الزمنية في المشاريع الانشائية في الضفة الغربية – فلسطين وترتيبها حسب أهميتها في حدوث الزيادات في المشاريع، قامت الدراسة على جمع هذه الأسباب وتصنيفها حسب الجهة المسؤولة عنها وتقييمها من قبل عينة ممثلة وعمل تحليل احصائي مناسب لها. بلغ عدد المشاركين في الاستبيان للدراسة 146 مشارك من أصل 242 هو حجم العينة الممثلة بنسبة مشاركة بلغت 60%. تم تحليل إجابات المشاركين في الاستبيان بعدة طرق للوصول لفهم واسع و عميق لأسباب التأخر و ارتفاع التكلفة في المشاريع الانشائية، الطريقة العامة و الأهم هي بدراسة نتائج العينة المشاركة كاملة و تحليل تقييمها للعوامل بعدة طرق، الطريقة الاولى قامت بتحليل كامل الأسباب بشكل عام و تقييمها، الطريقة الثانية قامت على تحليل تقييم العينة المشاركة للعوامل المتعلقة بالمالكين بشكل خاص، الطريقة الثالثة قامت على تحليل تقييم العينة المشاركة للعوامل المتعلقة بالمستشار الهندسي، الطريقة الرابعة قامت على تحليل العينة المشاركة للعوامل المرتبطة بالمقاول، و الطريقة الخامسة قامت على تحلي العينة المشاركة للعوامل المرتبطة بالعوامل الخارجية. كما قامت الدراسة بتحليل تقييم الأطراف الرئيسية في المشروع وهم المالك والمهندس المستشار والمقاول بشكل منفصل لمعرفة رأي كل جهة بهذه العوامل ومقارنة هذه الآراء. وجدت الدراسة ان أكثر عامل يساهم في حدوث ارتفاع تكاليف وتأخر زمني في المشاريع الانشائية هو عدم تخصيص المالكين لميزانية كافية لإنجاز المشروع، كما وجدت الدراسة ان اعتماد المكاتب الهندسية على مهندسين بخبرة غير كافية هو أكثر العوامل المرتبطة بالمكاتب الهندسية مساهمة في حدود الزيادات الزمنية والمالية في المشاريع. إضافة الى ذلك وجدت الدراسة ان ضعف الأداء الفني لمقاولي الباطن هو أكثر الأسباب مساهمة من بين الأسباب المرتبطة بالمقاول وان الاحتلال الإسرائيلي لفلسطين هو أكثر الأسباب مساهمة في الزيادات من بين الأسباب المعرفة بالعوامل الخارجية. لفهم أكثر دقة لعوامل التأخير وارتفاع التكلفة، قامت الدراسة بتحليل آراء المالكين والاستشاريين والمقاولين كل على حدى وتحليل وجهة النظر الخاص به وعمل مستخلص لوجهة نظره الخاصة في أسباب التأخيرات و الزيادات بشكل منفصل.

Chapter One

Research General Framework

1.1 Introduction

The construction sector is one of the main sectors of the global economy. The contribution of this sector to the world GDP exceeded 12 trillion American dollars in the year 2019, with a percentage of 13.7% (De Bes, 2021). The construction sector is also responsible for a large number of laborers all over the world, with more than 100 million workers involved in the construction sector in 2018 (Market Prospect, 2021).

According to the "Trading Economics" analysis for the Palestinian Central Bureau of Statistics reports, in Palestine, the statistics show that in 2018, 5.6% of the Palestinian GDP came from the construction sector itself, and in 2019, the percentage was 5.2%. However, in 2020, the percentage decreased dramatically to 3.5% due to the COVID-19 pandemic.

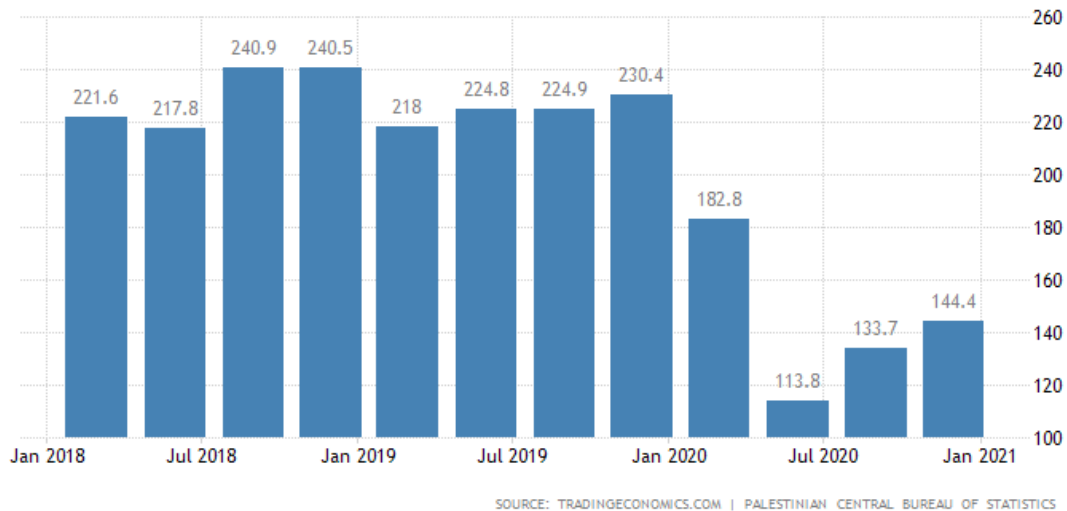


Figure 1.1: Construction sector quarterly contribution in Palestinian GDP

Source: Palestinian Central Bureau of Statistics

As seen above, the contribution of the construction sector in Palestine is significantly less than that in the rest of the world, which means that it is a sector that has a good margin for development and growth to reach the global percentage. Figuring out the problems

that face this sector and finding solutions to them is the first and most important step in developing it.

Reducing cost and time overruns are two of the largest struggles which the construction sector is facing (Dlamini & Cumberlege, 2021). For instance, it is common that construction projects in Palestine suffer from the increment of actual costs and time frames over the budget and duration estimated at the beginning of the project (Mahamid and Bruland, 2012). Cost overruns and time delays lead to massive damages for project owners and investors (Whelan, 2022). This issue reduces the number of executed projects in general, which reduces profit, causing the suspension of execution of many projects before completion, reducing labor, and increasing unemployment. Moreover, this problem reduces the productivity of projects and increases legal conflicts between project parties (Endut et al., 2014).

In this research, the causes of the cost increase over the estimated budget in construction projects in the West Bank, in addition to time delays in the execution of the projects, are discussed. The roles of the project's main stakeholders, which are the owner, the consultant, and the contractor, in cost and time overruns are figured out, as are the effects of other external factors such as legal, social, economic, and environmental factors.

An analysis employing a model of data collected via a questionnaire disseminated to a sample of owners, consultants, and contractors identifies the most influential factors among the four major cause groups.

1.2 Research Problem

The Palestinian construction industry is a vital part of the country's economy. The industry plays a crucial role in developing the country's infrastructure, a per-requisite for high levels of economic growth. Most construction projects experience cost and time overruns, which put a massive financial burden on clients or owners.

Examples of cost and time overruns in construction projects exist all around the world; according to recent studies, the average overrun of construction projects all over the world has exceeded the determined budget by 16% (Aero, 2020).

In Palestine, the average cost overrun and time delay in construction projects is about 30%, according to Eng. Badran (2020) from the Ministry of Public Works and Housing. The percentage is considered quite high, and it needs to be brought down as many projects face time delays or might get uncompleted due to overrunning the budget. It is widely stated that construction projects financed by the government have limited financial resources due to the Palestinian government's dependence mostly on donors to finance needed projects. Therefore, cost and time overruns in a project mean cutting from the financial resources of another project, which may cause a delay or cancellation of planned new projects (Badran, 2020).

Cost and time overruns have an effect on private projects as well; in some cases, they can result in decreased profits for the owner and contractor, technical difficulties with the project, legal conflict between the project's stakeholders, and even project failure.

In Palestine, there is a scarcity of similar studies and research that investigate the time and cost overrun problems, despite their importance for the construction sector.

According to the researcher's findings, few papers and master's theses related to the cost and time overruns in construction projects have been published in the last 10 years.

Therefore, this study aims to identify the main factors that cause costs and time overruns in construction projects in the West Bank of Palestine and to suggest solutions that may minimize their impact on construction projects.

1.3 Research Questions

The main question that the research aspires to answer is: what factors contribute more to the occurrence of cost and time overruns in construction projects in the West Bank - Palestine? This question can be broken down into:

- 1- What owner-related factors have a higher impact on the occurrence of cost and time overruns in construction projects in the West Bank - Palestine?
- 2- What consultant-related factors have a higher impact on the occurrence of cost and time overruns in construction projects in the West Bank - Palestine?
- 3- What contractor-related factors have a higher impact on the occurrence of cost and time overruns in construction projects in the West Bank - Palestine?
- 4- What external factors (political, social, economic, or environmental factors) have a higher impact on the occurrence of cost and time overruns in construction projects in the West Bank - Palestine?

1.4 Research Objectives

The aim of this study is to identify factors that cause cost and time overruns in construction projects in the West Bank – Palestine. These factors are divided into four major groups: consultant-related factors, owner-related factors, contractor-related factors, and external factors. Each major group's factors are classified into subcategories for a deeper understanding of these factors.

The study also aims to rank classified factors according to their impact. Factors were ranked according to different major stakeholder points of view to achieve a deeper understanding of owners, consultants, and contractors' priorities in order to suggest solutions to minimize overrun occurrences.

1.5 Research Significance

Cost and time overruns in projects are two of the major problems that face the construction sector in the world in general and in Palestine in particular (Albatsh, 2015). Identifying factors that cause cost and time overruns is the first step to minimizing their impact on the construction project, and classifying identified factors into major groups according to responsibility helps determine each party's responsibility to eliminate overruns.

The research has importance for decision-makers and practitioners involved in construction projects and construction management in Palestine when it investigates overrun causes in the Palestinian construction sector. Such investigations help enhance cost and time control for these projects.

In addition, the research has a theoretical contribution to make to the Palestinian literature on construction management, where insufficient research has been published in recent years on this important topic.

Chapter Two

Literature Review

2.1 Construction projects

The construction industry is the industrial division of production and trade that is concerned with the construction, repair, renovation, and maintenance of infrastructure (Hussain et al., 2022). In addition to its significant contribution to a country's economic and social development, the global construction industry's estimated market size in 2021 was \$7.28 trillion, with projections to reach \$14.41 trillion by 2030 (construction market report, 2022).

A construction project is the planned process of constructing, repairing, or refurbishing a building, structure, or infrastructure (Lingard et al., 2017). Typically, the project process begins with an overall need that is refined through the formulation of a brief, feasibility studies, option studies, design, finance, and construction (Hakoune, 2022).

The complexity of construction projects was the main impetus for the development of the science of construction project management. Walker (2015, P11) defined construction project management as "the planning, coordination, and control of a project from conception to completion (including commissioning) on behalf of the client, requiring the identification of the client's objectives in terms of utility, function, quality, time, and cost; the establishment of relationships between resources; integrating, monitoring, and controlling the contributors to the project" in his textbook "Project Management in Construction".

The Project Management Institute (PMI) defines construction project management as "the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, cost, time, quality, and participating objectives."

2.2 Construction project classifications

In order to comply with construction project requirements and standards, project managers must create categories depending on the project's needs. Professionals can assess construction projects by classifying them based on common characteristics using different classification techniques (Safa et al., 2015).

There are numerous project classification methods applicable to construction management. Each method has its own optimal application field, ranging from a simple guide for quick project classification to specific project characterization techniques for scheduling. Classifying construction projects based on their function, size, complexity, or owners are a common classification method (Okere, 2019).

The principal application of the functional classification of projects is to categorize them according to their primary function or objective (Safa et al., 2015). Wolf (2022) classified construction projects according to their function into four types, which are:

- Residential buildings, like homes.
- Commercial buildings, such as offices or warehouses.
- Industrial facilities, like factories or large-scale production facilities.
- Infrastructure projects, such as roads, bridges, airports, or wastewater systems.

Classifying projects according to function provides insight into the function of the project as well as the techniques and equipment that may be required for its construction (Tan & Lu, 1995).

Another common classification for construction projects is according to their size. The size of the project impacts the degree of difficulty in achieving its objectives; the size

classification category includes different characteristics such as contract amount, project duration to accomplish the job, size of project staff, or any other measured characteristic (Wiley, 2011).

classification according Complexity is used to classify construction projects; it investigates how interactions between a project's participants lead to the project's collective actions and how the project interacts with its surroundings (Wood, 2008).

2.3 Construction projects stakeholders

Construction project Stakeholders are those who have an interest in or concern about the project or are affected as a result of project execution or successful project completion. The Project Management Institute (2008) defines project stakeholders as "Individuals and organizations who are actively involved in the project or whose interests may be positively or negatively affected as a result of project execution or successful project completion."

There are a variety of potential stakeholders for a construction project due to the fact that stakeholders vary based on a large number of variables (Moore, 2022). Watt et al. (2020) classified a project's stakeholders as internal and external stakeholders, internal stakeholders include the project owner, supplier, creditor, contractor, subcontractors, consultant engineer, and project team; external stakeholders include interest groups, residents, social groups, political groups, and government-related departments.

The most common classifications of stakeholders categorize them as primary and secondary stakeholders (Kermanshahi & Safapourn, 2018). The primary stakeholders of a project are the owner, the consultant, and the contractor; the other stakeholders are considered secondary stakeholders (Viter, 2022).

The relationship between the primary stakeholders is an integrated one. In the event that the three parties commit to this relationship, the project will be completed within the estimated budget and timeframe; therefore, cost and time overruns will be minimized (Bourne, 2006). Moreover, the cooperation between the three main parties could help partially minimize the effect of external factors (Viter, 2022).

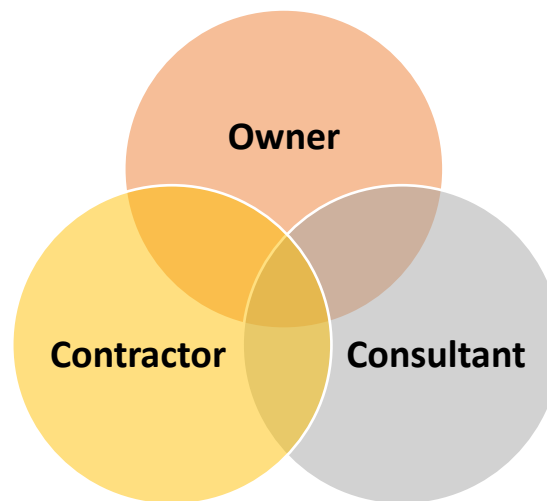


Figure 2.1: Integrated relation between construction project parties

Source: AIA contract documents, <https://help.aiacontracts.org/aia-contract-relationship-diagrams/>

2.4 Construction project life cycle

The construction project life cycle is the correct sequence for completing a construction project's duties. It serves as a road map for the entirety of the project completion process, from the basic concept to the last details. It helps ensure that construction projects are coordinated, completed efficiently, and on schedule (Noktehdan et al., 2019).

Researchers classified the construction project life cycle into different phases. Larson & Gray (2011) classified the project's life cycle into four phases: defining, planning, executing, and delivering. Abdul-Kadir & Price (1995) classified the project life cycle into

five phases, which are: the conceptual phase; the detailed engineering phase; the procurement phase; the construction phase; and the startup phase. Synuma (2022) classified the project's lifecycle into five phases, which are: initiation, planning, execution, performance and monitoring, and the closure phase.

Regardless of the phases of the project life cycle to which the project was assigned, the project's beginning begins when the green light is issued. Project effort begins slowly, increases to a peak, and then drops until client delivery (Larson & Gray, 2011).

The initiation phase is called the conceptual phase or the defining phase in different resources. It has the most impact on the subsequent phases. The success of these phases rests heavily on the decisions made during the conceptualization phase (MacNeil, 2022; Larson & Gray, 2011). It includes four steps: creating a project charter, identifying key stakeholders, running a feasibility study, and assembling the project team and tools. In the first step, the project must justify why it is required and what benefits it will offer (Taylor, 2022).

The project planning phase includes the development of goals and objectives that describe the work to be completed, the schedule for the project, and the resources required to achieve the project's objectives (Zwikael, 2009).

Project planning is the establishment of the procedures, policies, and programs to attain those objectives (Irfan et al., 2021). According to the Project Management Institute, the planning process consists of identifying and refining project objectives and selecting the most suitable options to meet these objectives.

The purpose of project planning is to create a road map for the undertaking, complete with enough information to inform the project team of the work packages that need to be

executed and the dates by which they must be completed, as well as to monitor the project's overall progress and preserve its record for future reference (Kloppenborg, 2011). Another objective of project planning is to verify if the plan is feasible and that planning methods will transform the objectives into activities that can be accomplished (Hamzeh et al., 2015).

In the execution phase, the project team and the required resources should be in place and ready to undertake project operations, and the project plan should have been finalized and evaluated at this point (Parsons, 2022). The project team and especially the project manager's attention switch from planning project activities to participating in, monitoring, and assessing the actual work being performed.

The execution phase may face challenges that may interfere with the project. The most common challenges are ineffective leadership, unclear goals and objectives, a lack of communication, team conflict, strategy execution gaps, weak change management, a lack of resources, and inadequate risk management (Tawfik, 2022).

The performance and monitoring phase start side by side with the execution phase. It incorporates all progress and performance measures. The main goal of performance and monitoring is to make sure that everything goes as planned by the project manager (Marketing Indovance, 2022). Informing project stakeholders is a crucial element of performance and monitoring. Regularly, project managers should submit progress reports that adhere to the approved forms. The majority of progress reports emphasize the probable end objectives for deliveries (Jenkins, 2022).

The purpose of the closing phase in the project lifecycle is to ensure the completion of project objectives to the satisfaction of the project owners and to inform all participants

and stakeholders of the project's conclusion and status (Caibula, 2021). Furthermore, the closing phase must include lessons learned and best practice recommendations. Moreover, a special focus is also placed on the project's sustainability (Pérez-Ezcurdia et al., 2015).

2.5 Cost overrun in construction projects

A cost overrun is defined as the increase in the total actual cost of the project over the estimated and budgeted cost. Invernizzi et al. (2018) defined a cost overrun as a situation where the actual cost is higher than the original estimate. Flyvbjerg et al. (2018) defined the cost overrun as the amount by which costs exceed the estimated cost.

According to the Association for Project Management (APM), overrun costs are incurred in excess of the contract target costs on an incentive-type contract or of the estimated costs on a fixed-fee contract. An overrun is when a project's budget exceeds the amount that management has approved.

A cost overrun can be calculated either as a fixed amount or as a percentage of the original contract value. A fixed-amount cost overrun is the difference between the contract value at the bedding phase (before starting the work) and the actual contract value at project handover (Patel, 2022). By dividing "the difference between the contract value at the bedding phase and the actual contract value at project handover" by the estimated project value, it is possible to calculate cost overrun as a percentage (Kanabar et al., 2009).

$$\text{Cost overrun} = \frac{\text{Final actual contract value} - \text{Estimated contract value}}{\text{Estimated contract value}}$$

In the bedding and document preparation phase, the cost overrun is high as a result of the difference in pricing techniques and cost estimates between contractors and consultant engineers, where the consultant engineer gives priority to the owner's needs and is not deeply involved in pricing; on the other hand, contractors are deeply involved in pricing and perform the work at a minimum cost (Rogers, 2001). In the contracting phase, cost overruns occur due to mistakes in quantity estimates, risks, changes in the scope of work, or cost escalation (Srivastav, 2020).

❖ **Cost estimation**

Project cost estimation is the process of predicting the total cost of the tasks, time, and resources required to deliver a project's scope of work (Meier, 2020). Overlap occurs between the project estimation lifecycle and various project phases (Olivarria, 2019).

Cost estimating main types are:

- Preliminary estimate
- detailed estimate
- quantity estimate
- bid estimate.

According to AACE International Recommended Practice No. 18R-97, the preliminary estimate, or "Class 4 Estimate," is made at the early phase of the project, "the conceptual stage," and depends on limited information where the project plans and details are not yet prepared. It may be used for strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to the next stage (De Soto, 2014).

A preliminary estimate is important in the decision-making process of a project's feasibility and becomes the basis for the economic analysis and the "go/no-go" decision (Shtub, 2005). With its fairly wide accuracy range, the preliminary estimate becomes the baseline estimate from which future estimates are unreasonably expected to agree (Oberlender, 2001).

The next step after making the "go" decision is the detailed estimate, where in this phase more information is available about the project, with 30–70% of the project definition being delivered (Shtub, 2005). This type of estimate is required to prepare the contract documents and serves as a guide in the execution of the work, financial plans, and cash flow plans. The accuracy range is from -15% to +20%, which is better than the preliminary estimate. (AACE International Recommended Practice No. 18R-97).

The consultant engineer prepares and submits a quantity estimate to the owner. It's important that it gives a list of all used materials, items, and jobs with a description of the work and the final expected quantities to accomplish the project (Hamakareem, 2022). To make an accurate quantity estimate, an engineering job that includes the project's drawings and specifications should be accomplished. According to AACE The expected accuracy range is high (-10-+15%), which helps to keep the project under control.

Depending on the project documents, the contractor creates the majority of bid estimates during the pricing phase. An accurate cost estimate helps contractors effectively price bids and achieve bidding objectives (Neenu, 2023). Mostly, the contractor's cost estimate is the baseline for the contractor's bid price, where the bid price is a combination of the cost estimate and profit margin (Akintoye & Skitmore, 1992).

2.6 Time overrun in construction projects

One of the biggest problems facing the construction business today is time overruns (Memon et al., 2011). When the project is not completed in the allotted time, there is a time overrun (Memon, 2012). On average, all over the world, 74% of construction projects suffer time overruns (Rivera et al., 2017).

Akhund et al. (2017) defined time overrun as a condition where the actual work is not completed in the estimated time period. Memon (2012) defined time overrun as the completion of the work later than expected or as agreed upon in the contract. Time overruns may occur in all phases of a project, which are planning, design, construction, and finishing (Ismail et al., 2014), while Chan and Kumaraswamy (1997) claim that most project delays occur in the construction phase.

❖ Delay types

Project delays and time overruns may occur for different reasons or parties. Much research has discussed types of delays to help in dealing with these delays. Kraiem and others (1987) classified delays according to liabilities into three major types, which are: 1-compensable, 2-excusable, and 3-nonexcusable.

Akhund et al. (2017) classified time overruns in construction projects into two types: inexcusable delays and excusable delays. Moreover, they classified excusable delays into non-compensable and compensable delays. Benarroche (2022) and Lepage (2020) both classified construction delays as: 1-critical and non-critical; 2-excusable and inexcusable; and 3-compensable and non-compensable.

Excusable delays are delays that occur because of unforeseeable or unexpected events (Revak, 2022). The first step to determining if the delay is excusable or not is to determine

the party's liability (Pany, 2018), where excusable delays leave related parties with no fault or negligence (Lepage, 2020).

Excusable delays can happen at any point in a project's lifecycle and take a variety of forms, including unanticipated events, events beyond one's control, and events that are not the result of negligence or fault (Kraiem et al., 1987). Unforeseen events refer to future events that are not clear currently. Furthermore, events that the contract warns about are not considered unforeseen events. Events beyond the party's control, or force majeure, are events beyond any party's reasonable control (Hughes, 2020).

The delay is classified as non-excusable when it is a result of the project party's own mistake or caused by sub-parties within his responsibility, such as subcontractors or material suppliers (Afshari et al., 2010). Contract documents usually interpret and list events classified within this type of delay. The party who suffers from the delay has the right to submit claims for damages, which could be in the form of time or money (Abd Majid & Zaimi, 1997).

Critical delays are delays that may affect the project's completion. Lepage (2015) defined a critical delay as a type of delay that "affects the project delivery date" or that affects the project's critical path. Non-critical delays are delays that do not affect the project completion date and have no effect on activities on the critical path (Fakunle, 2020). The project time frame is the tool used to determine whether the activities' delay is critical or not, as well as help correct non-critical activities from critical delay (Benarroche, 2022).

Compensable delays are delays that a party, mostly the contractor, has the right to ask for time extensions and additional compensation for. Bin Yousof et al. (2007) defined it as "those for which the construction contract allows the contractor to claim additional

monies equal to the monies lost by the contractor due to the delay and also additional time." The parties affected by these delays have the right to compensation, which may be a time extension, monetary compensation, or both (Kamandang & Casita, 2018). Examples of compensable delays include delays caused by late instructions given to the contractor, delays in the approval of materials, incomplete designs, and changed orders given to the contractor.

Non-compensable delays are delays that occur due to uncontrollable causes (Tayade and Mahatme, 2020). No-compensable delays are defined as those in which, although an excusable delay may have occurred, the contractor or the effected party is not entitled to any added compensation resulting from the excusable delay (bin Yousof et al., 2007). Third parties or incidents beyond the control of both the owner and the contractor cause non-compensable delays. Typical examples include unusual weather, strikes, government acts, and so on. (Gajare et al., 2014)

Concurrent delays occur when two or more parties are at fault. Kraiem and Diekmann (2014) defined concurrent delays as delays that refer to two or more delays that occur at the same time and would have affected the ultimate completion date if they had occurred separately. The concurrency argument is important not just for defining the project's critical delays but also for allocating responsibility for losses connected with delays to the critical path (Tayade & Mahatme, 2020).

2.7 Responsibility for cost and time overruns

Major stakeholders take their place individually in analyzing responsibility for causes of cost and time overruns, and this is because they have a significant effect on the project and are a major partner in the project (Safapour & Kermanshachi, 2020). Secondary

stakeholders have a minor effect on the project's daily activities and are mostly responsible for one of the major stakeholders' related activities (Malkat & Byung-GYOO, 2019).

❖ **Cost and time overrun causes classification**

Many scholars have looked into the reasons why construction projects go over budget and beyond completion dates in different countries and tried to put those reasons into groups. Shibani (2015) classified overruns as the result of internal or external factors. Internal factors are those that occur because of one or more of the four parties involved in the project: the owner, contractor, designer, and consultant. External causes are any causes that do not occur because of one or more of the four parties to the project, such as weather, government, or suppliers (Raykar, 2016).

The most common classification is to classify overrun causes according to responsibility. Albtoush et al. (2019) classified causes of cost overruns according to responsibility into 10 groups, which are: design and contract related factors; estimation related factors; planning and schedule related factors; project management related factors; labor related factors; financial related factors; materials and machinery related factors; construction related factors; communication related factors; and external related factors.

Alshihri et al. (2022) classified overrun factors into 9 groups, which are: client-related factors, contractor-related factors, labor-related factors, designer-related factors, materials-related factors, consultant-related factors, external risks, equipment-related factors, and force majeure. Shibani (2015) classified overrun causes into eight groups, including factors related to the owner, the contractor, the consultant, the drawings and

designs, the labor and equipment, the construction materials, the project itself, and external factors.

In the same way, Enshassi et al. (2009) categorized overrun factors in 12 groups, Muianga et al. (2015) in 11 groups, Widiaputra & Arumsari (2021) in 10 groups, Abd El-Razek et al. (2009) in 9 groups, Shaikh (2020) in 7 groups, and Baker (2015) in 6 groups.

Other researchers, such as Al Amri & Marey-Pérez (2020), Abd El-Razek et al. (2009), Albatsh (2015), Fugar & Agyakwah-Baah (2010), Rauzana (2016), and others, have classified overrun causes according to the core project parties' responsibilities. These core groups are: client-related factors; consultant-related factors; contractor-related factors; and external-related factors.

Another classification used is to classify overrun causes according to construction project type or sector. Construction projects' major sectors are residential buildings, commercial buildings, industrial facilities, and infrastructure projects (Matlin, 2021). Abd El-Razek et al. (2009) found different rankings for the most important delay causes according to project sector, where each sector has different priorities than others.

A key way to divide construction projects by sector is by whether they are private or public. Laws, funding, bedding methods, payment methods, claims, and conflicts are different for private and public projects (Bour et al., 2022), and these differences, of course, have to be taken into account in overrun analysis.

Simple classifications are used to understand the causes of cost and time overruns from different perspectives. A common classification is according to project size. Project size is measured in terms of estimated costs and is usually categorized as small, medium, large, or very large projects (Kaliba et al., 2009). Cantarelli et al. (2012) found that small

Dutch projects have the largest average percentage of cost overruns, but in terms of total overruns, large projects have a larger share. Shaikh (2020) and Johnson & Babu (2018) used simple classifications that take factors only as cost overrun causes, time overrun causes, or both.

In Palestine, the main project parties are mostly responsible for all their related works; one explanation is that the contractor is responsible for supplying the subcontractor with needed material, labor affordability, equipment, and all related activities to complete his activities. Furthermore, the client is accountable for making timely and accurate decisions and for keeping track of the scope of the project and all financial flows. The consultant is responsible for the right communication between the project parties, the suitable design, and the needed documents.

2.8 Factors cause cost and time overruns

Overrun factors are classified in this research according to the project parties, who are the owner, the consultant, and the contractor, in order to fit the Palestinian construction industry model. Any other factors outside of these main parties' control will be classified in a fourth group, which is identified as external factors.

2.8.1 Owner's related factors

These are the factors that cause cost and time overruns for construction projects, and they are within the owner's responsibility (Kamaruddeen et al., 2020). Sharma & Gupta (2011) classified owner-related factors into four main groups based on their function: project planning factors, contractual factors, managerial decision factors, and financial factors.

2.8.1.1 Project planning factors

The project owner is accountable for the big picture of the project; therefore, he produces the project vision and establishes the project objectives. He also has ownership over the project in the sense that he is responsible for its success or failure (Assaf et al., 2006).

In order to protect his interests, the owner sometimes makes planning-related decisions that result in cost and time overruns. Changing the scope of the work (AlAmri and Perez, 2020) and making changes in the initial design (Albtoush et al., 2019) Other causes that are classified as planning factors are inadequate initial planning and scheduling (Almaktari et al., 2017), poor estimation of the original project's expected time and cost (Annamalaisami & Kuppuuswamy, 2019), and not setting risk management strategies (Enshassi, 2009). On the other hand, if the owner plans well, there won't be as many extra works or change orders during both the design and construction phases, which will keep project overruns down (Enrica et al., 2021).

Furthermore, proper planning includes criteria for selecting a suitable consultant to design and supervise the project as well as a qualified contractor to construct the project; obviously, the provided price is very important to the owner, but qualified people are also very important. The owner should obtain prices from an adequate number of service providers in both the design and construction phases to create competition and get the best price; a limited number of competitors means higher prices and lower quality, which affects the project's final results (Bekr, 2015).

It is the owner's responsibility to select an appropriate site for the construction of the project. Inaccessible and far-flung logistics projects will face difficulty throughout the construction phase, which may result in cost and time overruns (Shah, 2016).

2.8.1.2 Contractual factors

The contractual decisions are the responsibility of the owner and may have long-term effects on the construction project. The owner is responsible for selecting the consulting engineer who will create the project design and supervise construction, and the selection of the construction contractor is the most critical contractual decision. If the consultant and contractor are selected based on who offers the lowest price, this is a contractually significant decision that could result in a delay in the project (Gunduz, 2018).

The selection of the proper type of contract is another essential contractual aspect; utilizing an unsuitable type of contract may result in cost and time overruns in the project (Johnson & Babu, 2018). After selecting the type of contract and the parties to the contract, the owner may request initial requirements that are unreasonable and may result in cost and time overruns (Kamaruddeen et al., 2020). Such requirements include requesting a sophisticated design or overqualified staff members. Surely, the lack of a unified system for the contract's general conditions allows for such conflicts, which contribute to project overruns (Ismail et al., 2013).

Al-Makharzah (2020) asserts that errors in the tendering phase will inevitably result in cost and time overruns, so it is crucial to allocate sufficient time to this phase to ensure that all contract documents are accurate and error-free. In some cases, the owner uses his power to impose unrealistic deadlines to finish the required jobs in different phases (Abd El-Razek et al., 2008). Such behavior might occur in the design and bid preparation phases, where it may cause big mistakes in the design or contract documents, or in the construction phase, where it may cause conflicts and struggles with the project parties.

One of the contractual problems that may face the project is the suspension of the project, which occurs following the owner's request (Gupta & Kumar, 2020), in line with a contractual right to do so, that a contractor stop work for a specified period of time on a project. Suspension can occur for different reasons, but commonly happens when the owner faces a problem with project funding or an unanticipated issue during construction that necessitates significant revisions to the work scope (Henderson, 2008).

2.8.1.3 Managerial factors

The project owner has an important managerial role in all phases of the project lifecycle, and any mistakes in this role may cause project cost and time overruns.

Most owners lack extensive experience in the construction industry, which may lead to decisions that result in cost and time overruns (Alshihri et al., 2022). To overcome the lack of experience problem, the owner has to employ a project manager to represent him and help in owner-related decisions; this project manager should be qualified and have the required experience in construction projects to protect the owner's interests. The owner's representative's lack of experience will almost certainly result in project overruns and a struggle for project progress (Enshassi, 2009).

The process of decision-making is crucial to the success of a construction project (Poon and Price, 1999). The owner's related decisions should be accurate and quick; wrong and late decisions definitely cause cost and time overruns for the project (Alajmi & Memon, 2022). Bureaucracy has been identified as one of the most difficult issues in many countries; it has been blamed for many project failures, particularly in the public sector (Karimi et al., 2020), and thus excessive bureaucracy in owner administration is classified

as one of the managerial causes of project overruns on the owner side (Akhund et al., 2018).

Before the tendering phase, it is the owner's or his representative's responsibility to ensure all documents are prepared correctly. Safapour and others (2020) found that preliminary tender documents, which might contain incomplete documentation or errors on bills of quantities, are one of the most common causes of project overruns. Shibani (2015) found another cause of overruns related to the tendering period, which is the long period between the design phase and the tendering phase. During this long time between design and tendering, things may have changed in the construction industry, like the materials that are available or the rules or costs of building. These changes affect the project directly and may cause cost and time overruns during the building phase (Alajmi & Memon, 2022).

To protect his interests by completing the project's tasks, the owner must provide logistical and technical assistance to the project's participants. One of the most essential responsibilities of the owner is to provide the requirements for each project phase. For example, if the owner takes too long to get various government approvals, the design stage may also be delayed, and if the owner takes too long to hand over the work site to the contractor, the project's construction will take longer to finish (Tayade & Mahatem, 2020).

Throughout the project's life cycle, the owner must maintain constant communication with all project stakeholders, particularly the consultant and contractor leaders. Raykar & Ghadge (2016) found that continuous communication with all stakeholders accelerates project completion and reduces the probability of cost and schedule overruns.

In exceptional cases, the owner may have no priority or urgency to complete the project for various reasons, such as financial or managerial reasons, which affect his attitude toward other parties and may result in project overruns (Karimi et al., 2020).

2.8.1.4 Financial factors

Funding and Budgeting The project is one of the main responsibilities of the owner. In the initial phases of the project, the owner should estimate the initial budget for the project and decide whether to proceed with it or not. This proper estimate is critical because inaccurate initial estimates may lead to incorrect decisions by the owner and inadequate funding for the project, which will cause cost and time overruns in later phases. (Cantarelli et al., 2012).

Each phase of the project requires its own budget and time to be completed successfully. Alajmi & Memon (2022) found that one of the errors that the owner makes during the design phase is not providing sufficient time and budget for this stage to study the project and complete the work requirements completely and accurately.

The construction phase of a project requires more financing from the project's owner than any other phase. At this point, the owner has financial obligations to the contractor and supervisor engineer corresponding with the finished work. Delay in making payments for finished work in accordance with the contract documents, whether to the contractor or the supervisor, causes the project to overrun (Aljohani et al., 2017). Similarly, the appearance of financial problems for the owner, even if they are unrelated to the project, or a shortage of cash flow in the project, will cause project cost and time overruns (Karunakaran et al., 2018).

Table 2.1: Owners' overruns related factors

Category	Factors
Planning factors	Change of scope of work.
	Change of initial design.
	Inadequate planning and scheduling.
	Poor estimation of the original project cost.
	No risk management strategies.
	Change orders and additional works by owner.
	Number of competitors.
	Location and accessibility of the project.
Contractual factors	Selecting a designer, consultant, and contractor according to the lowest price.
	Inappropriate type of contract used.
	Unrealistic owners' initial requirement.
	Lack of a unified system for contracts' general conditions
	Bid preparation time is limited.
	Unrealistic contract period.
	Project suspension by owner.
Managerial factors	Owner's lack of experience.
	Poor project management experience.
	Delays in decision-making.
	Excessive bureaucracy in owner administration.
	Premature tender documents.
	Long period between design and tendering.
	Delay in land acquisition and handover to the contractor.
	The owner has no priority or urgency to complete the project.
	lack of communication with project parties.
Financial Factors	Inadequate funding for the project.
	Small project design budgets.
	Delay in prompt payment.
	Owner's financial problems.

2.8.2 Consultant's related factors

The consultant engineer is one of the main parties in a construction project and plays a major role in the success or failure of the project. ACEI defines the consultant engineer as “a specialist in both public and private infrastructure planning, design, and construction, where the consulting engineering profession seeks to improve society as a whole by implementing safer, cleaner, and more efficient foundations”.

According to his contract with the owner, the consultant engineer may be the project's designer, supervisor, or both. The designer consultant has a wide range of responsibilities, which include meeting with clients to determine their needs, preparing drawings and plans that illustrate the project's design, Meeting with clients to discuss project details, budget requirements, and deadlines; creating designs for new projects based on client specifications; and meeting governmental project permit requirements (Sarda and Dewalkar, 2016)

The supervisor engineer is a third party who manages the contract between the owner and the contractor; he also communicates with clients to manage expectations and ensure satisfaction. He is also responsible for gathering data, analyzing and interpreting it, and formulating recommendations. Furthermore, developing solutions for difficult client situations in order to achieve goals and objectives, organizing daily fieldwork and project team operations, and measuring project progress, client benefits, and budgetary goals using specialized tracking tools are all part of the job (Shahraki et al., 2018).

As a significant project stakeholder, the consultant has the ability to affect the project in a favorable or negative way. The positive effect result is the achievement of the project's objectives, whereas the negative impact result is time and cost overruns. The causes of

cost and time overruns in construction projects, as well as those within the consultant's responsibility, are discussed below.

2.8.2.1 Designer consultant related factors

In the design phase, different factors may cause cost and time overruns; Annamalaisami & Kuppuswamy (2019) and Al Amri & Marey-Pérez (2020) found that the misunderstanding of owners' requirements by designers, frequent design changes, and client-designer conflicts are factors related to the designer-client relationship. Al-Makharzah (2020) and Enshassi (2009) found that in the design process, project overruns may occur due to design errors, complex designs, a lack of designer technical experience, and inadequate geotechnical investigation. Delays in design preparation and not using a systematic procedure in design are factors contributing to overruns (Mahamid, 2013).

The design phase includes an estimate of the project's budget and duration. Inadequate pre-construction study and estimate (Alshihri et al., 2022), the wrong method of estimation (Raykar & Ghadge, 2016), and differences between the selected bid and the consultant estimate (Shibani, 2015) are some factors that occur during the estimation process and lead to cost and time overruns.

The designer is responsible for preparing the project documentation for bidding. This delicate process has a significant impact on the project and can lead to cost and time overruns in later phases. Common faults that cause project overruns in this process are incomplete designs at the time of tender (Almaktar et al., 2017), specifications for materials not available in the local market (Karimi et al., 2020), and discrepancies between project documents (Abd El-Razek et al., 2008).

The design management may affect the design process badly by allocating a limited budget for design, which occurs by either speeding up the design phase or depending on unqualified staff to prepare the design phase (Aljohani, 2017).

2.8.2.2 Supervisor consultant related factors

During the construction phase, the supervisor consultant represents the client to ensure proper contract implementation until the project is completed. Delays caused by consultants include slow decision-making (Alajmi and Memon, 2022), delays in approval of shop drawings and materials (Albtoush et al., 2019), and delays in approval of completed works (Alajmi and Memon, 2022).

The qualified supervisor should have managerial and technical skills to avoid cost and time overruns. The lack of such skills causes poor site management, low quality assurance controls, and poor contract management (Karunakaran & others, 2017; Cantarelli et al., 2012). Communication and coordination skills are also needed because the project supervisor needs to stay in touch with all of the people involved in the project, especially the owner and the contractor, in order to finish the project successfully (Gunduz, 2017).

The lack of consultant experience is a critical shortcoming in construction projects and leads to cost and time overruns. The lack of experience is represented by staff members' lack of experience (Akhund et al., 2020), the lack of experience in the project's location (Johnson & Babu, 2018), consultants' inflexibility (Gupta & Kumar, 2020), excessive safety concerns (Ismail & others, 2013), and the centralization of decision-making (Mahamid, 2013).

The work environment should be safe and stable for staff members to achieve project objectives successfully. Lack of job security for the working teams and financial

difficulties encourage some consultants to get involved in corruption (Muianga et al., 2015; Tayade & Mahatme, 2020), which leads to project overruns.

Table 2.2: Consultants' overruns related factors

consultant Related Factors	
Designer Consultant Related Factors	Misunderstanding of owners' requirements by designers
	Frequent design changes
	Client-designer conflicts
	Mistakes in design
	Complexity of design
	Designer's lack of experience
	Inadequate geotechnical investigation.
	Delays in design preparation
	Not using systematic procedures in design and supervision
	Inadequate pre-construction study and estimate
	Wrong method of estimation
	Differences between the selected bid and consultant estimate
	Incomplete design in the time of tender
	Using specifications for materials not available in the local market
	Discrepancies between project documents.
Limited budget for design	
Speeding up the design phase	
Unqualified staff to prepare the design phase	
Supervisor Consultant Related Factors	Slowness in decision-making
	Delay in the approval of drawings, materials, and ShopDrawings
	Delay in approval of completed works
	Poor site management, supervision, and quality assurance control
	Poor contract management
	Consultant's financial difficulties with the owner
Lack of experience of consultant staff	

Poor coordination with project parties
Consultant corruption
Inflexibility of consultants
Excessive safety considerations
Lack of experience in project locations
Decision-making process centralization
Lack of job security for the consulting team
Little periodic meetings to discuss work issues
Lack of communication with project stakeholders

2.8.3 Contractor's related factors

The contractor is the third leg of the project's major parties triangle, along with the owner and the consultant. His role in the project is to execute the work activities required to complete the project. Contractors have duties and responsibilities that show up in different parts of a project, like planning, management, monitoring, safety on the job site, and legal considerations (Tobias, 2019). The importance and sensitivity of a contractor's position in a project require him to take precautions to minimize cost and time overruns, which can end in project failure.

The contractor's relationship with the project starts in the pricing and tendering phases. In this phase, and in order to avoid struggles that cause project overruns in later phases, the contractor should make efforts in the pricing process. Such efforts include a good and accurate review of tender documents (Almaktar et al., 2017), updates to materials and workmanship prices at the time of tendering, good initial plans for the project (Widiaputra & Arumsari, 2021), good profit margins and an adequate contingency allowance (Abd El-Razek et al., 2008), and letting a qualified and expert person make pricing decisions (Malkat & Byung, 2015).

After receiving the owner's project award letter, the contractor should immediately proceed with project preparations in order to avoid delays. These preparations include mobilization and preparing site offices (Kamaruddeen et al., 2020), issuing insurance, and providing performance guarantees at a good price (Shaikh, 2020). The contractor should work in this period on activating and developing project plans from the bedding phase, which includes building the organizational structure for the project (Aljohani et al., 2017), hiring a qualified project manager (Cantarelli et al., 2012), hiring needed staff members, and selecting proper subcontractors (Abdullah et al., 2017).

Each project has unique characteristics that distinguish it from other projects. The contractor should carefully review the contract documents and project drawings to determine project needs according to project size and complexity and prepare his own plans to fit the project's requirements (Ismail et al., 2013). Moreover, the contractor should maintain a balance between new projects and other in-construction projects to avoid work overload (Johnson & Babu, 2018). The contractor's inexperience and lack of experience in the project location are common causes of project overruns that the contractor should put plans in place to overcome (Raykar & Ghadge, 2016; Annamalaisami & Kuppuswamy, 2019).

With the construction process beginning, the project's main challenge begins, which is to deliver the project within the selected schedule and budget. The project manager is in charge of leading the company's teams in the project challenge. The project manager's primary responsibilities in the construction process are contractor contract management (Al Amri & Marey-Pérez, 2020), effective construction planning (Alajmi & Memon, 2022), communication with the project's stakeholders, and maintaining contractor team coordination and interaction (Safapour & Kermanshachi, 2020).

To avoid project overruns, contractor teams should avoid behaviors in site management that affect project progress. Such behaviors include poor site management (Albtoush et al., 2019), ineffective control of project progress (Enshassi, 2009), poor technical performance, technical errors that cause rework (Tayade & Mahatme, 2020), poor distribution of the laborers (Sharma & Gupta, 2021), delay in making procurement orders and delivering materials to the site (Soomro et al., 2019), unavailability of equipment at the site (Poon and Price, 1999), no compliance to the consultant's instructions (Malkat & Byung, 2015), slow information flow to the subcontractors (Alshihri et al., 2022), delay in preparation of shop drawings and material submissions (Shibani, 2015), underestimating safety considerations (Karimi et al., 2020), waste and damage of materials (Issa et al., 2021), using low quality materials (Getaneh & Kansal, 2022), using inadequate equipment (Rauzana, 2016), and unethical behaviors to achieve more profits (Samarghandi et al., 2016).

The Legal Information Institute (LII) defines a subcontractor as "a person to whom the general contractor has outsourced the performance of a part of the work described in an existing contract between the general contractor and the owner." Poor performance and lack of experience of subcontractors are common causes of project overruns (Enshassi, 2009); the subcontractor should have sufficient skilled labor power to provide adequate productivity rates to keep projects on schedule (Enrica et al., 2021) (Subramani et al., 2014; Enshassi, 2009). The relationship between the general contractor and subcontractors should be solid and based on trust; the conflict between the general contractor and subcontractor and the frequent changing of subcontractors affects the stability of the project and may cause project overruns (Shah, 2016).

Financial issues play a role in the progress of the construction process. The owner's delay in making progress payments affects the financial situation of the contractor and may cause cash flow crises, which will surely affect project progress and may cause project overruns (Al-Makharzah, 2020). To ensure proper progress, the contractor should financially cover the project, which includes staff salaries paid on time (Olupitan et al., 2021), no-delay subcontractors, and supplier payments (Gunduz, 2017).

The contractor should have plans to face financial challenges such as increased labor and subcontractor costs, higher machinery costs (Bekr, 2015), increased transportation and fuel costs, mishap costs, and penalty costs (Widiaputra & Arumsari, 2021; Muianga et al., 2015).

Table 2.3: Contractors' overruns related factors

Contractors Related Factors	
1	Inaccuracies in the contractor's project evaluation during the bidding phase.
2	A failure to update the prices of materials and workmanship during the project's pricing phase.
3	Inappropriate initial planning for the project
4	Incorrectly pricing the project with a low profit margin.
5	Delay in site preparation to start work
6	Not provide the contractor's staff with the necessary office equipment to continue working on the project.
7	High costs of bank guarantees and insurance
8	Insufficient administrative structure exists within the contractor's project team.
9	The absence of a qualified project manager for the contractor

10	The contractor's lack of sufficient and qualified staff members to manage the project and monitor the progress of the work
11	Poor contract management by the contractor and his representatives
12	Ineffectiveness of the administrative and technical plans execute the project.
13	Poor coordination and cohesion between the contractor's project work teams.
14	The contractor selecting an inappropriate subcontractor to perform the work.
15	A contractor is overburdened owing to concurrent work on multiple projects.
16	Lack of contractor experience in similar projects
17	Contractor's lack of experience in the geographical area of the project
18	Technical errors in the implementation phase of the work resulted in their rework.
19	Failing the technical and laboratory tests of the work and materials used
20	Slow information and instruction transmission between contractor staff and subcontractors
21	Delay in processing shop drawings and material approval requests by the contractor's staff.
22	Delay in procuring and delivering materials to the construction site.
23	Contractor noncompliance with safety instructions
24	Material loss and deterioration on the construction site
25	Applying low-quality materials in construction works
26	Using insufficient tools to complete the project activities
27	Immoral practices by the contractor to achieve greater profits
28	Shortage of skilled labor in the project

29	Poor performance by the contractor's subcontractors
30	Low labor productivity on the project.
31	Constant subcontractor turnover on the project.
32	Conflicts between the general contractor and subcontractors
33	Low labor productivity on the project.
34	The contractor's lateness in paying his staff's salaries and wages
35	The contractor's lateness in paying his staff's salaries and wages
36	Significant increase in labor costs
37	Increasing the contractor's transportation and equipment costs
38	Significant rises in equipment expenses
39	Financial penalties for various reasons against the contractor in the project
40	Noncompliance of the contractor with supervision directives
41	Disputes and conflicts between the contractor and other project stakeholders
42	The contractor's inability to develop contingency and risk management plans
43	Incompatibility between the contractor's technical teams and the supervision side's technical teams

2.8.4 External related factors

Externally related factors are cost and time overruns, which are the result of external variables that are not the responsibility of any of the principal stakeholders. Due to the fact that the construction industry is so vast and has ties to several aspects of life, these factors have a broad range of variation.

The country's economic situation affects the construction industry in many ways, such as project costs and delays. Economic stability is required in all countries to achieve the desired economic growth. In stable and growing economies, the construction industry has great recovery and high growth rates; in unstable economies, the construction industry suffers and becomes an unattractive sector for investors (Albtoush et al., 2019). Currency fluctuations are the most common economic factor, especially in Palestine, where four currencies are used in construction projects (Aljohani et al., 2017).

Higher inflation rates have an impact on the construction industry because they cause a rapid increase in construction costs, material prices, and transportation costs (Cantarelli et al., 2012), higher interest rates from banks (Safapour & Kermanshachi, 2020), and an increase in insurance prices (Enshassi, 2009)—factors that cause project overruns and are related to the economic situation.

Offering material that is needed to accomplish tasks according to the contract documents and specifications is the responsibility of the contractor, but some behaviors related to the material may occur, and in fact, they are out of the contractor's control. Unrealistic price increases and changes in the prices of building materials are common problems that can hurt projects in a big way (Al-Makharzah, 2020). Other factors affecting the project include a lack of materials in local markets and insufficient production of required

materials (Abd El-Razek et al., 2008) (Mahamid, 2013). Suppliers may behave unprofessionally or unethically, such as through monopolization of rare materials (Karimi et al., 2020) or unjustified material and equipment delays (Shibani, 2015), which surely affect project progress.

Official and governmental institutions are major stakeholders who have an impact on construction projects (Al-Makharzah, 2020). They are classified as external stakeholders and play a major role in project success. During the initial stages of a project, such as feasibility studies, the owner needs general information about the project. During the design phase, however, the designer needs more specific information from official institutions like the municipality, the relevant ministries, the defense forces, and service providers like the electric and water companies.

Difficulties and delays in obtaining work permits from various authorities (Almaktar et al., 2017), frequent changes in government and service provider policies (Alshihri et al., 2022), corruption and fraudulent practices in various institutes restricting policies on technology, material importation (Enrica et al., 2021), and the absence of official standard construction requirements and cost data (Enshassi, 2009) are examples of external factors that cause cost and time overruns in projects and are related to governmental institutions.

Political issues have little impact on the construction industry, but political stability is critical to the growth of a country's economy, including the construction industry and the progress of running projects (Alajmi and Memon, 2022). For decades, Israel has occupied Palestine, and this occupation has been a major external factor affecting the development of the country's economy, including the construction sector.

The occupation has a number of consequences for the Palestinian construction sector, including: the Palestinian economy being weak and failing to meet projected growth rates; the continuous closure of Palestinian cities due to a ring of military barriers separating Palestinian cities and limiting freedom of movement (Gupta & Kumar, 2020); national general strikes in response to Israeli attacks (Tayde & Mahatme, 2020); and the complicated Israeli struggles on Palestinians in import and export (Muianga et al., 2015).

The owner may not be the project's financier; in many cases, external donors finance construction projects, particularly in developing countries. In such cases, the donor has power that may affect the project's progress and cause project overruns. The donor's policy regarding implementation methods, materials, and work characteristics, as well as the donor's inflexibility in allocating appropriate project implementation periods, are examples of the negative role of the donor (Bekr, 2015). Further, political decisions may affect the donor financing of a project, and in many cases, donors stopped financing projects for an extended period of time, resulting in project suspension (Niazia et al., 2017).

Nature and the environment are active participants. In project overruns, external factors such as weather conditions in the project location (Annamalaisami & Kuppuswamy, 2019), geotechnical characteristics and land stability that do not match the previous tests' results (Shah, 2015), poor site conditions (Ismail et al., 2013), unforeseen site conditions (Akhund et al., 2018), and discovering archaeological features at the project site (Gunduz, 2017) are environmental factors that affect the progress of works and may force the major stakeholder to find an ad hoc solution to mitigate the environment's effect on the project.

In countries with a diverse religious population, religious and cultural factors affect construction projects and lead to cost overruns (Al-Amri & Marey-Pérez, 2020). Such instances include the Muslim fasting month of Ramadan, when the majority of construction projects' productivity decreases and many workers prefer to reduce their working hours, switch to night shifts, or even stop working completely. Cultural issues include the feeling of shame associated with working in certain jobs; for example, plumbers and sewer workers are scarce and unappealing to new workers due to cultural issues and the community's perception of them.

Table 2.4: Overruns' externally related factors

Externally Related Factors	
Economic Factors	Economic stability
	Currency fluctuation
	High transportation costs
	High interest rates
	Increase in insurance prices
	Increase in the prices of materials
	Level of competitors in the market
	Shortage of materials in the local market
	Inadequate production of raw materials in the country
	Monopoly by suppliers
	Delay in material supply and equipment provision by suppliers
Governmental Factors	Difficulties and delays in obtaining work permits and services from authorities (electricity, water, etc.).
	Problems with land disputes
	Change in government policies
	Corruption and fraudulent practices

	Policy of importation of technology, equipment, and materials
	Absence of standard construction cost data
Political and Foreign Factors	Political stability
	External occupation and border closure
	National general strikes
	Israeli struggles on Palestinians in importing and using modern technology and materials.
	Donor policy regarding implementation methods and work characteristics
	Inflexibility of the donor in giving appropriate periods of project implementation
	Political decisions affect the donor financing of a project
Nature and the environmental Factors	Weather
	Soil and land stability
	Poor site conditions
	Unforeseen site conditions
	Discovering archaeological features at the project location
Cultural Factors	Religious issues
	Cultural issues

Chapter Three

Research Methodology

3.1 Introduction

This chapter describes the methodology used in this study, including the procedures for collecting data from the research population in the West Bank and analyzing this data. The objective of this study is to identify the causes of cost and time overruns in construction projects, classify these causes according to the degree of responsibility carried by the owner, the consultant, the contractor, and external causes, moreover, rank these factors according to the impact they have on the construction project. This chapter describes the research strategy, research design, study sample, location of the research unit, and statistical tools employed.

3.2 Scope of the research

The study includes factors that cause cost and time overruns in construction projects in the West Bank, Palestine, during different project life cycle phases. The research population consists of construction project owners, consultants, and contractors from various West Bank cities.

3.3 Research Strategy

The three common approaches to conducting research are quantitative, qualitative, and mixed methods (Williams, 2007). The objective of qualitative research is to collect primary, first-hand textual material and evaluate it using specialized interpretative techniques. As its nature is exploratory, it is a suitable strategy for examining a phenomenon with minimal available information (Austin, 2014).

Quantitative research is the practice of applying numerical values generated from observations to describe and explain phenomena that the observations shed light on (Bhandari, 2020). This technique utilizes both empirical statements and procedures.

Empirical statements are descriptive statements about the meaning of the instances in real terms, not assertions about what the cases ought to be. Additionally, it conducts empirical analyses to determine the degree to which a particular policy or program satisfies a norm or standard (Bouchrika, 2023). The acquired numerical data are then examined using mathematical techniques.

Depending on the objective of the study and the nature of the research issue, mixed-method techniques combine qualitative and quantitative methodologies in order to gain a deeper grasp of the topic. However, the emphasis might be placed equally on both ways or on one of the methods, depending on the specified integration procedure (Schoonenboom & Johnson, 2017).

In this research, a quantitative research method was selected, overrun causes were obtained from previous similar research, and a quantitative approach was used to quantify the impact of the obtained factors on construction projects and rank these factors in order of importance.

3.4 Research population

The research population is a group of people whom information must be gathered about. A population does not always refer to individuals. It can refer to any set of items that researchers wish to investigate, such as things, events, and organizations. (Bhandari, 2022)

The research population for this study includes the main stakeholders of the project, specifically the project owners, consultants, and contractors. These individuals have direct involvement in the project and are susceptible to the impact of cost and time overruns, making them crucial subjects for research.

Owners who are active in the construction industry and rely on a licensed consulting engineering firm to supervise their projects and a qualified contractor to execute these projects are the target owners' population.

Engineering firms that have been classified as "consultants" by the engineering association are chosen to represent the consultant engineer's population in this study. This is because consultant firms have higher qualifications and experience in construction projects than lower-class firms. According to the engineering association's annual report for the year 2021, 288 engineering offices were classified as consultant engineering firms by the end of December 2021. These 288 engineering firms represent the population of engineering consultants in this study.

According to the 2022 Palestinian Contractors Union annual report, there are 281 contractors who the contractor union has categorized as first- and second-grade contractors. These contractors were chosen to represent the contractor population since they are involved in larger-scale projects and have extensive experience in the Palestinian construction industry.

3.5 Research Sample

A sample is an assortment of data drawn by a researcher using a predetermined selection procedure from a larger population. Researching the entire population is often impractical, costly, and time-consuming. Consequently, analyzing the sample provides the researcher with information applicable to the entire population (Fleetwood, 2022).

For this research, the sample sizes for the consultant engineering firms' population and the contractor population were calculated using the "Sample Size Calculator" by "calculator.net" <https://www.calculator.net/sample-size-calculator.html>.

The required data submission includes the level of confidence, error margin, proportion of the population, and population size. The confidence level is the range of values that the researcher expects the estimate to fall within a certain percentage of the time if he repeats the experiment or resamples the population (Bevans, 2020). The confidence level chosen for this study is 95%, which is a suitable and commonly used level for similar research.

The margin of error is a statistic that expresses the quantity of random sampling error in the survey results. The larger the margin of error, the less confidence one should have that a poll result precisely reflects the outcome of a population census (Appinio, 2023). Following a discussion with the research supervisor in order to have an adequate number of respondents within the research timeline, the marginal error for this study has been determined to be 10%.

A population proportion is the proportion of the population that possesses a certain characteristic (Zach, 2021), since it is uncertain whether the entire population possesses that characteristic. 50% of the population is designated.

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Sample Size Calculator

Find Out The Sample Size

This calculator computes the minimum number of necessary samples to meet the desired statistical constraints.

Result

Sample size: **73**

This means 73 or more measurements/surveys are needed to have a confidence level of 95% that the real value is within $\pm 10\%$ of the measured/surveyed value.

Confidence Level:

Margin of Error: %

Population Proportion: % Use 50% if not sure

Population Size: Leave blank if unlimited population size.

Figure 3.1: Sample size calculator for specified population

Since the population of owners cannot be specified because they do not belong to a union or association, the sample size calculator suggests a sample size of 97 for owners.

Calculator.net
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Sample Size Calculator

Find Out The Sample Size

This calculator computes the minimum number of necessary samples to meet the desired statistical constraints.

Result

Sample size: **97**

This means 97 or more measurements/surveys are needed to have a confidence level of 95% that the real value is within $\pm 10\%$ of the measured/surveyed value.

Confidence Level: Use 95% if not sure

Margin of Error: % Use 10% if not sure

Population Proportion: % Use 50% if not sure

Population Size: Leave blank if unlimited population size.

Calculate
Clear

Figure 3.2: Sample size calculator for unspecified population

The following table contains the calculated sample size and utilized data for owners, consultants and contractors.

Table 3.1: Research sample size

	Consultant offices	Contractors	Owners
Confidence Level	95%	95%	95%
Margin of Error	10%	10%	10%
Population Proportion	50%	50%	50%
Population Size	288	281	unlimited
Sample size	73	72	97

3.6 Data collection

This research relies on two categories of data, which are secondary and primary. Secondary data consists of information collected and analyzed by someone other than the researcher (George, 2023). In this study, previous research, articles, statistics, and official information resources are important secondary data sources.

The factors that cause cost and time overruns are collected from a variety of resources, such as analogous local and global studies, articles, and technical reports, compared to the Palestinian market case, and based on the researcher's personal experience, categorized and ranked.

In primary data collection, the researcher collects and analyzes data directly (George, 2023). In this study, questionnaire is a major tool used as the primary data resource to obtain results from quantitative analysis of derived secondary data factors.

The questionnaire is designed to evaluate and rank the factors that lead to cost and time overruns in construction projects based on their impact and level of responsibility. These factors were acquired from secondary sources and classified as owner, consultant, or contractor responsibility; this classification is widely used by other researchers in cases similar to the Palestinian case, such as Enshassi (2009) in the Gaza Strip and Shibani (2015) in Egypt.

The questionnaire was carefully developed in order to mitigate various limitations commonly associated with questionnaire surveys, such as low response rates and challenges related to question formulation and phrasing.

The questionnaire consisted of two sections. The first section contained information about the respondents' roles, experiences, and the categories of construction in which

they are involved. In addition, it includes the geographic work area of the respondent in order to assure geographical coverage of the West Bank, as well as the classification of the respondent's employer as an owner, consultant, or contractor.

In the second section, the respondents were asked to rate the impact of 136 identified construction cost and time overrun factors. These factors were categorized into the following four major groups:

Group 1 consists of 28 owner-related factors that are classified into four subgroups to make evaluation easier for respondents. These subgroups are as follows: project planning difficulties (8 factors), contractual issues (7 factors), management concerns (9 factors), and financial issues (4 factors).

Group 2 consists of 34 consultant-related factors classified into two subgroups: the first subgroup consists of 18 factors related to consultant behaviors in the design phase, and the second subgroup contains 16 factors that discuss consultant performance during the project execution phase.

Group 3 consists of 43 contractor-related factors that are distinct contractor behaviors in the project, such as planning, management, and financing, that may affect the project and cause cost and time overruns.

Group 4 consists of 31 externally related factors that are not the responsibility of the primary stakeholders; these external factors are classified into 5 subgroups in order to discuss the issue from a variety of perspectives. There are 11 economic factors, 6 government-related factors, 7 political and international factors, 5 natural and environmental factors, and 2 religious and cultural factors in these subcategories.

3.7 Questionnaire evaluation and review

After drafting the questionnaire, the next step is to ensure its compatibility with the Palestinian construction industry's circumstances. Experts in the Palestinian construction sector reviewed the questionnaire's topics and questions, which is crucial to ensure that it is relevant to the Palestinian context and addresses its associated issues.

The questionnaire was sent to seven highly qualified engineers with extensive experience in the Palestinian construction industry in order to validate its reliability. Two of the specialists are owner representatives; another two are consultant engineers; and three are contractor representatives. *The following table contains expert information.*

Table 3.2: Questionnaire reviewer information

Expert	position	Employer	Employer classification	Years of experiences
Eng. Samer Assaf	Project Manager	Sanad Construction Resources	Owner	21
Eng. Mahmoud Amer	Contracts Manager	Unifives investment Comp	Owner	18
Eng. Ezz Fatouh	Project Manager	ARABESC	Consultant	27
Eng. Marwan Shuaibi	Design Manager	Eng. Marwan Shuaibi engineering office	Consultant	13
Eng. Jareer Ahmad	General Manager	Beton Construction and Development	Contractor	25
Eng. Mamoun thawabi	Project Manager	Dar Al Bena Contracting company	Contractor	17
Eng. Mohammad Amarneh	Project Manager	Technical group company	Contractor	15

The experts' recommendations were to accept the questionnaire with limited modifications, such as merging some questions and paraphrasing another question, to ensure an accurate description of each question.

The final questionnaire is developed after applying experts' recommendations; consisting of 130 cost and time overrun factors classified into 4 major groups as follows:

- **Group 1:** 28 owner-related factors, which are classified into 7 project planning difficulties factors, 7 contractual issues factors, 9 management concerns factors, and 5 financial issues factors.
- **Group 2:** 31 consultant-related factors classified into 16 factors related to designer consultants and 15 factors related to supervisor consultants.
- **Group 3:** 42 contractor-related factors that are distinct contractor behaviors in the project.
- **Group 4:** 29 externally related factors that are classified into 5 subgroups. These subgroups are : 10 economic factors, 6 government-related factors, 7 political and international factors, 4 natural and environmental factors, and 2 religious and cultural factors.

The final version of the questionnaire was created as a Google file, and the URL was sent via email and text messages to the research population. The file recipients were selected randomly based on their contact information from the engineering association and contractor union.

The respondents evaluate the impact of the factors on a 5-point Likert scale, with scores ranging from 1 to 5 based on the impact of cost and time overruns: 5 = incredibly high, 4 = high, 3 = medium, 2 = low, and 1 = incredibly low.

3.8 Data Analysis

In order to develop a deeper understanding of cost and time overrun causes, the obtained data is analyzed using variety of approaches and statistical methods to obtain results and validate the analysis work.

3.8.1 Data Analysis Methods and Approaches

Questionnaire First-part analysis ensures that the research sample is representative and has sufficient validity to offer an opinion on the causes of cost and time overruns in West Bank construction projects. To be representative, the sample should be balanced through different aspects, such as representatives for project stakeholders, employers, sufficient experience in the construction industry, and geographic distribution.

To understand project major stakeholders' points of view, the research sample evaluates cost and time overrun causes in the second part of the questionnaire. Four approaches are used to analyze the collected data: all respondents, owners, consultants, and contractors.

Each analysis approach is analyzed in four different ways, which are: all-factors analysis, owner-related factors analysis, consultant-related factors analysis, contractor-related factors analysis, and external factors analysis. These analysis methods for each approach help to make comparisons between different viewpoints easier and more comprehensive, as well as reveal the priorities and factors with the greatest impact for each stakeholder. The next graph shows analysis approaches and different analysis methods for each one.

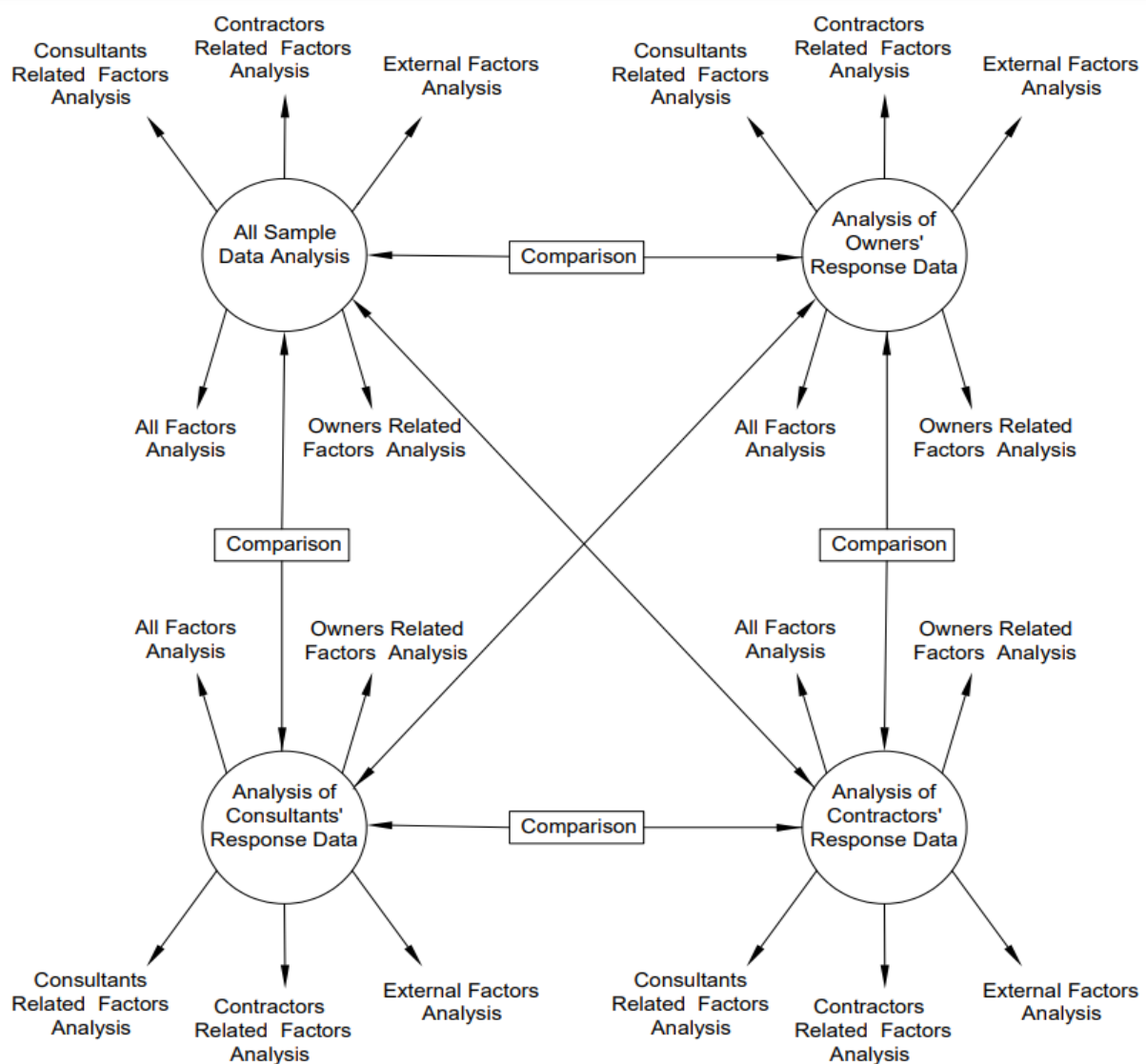


Figure 3.3: Research analysis approaches and different analysis methods

3.8.2 Data Analysis statistical tools

The data collected in the second part of the questionnaire was analyzed using descriptive and frequency-based statistical tools. However, advanced and accurate methods are required to analyze the data in a systematic, rapid, and reliable way. Cronbach's alpha (Ca) was used to determine the questionnaire's reliability, while the Relative Importance Index (RII) and standard deviation were used to rank the overrun factors as follows:

▪ Cronbach Alpha Reliability Test

For this research, Cronbach's alpha (Ca) testing was used to evaluate the internal consistency and reliability of the identified overrun factors. It was used to estimate reliability in similar studies such as Alshihri et al. (2022), Hisham and Yahya (2012), and Enshassi (2009).

The Ca range is between 0 and 1, and the acceptable reliability number is typically 0.7 or higher (Taber, 2017). The Ca formula for the Likert scale is shown in Equation (3) below:

$$C\alpha = \frac{K}{K-1} \left[1 - \frac{\sum_{i=0}^k \sigma_b^2}{\sigma_t^2} \right]$$

where:

$C\alpha$ —is Cronbach's alpha;

K —is many items;

σ_b^2 —is the variance of test score;

σ_t^2 —is the variance of item scores after weighing.

The next table shows the Cronbach Alpha values and the internal consistency classification according to them (Taber, 2017).

Table 3.3: Cronbach Alpha values and the internal consistency classification

Cronbach Alpha, α	Internal Consistency
$0.9 \leq \alpha$	Excellent (High Stakes Testing)
$0.7 \leq \alpha < 0.9$	Good (Low Stakes Testing)
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

- **Relative importance index**

The relative importance index is a statistical tool used to rank factors according to the respondent's evaluation. It is a common practice among researchers to use the Relative Importance Index (RII) when studying the factors causing cost and time overruns (Kamaruddeen et al., 2020). Moreover, Almaktari et al. (2017), Alshihri et al. (2022), Enshassi (2009), and many other researchers used the RII index as follows:

The Relative importance factor formula is as follow:

$$RII = \frac{\sum W}{A * N}$$

Where W: respondent weighting for each factor

A : highest possible weight, in this research A = 5

N = total number of respondents

The RII value ranges from 0 to 1, with a higher RII value indicating that the cause and effect of an overrun cause are more significant (Shakhare & Patil, 2019).

- **Standard deviation**

The standard deviation is used in analysis for ranking overrun factors that have the same RII value. The standard deviation is considered the most appropriate measure of variability when using a population sample (Tarver, 2022).

Statistically, it measures the dispersion of a data set relative to its mean and is calculated as the square root of the variance. If the data points are farther from the mean, the deviation within the data set is greater; consequently, the more dispersed the data, the greater the standard deviation (Hargrave, 2023). Overrun factors with a smaller standard deviation have a smaller dispersion and a higher rank in overrun factors analysis results.

Chapter Four

Data Analysis & Results

4.1 Introduction

This chapter presents the results of data analysis collected from a research population discussing the causes of cost and time overruns in Palestine. The first section presents a demographic analysis of the participants, and the following sections analyze the causes of cost and time overruns from various angles.

4.2 Sample characteristics

This section contains demographic analysis results for participants. The research-calculated population is 242 and is comprised of 97 owners, 73 consultants, and 72 contractors. The total number of participants was 146, and the response rate was 60%, which the research supervisor deemed acceptable.

Respondents included are representatives of 60 owners, 44 consultants, and 42 contractors, with response rates as follows: 61.85% for owners, 60.27 % for consultants, and 58.33% for contractors.

The study covered both public and private sector projects. The participants belong to government ministries, municipalities, and local councils. Contracting and real estate companies, in general, included only highly classified ones. Out of the 146 participants, 81 are from the private sector, 51 are from the public sector, and 14 are from non-governmental organizations. Moreover, the respondents are divided into three categories based on their geographical distribution on the west banks: north, middle, and south of the west banks. The majority of respondents (38%) are from the middle of the West Bank, while 33% are from the north and 29% are from the south.

The majority of respondents (59%) have 10 years or more of experience in the construction industry; 32% have 5–10 years of experience; and only 9% have less than 5

years of experience. The majority of the respondents job titles are site engineers (38%), followed by project managers (35%), and company managers (15%), followed by other job titles like planning engineers, design managers, etc. The majority of respondents hold a bachelor's degree (85%), while a minority hold a postgraduate degree (15%).

Out of 44 participants who are consultant engineers, 66% of them are classified as consultant companies according to the Engineering Association, and 34% of them are classified as first-class consultant companies. On the other hand, out of 42 participants who are contractors, 67% of them are classified as first-class contractors according to the Contractors Union, and 33% of them are classified as second-class contractors. The following table provides a summary of the first section of questionnaire responses for all demographic divisions.

Table 4.1: Sample demographic characteristics

<i>category</i>	<i>Respondent number</i>	<i>Percentage</i>
<i>Participants</i>		
<i>Owners</i>	60	41%
<i>Consultants</i>	44	30%
<i>contractors</i>	42	29%
<i>Response Rate</i>		
<i>Owners</i>	-	61.85%
<i>Consultants</i>	-	60.27%
<i>contractors</i>	-	58.33 %
<i>Employer</i>		
<i>Governmental Sector</i>	51	35%
<i>Private Sector</i>	81	55%
<i>NGO's</i>	14	10%
<i>Geographic Distribution</i>		
<i>North of WB</i>	48	33%
<i>Middle of WB</i>	56	38%

<i>South of WB</i>	42	29%
<i>Years of Experience</i>		
<i>More than 10 years</i>	86	59%
<i>5-10 years</i>	47	32%
<i>Less than 5 years</i>	13	9%
<i>Job Title</i>		
<i>Site Engineer</i>	55	38%
<i>Project Manager</i>	51	35%
<i>Company manager/owner</i>	22	15%
<i>Other job titles</i>	18	12%
<i>Consultants Classification</i>		
<i>Consultant</i>	29	66%
<i>First-Class</i>	15	34%
<i>Contractors Classification</i>		
<i>First - Class</i>	28	67%
<i>Second - Class</i>	14	33%

4.3 Ranking overruns factors

In the second section of the questionnaire, respondents evaluated factors that lead to cost and time overruns in construction projects. The data obtained is analyzed, ranked, and presented in this section according to the points of view of different major stakeholders to give a deeper and wider understanding of overrun causes and to rank factors according to each party's priorities.

The ranking was devised by calculating the relative importance index (RII) and standard deviation (STDV) for factors that cause cost and time overruns; factors with a higher RII value were ranked first, and factors with the same RII value were ranked according to the standard deviation.

4.3.1 All Sample participants analysis

In this analysis approach, the overrun causes were ranked following all sample participant evaluations. First, the analysis was devised for all factors that cause overruns. Another analysis was devised depending on all participants' evaluations of owner-related factors only to assess owner-related factors separately. The same was done for consultant-related factors, contractor-related factors, and external factors.

Different analysis methods for the same participant group help to understand participants' priorities for this factor group and give the opportunity to make comparisons between different factor groups.

4.3.1.1 Ranking all groups overruns factors

In this analysis, all factors evaluated by participants in the second section of the questionnaire were ranked based on their RII values. This analysis is important because it ranks overrun causes for all factors, regardless of the responsible party.

As a result of overrun causes ranking, four factors have the most significant contribution to cost and time overruns: (1) the lack of sufficient financing for the project by the owner (RII = 0.871); (2) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.860); (3) the owner delays interim payments for completed contractor work (RII = 0.847); and (4) poor performance by the contractor's subcontractors (RII = 0.80). On the other hand, there are six significant factors that contribute to cost and time overruns: (1) the contractor selecting an inappropriate subcontractor to perform the work (RII = 0.797); (2) the owner's general financial difficulties and a lack of liquidity (RII = 0.794); (3) the Israeli occupation of the Palestinian territories (RII = 0.794); (4) the owner's delays in making related decisions (RII = 0.794);

(5) the owner's selection of the consultant based on the lowest prices only (RII = 0.789); and (6) frequent change orders and additional work by the owner (RII = 0.781).

Factors that have the same RII values are ranked according to their STDV values. The top ten ranking factors that cause cost and time overruns are shown in the following table to provide a reasonable range for understanding higher-impact causes.

Table 4.2: Analysis of all respondents' evaluations for all overruns factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The lack of sufficient financing for the project by the owner.	Owner - Financial	0.871	1.055
2	The selection of the contractor by the owner based solely on the lowest price offered.	Owner - Contractual	0.860	0.992
3	The owner delays interim payments for completed contractor work.	Owner - Financial	0.847	1.044
4	Poor performance by the contractor's subcontractors.	Contractor	0.80	1.089
5	The contractor selecting an inappropriate subcontractor to perform the work.	Contractor	0.797	1.057
6	The owner has general financial difficulties and a lack of liquidity.	Owner - Financial	0.794	1.076
7	The Israeli occupation of the Palestinian territories.	External - Political	0.794	1.089
8	The owner delays making related decisions.	Owner - Administrative	0.794	1.101
9	The owner's selection of the consultant based on the lowest prices only.	Owner - Contractual	0.789	1.022
10	Frequent change orders and additional work by the owner.	Owner - Planning	0.781	0.956

The most significant overrun factors identified in this study are 7 related to owners, 2 related to contractors, and 1 related to external factors. The owner-related factors are (3

financial, 2 contractual, 1 administrative, and 1 planning) related factors. On the other hand, the 2 contractor-related factors are related to the subcontractors, and the external factor is related to political issues.

The high number of owners' related factors in the top-ranking list highlights their important role in overrun occurrences. In similar studies Widiaputra & Arumsari (2021) and Bekr (2015) owner-related factors have higher attendance in the top overrun factors.

This study found that the lack of sufficient financing for the project is the most important factor that causes cost and time overruns, the same result found by Hisham & Yahya (2012) and Shibani (2015), delayed progress payments and high expenses for construction projects lead to delaying construction work progress and increasing project costs (Alshihri et al., 2022).

4.3.1.2 Ranking overruns owners' related factors

In this method of analysis, only owner-related factors evaluated by all respondents in the second part of the questionnaire were ranked according to their RII values. This analysis is important because it provides a more comprehensive understanding of construction project stakeholder evaluation for owners' higher impact factors leading to cost and time overruns.

As a result of overrun owners' related causes ranking, factors that has the most significant contribute to cost and time overruns: (1) the lack of sufficient financing for the project by the owner (RII = 0.871); (2) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.86); and (3) the owner delays interim payments for completed contractor work (RII = 0.847). On the other hand, there are two significant factors that contribute to cost and time overruns that have the same RII value of 0.794, which are: (1) the owner has general financial difficulties and a lack of liquidity; and (2) the owner delays making related decisions.

Factors that have the same RII values are ranked according to their STDV values. The top five ranking factors that cause cost and time overruns are shown in the following table to provide sufficient understanding for owners' higher-impact causes.

Table 4.3: Analysis of all respondents' evaluations of owners' overruns related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The lack of sufficient financing for the project by the owner.	Financial	0.871	1.055
2	The selection of the contractor by the owner based solely on the lowest price offered.	Contractual	0.860	0.992
3	The owner delays interim payments for completed contractor work.	Financial	0.847	1.044
4	The owner has general financial difficulties and a lack of liquidity.	Financial	0.794	1.076
5	The owner delays making related decisions.	Administrative	0.794	1.101

Owners-related top five factors are classified as 3 financial, 1 contractual, and 1 administrative. In similar studies, Almaktar et al. (2017) found financial issues in the 5th rank for causes as a group of factors. On the other hand, the financial factors found in this study were mentioned in other studies like Johnson & Babu (2018) and Shaikh (2020).

Kamaruddeen et al., (2020) ranked the selection of the contractor by the owner based solely on the lowest price offered in the 9th ranking for the top factors that cause overruns, the same factor was ranked in the top factors by Annamalaisami & Kuppuuswamy (2019) too. The owner's delays in making related decisions ranked as the 5th factor in the top affecting owner-related factors in this study, which was ranked as the 4th factor by Johnson & Babu (2018).

4.3.1.3 Ranking overruns consultants' related factors

Consultants' related factors that were evaluated by all respondents in the second part of the questionnaire were ranked according to their RII values. This method of analysis provides a more comprehensive understanding of major stakeholder evaluation for consultants' higher impact factors that contribute to cost and time overruns on construction projects.

Analysis results for overrun consultants' related factors show that all factors have a moderately significant contribution to cost and time overruns. The top five are: (1) the designer's reliance on an unqualified team to complete the design (RII = 0.751); (2) mistakes in the project's final design (RII = 0.751); (3) delay in authorizing and approving requests for project materials and execution plans (RII = 0.742); (4) continuous design modification (RII = 0.737); and (5) lack of technical expertise by the supervising consultant's team in executing the work (RII = 0.732).

The top two factors have the same RII values ranked according to their STDV values. The top five ranking factors that cause cost and time overruns are shown in the following table to provide sufficient understanding of consultants' higher-impact causes.

Table 4.4: Analysis of all respondents' evaluations of consultants' overruns related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The designer's reliance on an unqualified team to complete the design.	designer	0.751	0.951
2	mistakes in the project's final design.	designer	0.751	0.994
3	Delay in authorizing and approving requests for project materials and execution plans	supervisor	0.742	1.017
4	Continuous design modification.	designer	0.737	0.967

5	Lack of technical expertise by the supervising consultant's team in executing the work.	supervisor	0.732	0.943
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The five consultant's-related factors with the strongest effect identified in this study are categorized as follows: three consultant designer factors and two consultant supervisor factors. All factors' RII is in close range and is categorized as having a moderately significant impact.

The designer's reliance on an unqualified team causes mistakes in project design, which lead to overruns (Bekr, 2015). The higher impact consultant-related factors found in this study were found in other studies such as Almaktar et al. (2017), Bekr (2015), and Johnson & Babu (2018). Johnson & Babu (2018) ranked continuous design modification in the first rank for consultant overrun causes. On the other hand, Almaktar et al. ranked the lack of technical experience of the supervisor in the 6th ranking, and Kamaruddeen et al. (2020) ranked the delay in request approval in the 11th rank for overrun factors.

4.3.1.4 Ranking overruns contractors' related factors

The analysis method in this section is based on analyzing contractors' related factors evaluated by all respondents in the second part of the questionnaire and ranking them according to their RII values. This method's importance comes from providing a more comprehensive understanding of construction project stakeholder evaluation for contractors' higher impact factors that lead to cost and time overruns.

Results show that in the top five factors, only one of the contractors' related factors has a high impact on cost and time overruns. This factor is poor performance by the contractor's subcontractors (RII = 0.80). On the other hand, the other four factors that have moderate significance are: (1) the contractor selecting an inappropriate

subcontractor to perform the work (RII = 0.797); (2) conflicts between the general contractor and subcontractors (RII = 0.778); (3) technical errors in the implementation phase of the work that resulted in their rework (RII = 0.773); and (4) incorrectly pricing the project with a low profit margin (RII = 0.770). The top five ranking factors that cause cost and time overruns are shown in the following table to provide sufficient understanding of contractors' higher-impact causes.

Table 4.5: Analysis of all respondents' evaluations of contractors' overruns related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	Poor performance by the contractor's subcontractors.	Contractor	0.800	1.089
2	The contractor selecting an inappropriate subcontractor to perform the work.	Contractor	0.797	1.057
3	Conflicts between the general contractor and subcontractors.	Contractor	0.778	0.962
4	Technical errors in the implementation phase of the work resulted in their rework.	Contractor	0.773	0.868
5	Incorrectly pricing the project with a low profit margin.	Contractor	0.770	0.935

This study found the most important contractor-related factors are related to subcontractors' performance, selection, and relationship, all though other studies like Sharma & Gupta (2021) and Subramani et al. (2014) did not mention subcontractors as high-ranking factors. Parbat (2015) found that the conflict between the main contractor and his subcontractor contributes to overruns and ranked this factor as the 8th factor in his top factors list; moreover, he found that the technical errors in the implementation that cause the rework are a very important factor in overruns and listed it in the 6th ranking.

Chan and Kumaraswamy (1997) and Tayade and Mahatme (2020) also found that technical errors that cause rework are important causes of project overruns and ranked this factor in the top 5 rankings. Annamalaisami & Kuppuuswamy (2019) mentioned that the contractors' incorrect pricing affects overruns and ranked this factor in the top 10 overrun factors list.

4.3.1.5 Ranking of overruns' external factors

In this method, the participants evaluation of overruns' external factors is analyzed, ranked, and presented. This method's importance is that it separates external factors from other factors to analyze and get a deeper understanding of their role in cost and time overruns.

Analysis results show a higher significant contribution for the Israeli occupation of the Palestinian territories in overruns occurrence with RII = 0.794; other external factors have a lower significant impact than the first factor are: (1) political decisions affect the donor's project funding (RII = 0.751); (2) Israeli policies that impede the West Bank's import of technology and materials (RII = 0.751); (3) significant increases in raw material prices in the country (RII = 0.737); and (4) currency exchange fluctuations (RII = 0.726).

Table 4.6: Analysis of all respondents' evaluations of overruns' external factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The Israeli occupation of the Palestinian territories.	Political	0.794	1.089
2	Political decisions affect the donor's project funding.	Political	0.751	1.007
3	Israeli policies that impede the West Bank's import of technology and materials.	Political	0.751	1.034
4	significant increase in raw material prices in the country.	Economical	0.737	0.981

5	Currency exchange fluctuations.	Economical	0.726	1.031
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Results show that three of the five most significant external factors are political and two are economical, which indicates the high impact of the political situation in Palestine on the construction industry. The first factor, which is the Israeli occupation of the Palestinian territories, is the only factor listed in the top 10 factors for all overrun causes. Political factors listed in this study are listed by other Palestinian researchers such as Enshasi (2009) and Albatsh (2015) in their studies.

Economic factors rank second among the external factors that have the greatest impact on overruns, according to this study. This is due to the absence of occupation and political conflict in other countries, which contribute to the greater influence of external factors in this research. Fluctuations in currency exchange rates and rising costs of raw materials are the most significant economic factors. Other studies have identified these factors; for instance, Shaikh (2020) ranked price fluctuations as the second most significant external factor, while Widiaputra and Arumsari (2021) ranked them as the first material-related factor. The currency exchange rate was positioned fifth on the lists of Hisham & Yahya (2019) and Widiaputra & Arumsari (2021).

4.3.2 Analysis of the assessment of the owners participating in the study

In this analysis approach, the overrun causes were ranked following owners' participation evaluations. First, the analysis was devised for all factors that cause overruns. Another analysis was devised depending on owner participant evaluations for owner-related factors, only to assess owner-related factors separately. The same was done for consultant-related factors, contractor-related factors, and external factors.

These analysis methods for the owner participant group help to understand the owner's needs and priorities, giving a deeper understanding of their point of view regarding cost and time overruns.

4.3.2.1 Ranking all overruns' causes according to owners' perspectives

In this analysis, all factors evaluated by owners in the second section of the questionnaire were ranked based on their RII values. This analysis is important because it ranks overrun causes for all factors reflecting the owner's perspective, regardless of the responsible party.

Analysis results show that eight factors that have high significant contribute to cost and time overruns are: (1) the lack of sufficient financing for the project by the owner (RII = 0.880); (2) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.840); (3) the owner delays interim payments for completed contractor work (RII = 0.820); (4) Technical errors in the implementation phase of the work resulted in their rework (RII = 0.807); (5) Poor performance by the contractor's subcontractors (RII = 0.807); (6) Frequent change orders and additional work by the owner (RII = 0.807); (7) The designer's reliance on an unqualified team to complete the design (RII = 0.80); and (8) The contractor selecting an inappropriate subcontractor to perform the work (RII = 0.80). On the other hand, there are two moderately significant factors that contribute to cost and time overruns: (1) constant subcontractor turnover on the project (RII = 0.793); and (2) a shortage of skilled labor on the project (RII = 0.787).

Factors that have the same RII values ranked according to their STDV values, the owners' point of view for the top ten ranking factors that cause cost and time overruns, are shown in the following table to provide a reasonable range for understanding higher-impact causes.

Table 4.7: Ranking of all overruns' causes according to owners' perspectives

RANKING	FACTOR	CATEGORY	RII	STDV
1	The lack of sufficient financing for the project by the owner	Owner - Financial	0.880	1.102
2	The selection of the contractor by the owner based solely on the lowest price offered.	Owner - Contractual	0.840	1.064
3	The owner delays interim payments for completed contractor work.	Owner - Financial	0.820	1.094
4	Technical errors in the implementation phase of the work resulted in their rework.	Contractor	0.807	0.850
5	Poor performance by the contractor's subcontractors	Contractor	0.807	0.928
6	Frequent change orders and additional work by the owner	Owner - Planning	0.807	0.999
7	The designer's reliance on an unqualified team to complete the design	Consultant - designer	0.800	0.643
8	The contractor selecting an inappropriate subcontractor to perform the work.	Contractor	0.800	0.983
9	Constant subcontractor turnover on the project.	Contractor	0.793	0.999
10	Shortage of skilled labor in the project	Contractor	0.787	0.868

The owner perspective of the top ten factors list includes 5 contractors' related factors, 4 owners' related factors, and 1 consultant's related factors. The 4 owners' related factors are classified into 2 financial, 1 contractual, and 1 planning factor; the consultant factor is a designer-related factor.

Compared to the all-sample results, owners give high responsibility to the contractor about the overrun occurrence, whereas in all-sample analysis, only two factors of the top ten are contractor-related, while in owners' perspective analysis, five of the top ten are contractor-related factors. The top three factors on the higher impact list are owner-

related factors, which is a clear confession by owners about their high contribution to overruns.

Limited studies analyzed owners respective only, which do not give a comparison range with other studies results, but Enshassi (2008) results gave a higher impact for external and contractor-related factors in the top ten ranking than this study.

4.3.2.2 Ranking of owners' related causes according to owners' perspectives

In this method of analysis, owner-related factors evaluated by the participant owners in the second part of the questionnaire were ranked according to their RII values. This analysis is important because it reflects owner perspectives about their role in cost and time overruns.

As a result of overrun owners' related causes ranking, in the top five ranking list, there are four factors that are classified as having a high significant contribution to cost and time overruns, which are: (1) the lack of sufficient financing for the project by the owner (RII = 0.88); (2) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.84); (3) the owner delays interim payments for completed contractor work (RII = 0.82); and (4) frequent change orders and additional work by the owner (RII = 0.807). On the other hand, there is one moderately significant factor that contributes to cost and time overruns, which is that the owner delays making related decisions (RII = 0.787). The top five ranking factors that cause cost and time overruns are shown in the following table to provide sufficient understanding of owners' higher-impact causes.

Table 4.8: Owners respondents' analysis of owners' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The lack of sufficient financing for the project by the owner	Financial	0.880	1.102
2	The selection of the contractor by the owner based solely on the lowest price offered.	Contractual	0.840	1.064
3	The owner delays interim payments for completed contractor work.	Financial	0.820	1.094
4	Frequent change orders and additional work by the owner	Planning	0.807	0.999
5	The owner delays making related decisions.	Administrative	0.787	1.015

The results of the owners' perspective analysis for factors related to the owners are almost the same as those of all sample analyses. Four of the top five causes of impact overruns found in all sample analyses are also found in the owners' perspective analysis. Compared to the findings of Enshasi (2008), the results of this study indicate that owner-related factors have a greater impact. The owners' viewpoint suggests that the Enshasi (2008) study has a lower RII, indicating that the factors have a reduced impact.

4.3.2.3 Ranking consultants' related causes according to owners' perspectives

In this section, consultants' related factors are analyzed following the owners' evaluation and ranked according to their RII values. This method of analysis provides a more comprehensive understanding of owner's evaluations of consultants' higher impact factors that contribute to cost and time overruns on construction projects.

Analysis results from the owners' perspectives on consultants' related factors show that only one factor has a high significant contribution to cost and time overruns, which is the designer's reliance on an unqualified team to complete the design (RII = 0.80). The other

four factors in the top 5 ranking list that have a moderately significant contribution to cost and time overruns are: (1) mistakes in the project's final design (RII = 0.773); (2) the consultant suspects corruption in relation to the project. (RII = 0.760); (3) conflicts between the designer and the owner (RII = 0.753); (4) and continuous design modification (RII = 0.747).

The top five ranking factors that cause cost and time overruns are shown in the following table with their RII and STDV values to provide a sufficient understanding of consultants' points of view for owners' related overrun factors.

Table 4.9: Owners' respondents' analysis for consultants' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The designer's reliance on an unqualified team to complete the design.	designer	0.800	0.643
2	mistakes in the project's final design.	designer	0.773	0.681
3	The consultant suspects corruption in relation to the project.	Supervisor	0.760	1.031
4	Conflicts between the designer and the owner.	designer	0.753	0.817
5	Continuous design modification.	designer	0.747	0.944

From the owner's perspective, for consultant-related factors, three of the five higher impact factors are the same as those listed in all sample analyses. It is noticed that owners give attention to the consultants' relationships with other parties. This appears when the owners rank "the consultant suspects corruption in relation to the project" and "conflicts between the designer and the owner" as high impact factors contributing to overruns, where the corruption suspects relate to the consultants' relationships with parties like contractors or suppliers, while the second factor is related to the relationship between the owner and the consultants.

The RII values obtained from the owners' assessment of consultant's-related factors surpass those obtained from all sample evaluation analyses. This indicates that the owners attribute more importance to consultants' rules in overruns.

4.3.2.4 Ranking of contractors' related causes according to owners' perspectives

This section analysis method is based on analyzing contractors' related factors according to the owner's evaluation in the second part of the questionnaire and ranking them according to their RII values. This method's importance comes from providing a better understanding of owners' evaluations and perspectives on contractors' higher impact factors that lead to cost and time overruns.

Results show that in the top five ranking factors, three of the contractors' related factors have a high impact on cost and time overruns, which are: (1) technical errors in the implementation phase of the work resulted in their rework (RII = 0.807); (2) poor performance by the contractor's subcontractors (RII = 0.807); and (3) the contractor selecting an inappropriate subcontractor to perform the work (RII = 0.80). On the other hand, there are two moderately significant factors that contribute to cost and time overruns, which are: (1) constant subcontractor turnover on the project (RII = 0.793); and (2) shortage of skilled labor in the project (RII = 0.787).

Factors that have the same RII values are ranked according to their STDV values. The owners' point of view for the top five ranking contractors-related factors that cause cost and time overruns is shown in the following table.

Table 4.10: Owners' respondents' analysis for contractors' related factors

RANKING	FACTOR	RII	STDV
1	Technical errors in the implementation phase of the work resulted in their rework.	0.807	0.850
2	Poor performance by the contractor's subcontractors.	0.807	0.928
3	The contractor selecting an inappropriate subcontractor to perform the work.	0.800	0.983
4	Constant subcontractor turnover on the project.	0.793	0.999
5	Shortage of skilled labor in the project.	0.787	0.868

Results show that the owner's perspective gives higher priority to technical performance and good implementation to minimize overruns from the contractor's side; moreover, they believe that shortage administrative issues such as selecting the qualified subcontractor and providing the needed skilled labor have a high impact on overrun occurrence.

Enshassi (2008) analysis for the owner perspective shows a higher ranking and more factors in the top ranks for contractor-related factors than the owners and consultants. These top factors related to the contractors' financial issues, which were not top factors in this study, and financial administrative and technical issues, which appeared in the study results.

4.3.2.5 Ranking external related causes according to owners' perspectives

In this method, the owners' evaluation of overruns' external factors is analyzed, ranked, and presented. This method's importance is that it separates external factors from other factors to analyze and get a deeper understanding of the owner's perspective on their role in cost and time overruns.

Analysis results show that owners think that all external factors have a moderately significant contribution to overrun occurrences. The top five external factors are: (1) the Israeli occupation of the Palestinian territories (RII = 0.787); (2) political decisions affect the donor's project funding (RII = 0.780); (3) Israeli policies that impede the West Bank's import of technology and materials (RII = 0.740); (4) a significant increase in raw material prices in the country (RII = 0.727); and (5) donors' inflexibility in providing suitable project durations (RII = 0.727).

The owners' point of view for the top five rankings for overruns' external factors that cause cost and time overruns is shown in the following table.

Table 4.11: Owners' respondents' analysis for overruns' external factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The Israeli occupation of the Palestinian territories	Political	0.787	1.048
2	Political decisions affect the donor's project funding.	Political	0.780	0.995
3	Israeli policies that impede the West Bank's import of technology and materials.	Political	0.740	0.952
4	significant increase in raw material prices in the country	Economical	0.727	0.964
5	Donors' inflexibility in providing suitable project durations	Political	0.727	0.999

Results from the owner perspective for higher impact overrun factors are almost the same as from all sample analysis results. According to the owner's perspective, political issues and the Israeli occupation are the highest impact factors as a result of the continuous aggressive occupation of Palestine. Only one economic factor is on the owners' list for the highest impact overruns' factors, which is the significant increase in

raw material prices. Another factor with high impact is related to the donors' inflexibility in providing suitable project duration, and this is mostly because of donor issues or different cultures that do not take the Palestinian situation into consideration.

The findings of Enshassi's (2008) analysis indicate that political factors associated with the Israeli occupation have the most significant influence on cost overruns, followed by economic factors, including material shortages and increased material prices. Despite the considerable interval between the two studies, the results remain consistent and do not differ, and this is mostly because of the continuous occupation and its impact on different life aspects.

4.3.3 Analysis of the assessment of the consultants participating in the study

In this analysis approach, the overrun causes were analyzed and ranked following consultants' participation evaluations in several ways. First, the analysis was devised for all factors that cause overruns. More methods were devised depending on consultant participants' evaluations of owner's-related factors, consultant's-related factors, contractor's-related factors, and external factors separately to assess overrun causes for each group.

These analysis methods for the consultants' participant group help to understand the consultants' needs and priorities, giving a deeper understanding of their point of view regarding cost and time overruns.

4.3.3.1 Ranking all overruns' causes according to consultants' perspectives

In this analysis, all factors from all groups were analyzed and ranked based on their RII values following the consultant's evaluation of the questionnaire. This analysis is

important because it ranks overrun causes for all factors, reflecting the consultant's perspective on the causes of cost and time overruns.

Analysis results show that six factors that highly significantly contribute to cost and time overruns are: (1) the lack of sufficient financing for the project by the owner (RII = 0.846); (2) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.836); (3) the owner delays interim payments for completed contractor work (RII = 0.827); (4) the Israeli occupation of the Palestinian territories (RII = 0.80); (5) the contractor selecting an inappropriate subcontractor to perform the work (RII = 0.80); and (6) poor performance by the contractor's subcontractors (RII = 0.80). On the other hand, there are four moderately significant factors that contribute to cost and time overruns: (1) conflicts between the general contractor and subcontractors (RII = 0.791); (2) the owner allocates a limited budget for the design phase and prepares project tender documents (RII = 0.791); (3) the owner's selection of the consultant based on the lowest prices only (RII = 0.791); and (4) the owner has general financial difficulties and a lack of liquidity (RII = 0.773).

Factors that have the same RII values ranked according to their STDV values, the consultant's point of view for the top ten ranking factors that cause cost and time overruns, are shown in the following table to provide a reasonable range for understanding higher-impact causes.

Table 4.12: Consultants' respondents' analysis for all overruns' factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The lack of sufficient financing for the project by the owner	Owner – Financial	0.846	1.192
2	The selection of the contractor by the owner based solely on the lowest price offered.	Owner – Contractual	0.836	1.181
3	The owner delays interim payments for completed contractor work.	Owner – Financial	0.827	1.207
4	The Israeli occupation of the Palestinian territories	External – Political	0.800	0.976
5	The contractor selecting an inappropriate subcontractor to perform the work.	Contractor	0.800	1.069
6	Poor performance by the contractor's subcontractors	Contractor	0.800	1.234
7	Conflicts between the general contractor and subcontractors	Contractor	0.791	0.950
8	The owner allocates a limited budget for the design phase and prepares project tender documents.	Owner – Financial	0.791	0.999
9	The owner's selection of the consultant based on the lowest prices only	Owner – Contractual	0.791	1.090
10	The owner has general financial difficulties and a lack of liquidity.	Owner – Financial	0.773	1.167

Consultants consider six owner's-related factors, consisting of two contractual and four financial factors, three contractor's-related factors, and one political external factor, when identifying overrun factors with the greatest impact. In comparison with the all-sample respondent analysis results, both agree on the high impact of the owner on overrun occurrences and give the majority of higher impact factors for owner-related

factors. On the other hand, consultant results have a higher impact on contractors' related factors, and both agree with the minor contribution of the consultant's related factors.

Comparing the results of this study to those of Enshassi (2008) regarding consultants'-related factors reveals that Enshassi (2008) demonstrates a greater influence of material and political external factors. Moreover, the comparison shows that Enshassi's (2008) results include a higher ranking for contractors' related factors, followed by owners and consultants.

4.3.3.2 Ranking of owners' related causes according to consultants' perspectives

In this method of analysis, owner-related factors are separated, analyzed, and ranked according to their RII values based on the consultants' evaluation of the second part of the questionnaire. This analysis is important because it presents consultants' perspectives about owners' contribution to cost and time overruns.

As a result of analysis and causes ranking, three of the top five ranks are classified as having a high significant contribution to cost and time overruns, which are: (1) the lack of sufficient financing for the project by the owner (RII = 0.846); (2) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.836); and (3) the owner delays interim payments for completed contractor work (RII = 0.827). On the other hand, two of the factors have a moderately significant contribution to cost and time overruns, which are: (1) the owner allocates a limited budget for the design phase and prepares project tender documents (RII = 0.791); and (2) the owner's selection of the consultant based on the lowest prices only (RII = 0.791).

The top five ranking factors that cause cost and time overruns are shown in the following table to provide sufficient understanding of owners' higher-impact causes.

Table 4.13: Consultants' respondents' analysis for owners' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The lack of sufficient financing for the project by the owner	Financial	0.846	1.192
2	The selection of the contractor by the owner based solely on the lowest price offered.	Contractual	0.836	1.181
3	The owner delays interim payments for completed contractor work.	Financial	0.827	1.207
4	The owner allocates a limited budget for the design phase and prepares project tender documents.	Financial	0.791	0.999
5	The owner's selection of the consultant based on the lowest prices only.	Contractual	0.791	1.090

Comparing consultants' respondents results for the highest impact owner-related factors to the all-respondents analysis results shows correspondence in the top three factors that are related to a financial situation and the decisions of the owner. It is shown that consultants added factors related to the relationship between them and the owners to the causes of the highest impact overruns, which are: (1) they believe, in some cases, owners allocate a limited budget for the design; and (2) the owner's selection of an unqualified consultant based on the lowest prices. Compared to Enshassi (2008), Enshassi results show factors related to financial decisions and work modifications have a higher impact on overrun contributions.

4.3.3.3 Ranking of consultants' related causes according to consultants' perspectives

In this section, consultants' evaluation for their related overrun factors is analyzed, and factors are ranked following their RII values. This method of analysis provides a self-assessment by consultants for their related causes that contribute to cost and time overruns and ranks the factors that cause cost and time overruns on construction projects.

Analysis results show that consultant-related factors have a moderate to low contribution to cost and time overruns. In the top 5 factors, four factors have a moderately significant contribution, which are: (1) continuous design modification (RII = 0.718); (2) delay in authorizing and approving requests for project materials and execution plans (RII = 0.709); (3) lack of decision-making flexibility on the part of the supervisor (RII = 0.709); and (4) poor project management and quality control (RII = 0.70). On the other hand, one factor has a low and significant contribution to cost and time overruns, which is poor project management and quality control (RII = 0.682).

Factors that have the same RII values are ranked according to their STDV values. The top five ranking factors that cause cost and time overruns are shown in the following table with their RII and STDV values to provide a sufficient understanding of consultants' higher-impact causes.

Table 4.14: Consultants' respondents' analysis for consultants' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	Continuous design modification	designer	0.718	0.959
2	Delay in authorizing and approving requests for project materials and execution plans.	Supervisor	0.709	1.184
3	Lack of decision-making flexibility on the part of the supervisor.	Supervisor	0.709	1.224
4	Poor project management and quality control.	Supervisor	0.700	1.336
5	Mistakes in the project's final design.	designer	0.682	1.260

According to the analysis' findings, the consultants themselves have divided consultant-related factors into two consultant designer factors and three consultant supervisor factors. Moreover, consultants consider factors associated with work flexibility, the ability to respond to a high volume of requests, and strong management abilities to be significant determinants of project overruns. On the other hand, continuous changes in design and designer mistakes contribute to overruns.

The consultants' viewpoints align with the results of the Enshassi (2008) analysis and all sample analyses in this study, indicating that the factors fall within the same scope of work.

4.3.3.4 Ranking contractors' related causes according to consultants' perspectives

This section analysis method is based on analyzing contractors' related factors according to the consultants' evaluation in the second part of the questionnaire and ranking them according to their RII values. This method's importance comes from providing a better understanding of consultants' evaluations and perspectives on contractors' higher impact factors that lead to cost and time overruns.

Results show that in the top five ranking factors, two of the factors have a high impact on cost and time overruns, which are: (1) the contractor selecting an inappropriate subcontractor to perform the work (RII = 0.80); and (2) poor performance by the contractor's subcontractors (RII = 0.80). On the other hand, there are three moderately significant factors that contribute to cost and time overruns, which are: (1) conflicts between the general contractor and subcontractors (RII = 0.791); (2) incorrectly pricing the project with a low profit margin (RII = 0.773); and (3) a shortage of skilled labor in the project (RII = 0.773).

Factors that have the same RII values ranked according to their STDV values, the consultants' point of view for the top five ranking contractors-related factors that cause cost and time overruns, are shown in the following table.

Table 4.15: Consultants' respondents' analysis for contractors' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The contractor selecting an inappropriate subcontractor to perform the work.	Contractor	0.800	1.069
2	Poor performance by the contractor's subcontractors.	Contractor	0.800	1.234
3	Conflicts between the general contractor and subcontractors.	Contractor	0.791	0.950
4	Incorrectly pricing the project with a low profit margin.	Contractor	0.773	1.246
5	Shortage of skilled labor in the project.	Contractor	0.773	1.283

As determined by the analysis, consultants consider subcontractor selection and performance-related contractor-related factors to have the greatest impact on the occurrence of cost overruns. These results are consistent with all sample analyses and contradict the findings of Enshassi (2008), who discovered that financial factors of

contractors have the greatest impact on the occurrence of overruns from the contractor side.

Furthermore, the consultant's point of view included factors related to the contractor's demonstrative issues, such as inaccurate pricing, a low profit margin, and an insufficient workforce for the project. This view matches all sample analyses in this study and does not match Enshassi (2008), who found technical issues affect more from the contractor side.

4.3.3.5 Ranking external related causes according to consultants' perspectives

In this method, the consultants' evaluation of overruns' external factors is analyzed, ranked, and presented. This method's importance is that it separates external factors from other factors to analyze and get a deeper understanding of the consultants' perspective on their role in cost and time overruns.

Analysis results show that only one external factor has a highly significant contribution to overrun occurrences, which is the Israeli occupation of the Palestinian territories (RII = 0.80). On the other hand, three of the top five factors contribute moderately to cost and time overruns, which are: (1) Israeli policies that impede the West Bank's import of technology and materials (RII = 0.718); (2) political decisions affect the donor's project funding (RII = 0.70); and (3) political stability in the country (RII = 0.70). One factor classified as having a low significant contribution to overruns is currency exchange fluctuations (RII = 0.691).

The consultants' point of view for the top five ranking for overruns' external factors that cause cost and time overruns is shown in the following table.

Table 4.16: Consultants' respondents' analysis for overrun's external factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The Israeli occupation of the Palestinian territories.	Political	0.800	0.976
2	Israeli policies that impede the West Bank's import of technology and materials.	Political	0.718	0.959
3	Political decisions affect the donor's project funding.	Political	0.700	1.012
4	political stability in the country.	Political	0.700	1.102
5	Currency exchange fluctuations.	Economical	0.691	1.011

The findings indicate that consultants assign greater significance to the political factors among all external factors in overrun occurrences, as 4 of the 5 factors are political factors. The political situation in Palestine is complicated and affects all aspects of life, and this is an agreed point of view. Currency exchange fluctuations are the only factor listed in the highest impact factors, and this is because, as we know, different currencies are used in financing projects, which causes confusion in currency exchange with the locally used currency. This analysis results match Enshassi (2008), who found political factors, followed by materials' factors, to have the highest impact external factors.

4.3.4 Analysis of the assessment of the contractors participating in the study

In this analysis approach, the overrun causes were analyzed and ranked following contractors' participation evaluations in several ways. First, the analysis was devised for the contractor's evaluation of all factors that cause overruns. More methods were devised depending on contractors' participant evaluations for owners'-related factors, consultants'-related factors, contractors'-related factors, and external factors separately to assess overrun causes for each group.

These analysis methods for the contractors' participant group help to understand their needs and priorities, giving a deeper understanding of their point of view regarding cost and time overruns.

4.3.4.1 Ranking of all overruns' causes according to contractors' perspectives

In this analysis, all factors from all groups were ranked based on their RII values following an analysis of contractors' evaluations of overrun causes. This analysis is important because it ranks overrun causes for all factors and reflects the consultant's general perspective on the causes of cost and time overruns.

Analysis results show that two of the top ten factors have a very highly significant contribution to cost and time overruns, which are: (1) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.914); and (2) the owner delays interim payments for completed contractor work (RII = 0.905). On the other hand, there are eight highly significant factors that contribute to cost and time overruns, which are: (1) the lack of sufficient financing for the project by the owner (RII = 0.886); (2) the owner delays making related decisions (RII = 0.857); (3) inaccuracies in the initial estimate of the project's budget and duration (RII = 0.848); (4) the owner's general financial difficulties and a lack of liquidity (RII = 0.829); (5) economic stability in the country (RII = 0.829); (6) The owner's selection of the consultant based on the lowest prices only (RII = 0.829); (7) Difficulty and delay in obtaining necessary approvals and permissions to start work, such as licenses and others (RII = 0.829); and (8) A contractor is overburdened owing to concurrent work on multiple projects (RII = 0.819).

Factors that have the same RII values ranked according to their STDV values, the contractors' point of view for the top ten ranking factors that cause cost and time

overruns, are shown in the following table to provide a reasonable range for understanding and comparing higher-impact causes.

Table 4.17: Contractors' respondents' analysis for all overruns factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The selection of the contractor by the owner based solely on the lowest price offered.	Owner - Contractual	0.914	0.598
2	The owner delays interim payments for completed contractor work.	Owner - Financial	0.905	0.750
3	The lack of sufficient financing for the project by the owner	Owner - Financial	0.886	0.870
4	The owner delays making related decisions.	Owner - Administrative	0.857	1.007
5	Inaccuracies in the initial estimate of the project's budget and duration	Owner - Planning	0.848	0.831
6	The owner has general financial difficulties and a lack of liquidity.	Owner - Financial	0.829	0.964
7	Economic stability in the country	External - Economical	0.829	0.964
8	The owner's selection of the consultant based on the lowest prices only	Owner - Contractual	0.829	1.014
9	Difficulty and delay in obtaining necessary approvals and permissions to start work, such as licenses and others	External - Governmental	0.829	1.108
10	A contractor is overburdened owing to concurrent work on multiple projects.	Contractor	0.819	0.995

Analyzing contractors' perspectives shows contractors classified the highest impact overrun factors as follows: 7 contractor-related, 2 external, and 1 contractor's-related factor. In order to categorize these factors, owner-related factors are categorized as 3

financial, 2 contractual, 1 administrative, and 1 planning. On the other hand, external factors are categorized as economic and governmental.

In comparison to the results of the analysis of all responses, contractors hold the owners more responsible for cases of cost and time overruns, with seven of the top ten factors being owner-related. Furthermore, contractors assign only one of the top ten factors to the consultants and none to the contractors, indicating that they attribute a limited amount of responsibility to both the owners and the consultants.

In contrast to the findings of this study, which indicate that owners carry a greater responsibility for overruns, Enshassi et al. (2010) and Enshassi (2008) attributed greater responsibility for overruns to material and political factors, which are classified as external factors in this research.

4.3.4.2 Ranking of owners' related causes according to contractors' perspectives

This section analysis method is based on analyzing owners' related factors according to the contractors' evaluation of causes in the second part of the questionnaire and ranking them according to their RII values. This method's importance comes from providing a better understanding of evaluations and perspectives on contractors' higher-impact factors that lead to cost and time overruns.

Results show that in the top five ranking factors, two of the contractors' related factors have a very high impact on cost and time overruns, which are: (1) the selection of the contractor by the owner based solely on the lowest price offered (RII = 0.914); and (2) the owner delays interim payments for completed contractor work (RII = 0.905). On the other hand, there are three factors classified as high-significant factors that contribute to cost and time overruns, which are: (1) the lack of sufficient financing for the project by

the owner (RII = 0.886); (2) the owner's delays in making related decisions (RII = 0.857); and (3) inaccuracies in the initial estimate of the project's budget and duration (RII = 0.848).

The contractors' point of view for the top five ranking contractors' related factors that cause cost and time overruns is shown in the following table.

Table 4.18: Contractors' respondents' analysis for owners' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	The selection of the contractor by the owner based solely on the lowest price offered.	Contractual	0.914	0.598
2	The owner delays interim payments for completed contractor work.	Financial	0.905	0.750
3	The lack of sufficient financing for the project by the owner	Financial	0.886	0.870
4	The owner delays making related decisions.	Administrative	0.857	1.007
5	Inaccuracies in the initial estimate of the project's budget and duration	Planning	0.848	0.831

Contractors classified the selection of the contractor by the owner based solely on the lowest price as the most important factor by the owner that causes the overruns. This is because this factor has a dual relationship between the owner and the contractor. Another overrun owner's factor is related to the owner's financial situation, such as payment delays and insufficient financing for the project. On the other hand, administrative and planning factors such as delays in making decisions and inaccurate estimates by the owner have lower impact factors compared to the factors mentioned before but still have the highest impact factors. This research results match Enshassi et al. (2010) and Enshassi (2008) results, where financial owner-related factors have the highest impact on overrun occurrence.

4.3.4.3 Ranking of consultants' related causes according to contractors' perspectives

In this section, consultants' related factors are analyzed following the contractor's evaluation and ranked according to their RII values. The closer technical contact in a project is between the contractor and the consultant, and so this analysis's importance is that it provides a more comprehensive understanding of contractors' evaluations of consultants' higher impact factors that contribute to cost and time overruns on construction projects.

Analysis results for contractors' perspectives on consultants' related factors show that only one factor has a high significant contribution to cost and time overruns, which is the lack of technical expertise by the supervising consultant's team in executing the work (RII = 0.80). The other four factors in the top 5 ranking list have a moderately significant contribution to cost and time overruns, which are: (1) delay in authorizing and approving requests for project materials and execution plans (RII = 0.791); (2) mistakes in the project's final design (RII = 0.791); (3) poor contract management by the consultant (RII = 0.791); and (4) significant disparities between the designer's estimates at the stage of gathering the project documents and the contractors' bids at the tender stage (RII = 0.781). The top five ranking factors that cause cost and time overruns are shown in the following table with their RII and STDV values to provide sufficient understanding of consultants' higher-impact causes.

Table 4.19: Contractors' respondents' analysis for consultants' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	Lack of technical expertise by the supervising consultant's team in executing the work	Supervisor	0.800	0.894
2	Delay in authorizing and approving requests for project materials and execution plans	Supervisor	0.791	0.974
3	Mistakes in the project's final design	Designer	0.791	1.024
4	Poor contract management by the consultant	Supervisor	0.791	1.117
5	The significant disparities between the designer's estimates at the stage of gathering the project documents and the contractors' bids at the tender stage.	Designer	0.781	0.768

The contractor's point of view for consultants-related overrun causes classified the highest impact overrun factors as three consultant-supervisor factors and two consultant-designer factors. Three of the top five factors on the contractors' list are the same in all sample analysis lists, which indicates general agreement in the sample for these highest impact factors.

Contractors place significant importance on factors related to the skills and expertise of consultants because of the close technical relationship that exists between the contractor and the consultant while they are on-site. Consistent with Enshassi's (2008) findings, the results indicate that technical expertise and experience are the most crucial factors.

4.3.4.4 Ranking contractors' related causes according to contractors' perspectives

This section analysis method is based on analyzing contractors for their related overrun factors in the second part of the questionnaire and ranking them according to their RII values. This method's importance comes from providing a self-assessment by the contractors for their role in overrun occurrences and a better understanding of the contractors' perspectives on their own higher impact factors that lead to cost and time overruns.

Results show that in the top five ranking factors, three of the factors have a high impact on cost and time overruns, which are: (1) the contractor is overburdened owing to concurrent work on multiple projects (RII = 0.819); (2) incorrectly pricing the project with a low profit margin (RII = 0.80); and (2) a significant increase in labor costs (RII = 0.80). On the other hand, there are two moderately significant factors that contribute to cost and time overruns, which are: (1) the contractor selecting an inappropriate subcontractor to perform the work (RII = 0.791); and (2) poor performance by the contractor's subcontractors (RII = 0.791).

Factors that have the same RII values ranked according to their STDV values, the contractors' point of view for the top five ranking contractors-related factors that cause cost and time overruns, are shown in the following table.

Table 4.20: Contractors' respondents' analysis for contractors' related factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	A contractor is overburdened owing to concurrent work on multiple projects.	Contractor	0.819	0.995
2	Incorrectly pricing the project with a low profit margin.	Contractor	0.800	0.837
3	significant increase in labor costs	Contractor	0.800	1.304
4	The contractor selecting an inappropriate subcontractor to perform the work.	Contractor	0.791	1.203
5	Poor performance by the contractor's subcontractors	Contractor	0.791	1.203

Results show contractors believe that financial factors have the highest impact on overruns from their side; these financial factors might be a result of mistakes or weak management from the contractor or his representative. Another high impact factor that is related to subcontractors' selection and performance is surely the importance of subcontractors in the project.

The results in this section partially match the results from all sample analyses, where three factors are the same in both highest impact factors list. On the other hand, the contractor's point of view in this research matches the contractor's perspective in Enshassi (2008), where they gave higher priorities to the contractor's financial situation, followed by site management skills.

4.3.4.5 Ranking external related causes according to contractors' perspectives

In this method, the contractors' evaluation of overruns' external factors is analyzed, ranked, and presented. This method's importance is that it separates external factors

from other factors to analyze and get a deeper understanding of the contractors' perspective on their role in cost and time overruns.

The study found that from the contractor's point of view, the five most important factors that cause cost and time overruns are: (1) the country's economic stability (RII = 0.829); (2) the difficulty and delay in getting the necessary permissions and approvals to start work, such as licenses and others (RII = 0.829); (3) currency exchange fluctuations (RII = 0.810); and (4) a big rise in the prices of raw materials in the country (RII = 0.8).

Factors that have the same RII values are ranked according to their STDV values. The contractor's point of view for the top five rankings for overruns' external factors that cause cost and time overruns is shown in the following table.

Table 4.21: Contractors' respondents' analysis for overruns' external factors

RANKING	FACTOR	CATEGORY	RII	STDV
1	Economic stability in the country	Economical	0.829	0.964
2	Difficulty and delay in obtaining necessary approvals and permissions to start work, such as licenses and others	Governmental	0.829	1.108
3	Currency exchange fluctuations	Economical	0.810	0.865
4	significant increase in raw material prices in the country.	Economical	0.800	0.949
5	High competition levels in the construction sector	Economical	0.800	1.095

Results show that the most important external overrun causes, according to the perspective of contractors, are economic factors. Economic stability, which includes all economic aspects such as currency, material prices, and other costs, is the most important factor. The findings diverge from those of Enhsassi (2008) and all sample analyses, in which political factors are found to have the most significant influence on external factors.

4.4 Major stakeholders' results comparison

In this section, various perspectives on the causes of project overruns will be discussed. The purpose of this comparison is to highlight divergent stakeholder perspectives regarding the same factor category.

4.4.1 Respondents' comparison for all factors ranking

Major stakeholders are asked to rank the top 10 factors that contribute to cost and time overruns, and the list of the top 10 factors that result from the analysis of all respondents is categorized as follows: There are 7 owner-related factors, 2 contractor-related factors, and 1 external factor.

The top 10 factors from the owner's perspective are categorized into: 4 owner-related factors, 1 consultant-related factor, and 5 contractor-related factors. The consultant's perspective includes 6 owner factors, no consultant factors, 3 contractor factors, and 1 external factor. The contractor perspective for the top 10 list consists of 7 owner-related factors, no consultant factors, 1 contractor factor, and 2 external factors.

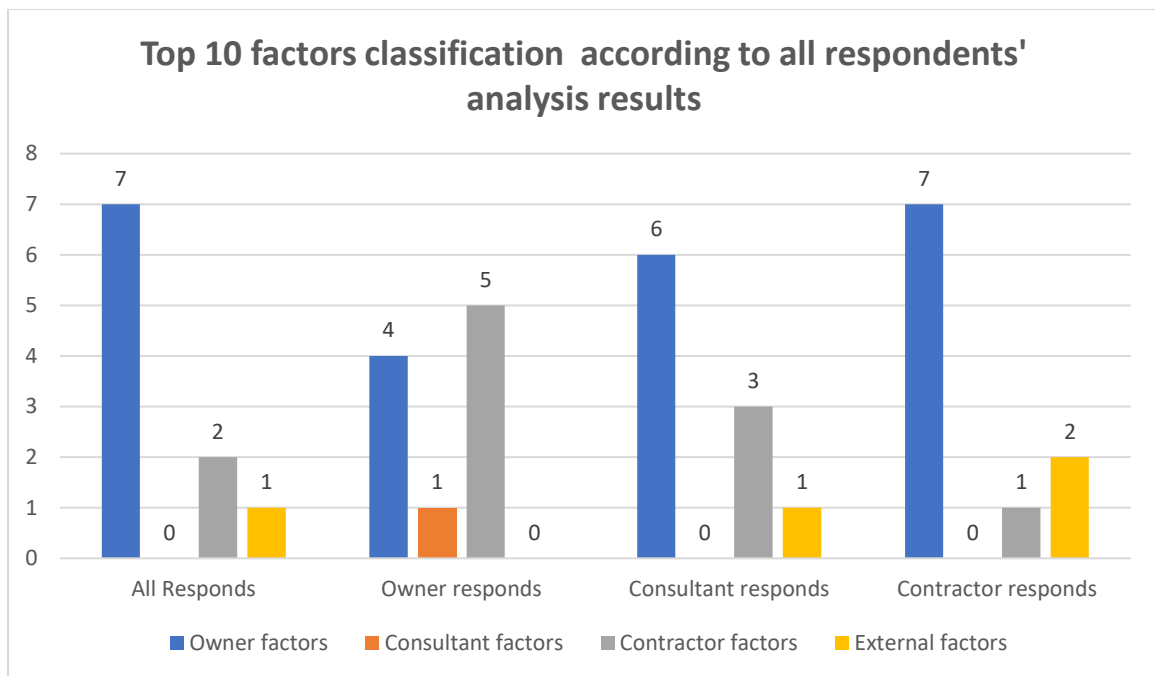


Figure 4.1: Top 10 factors classification according to respondents' category

All sample respondent analyses, owner respondent analyses, and consultants' respondent analyses indicate that "the lack of sufficient financing for the project by the owner" is the highest-ranking factor. However, contractors' respondent analyses indicate that "the selection of the contractor by the owner based solely on the lowest price offered" is the highest-ranking factor.

Relative importance factors have different ranges for different analysis approaches: the RII range for all sample respondents' analysis is between 0.872 and 0.781, the RII range for owner respondents' analysis for all factors is between 0.88 and 0.787, the RII range for consultant respondents' analysis is between 0.846 and 0.773, and the RII range for contractor respondents is between 0.914 and 0.819.

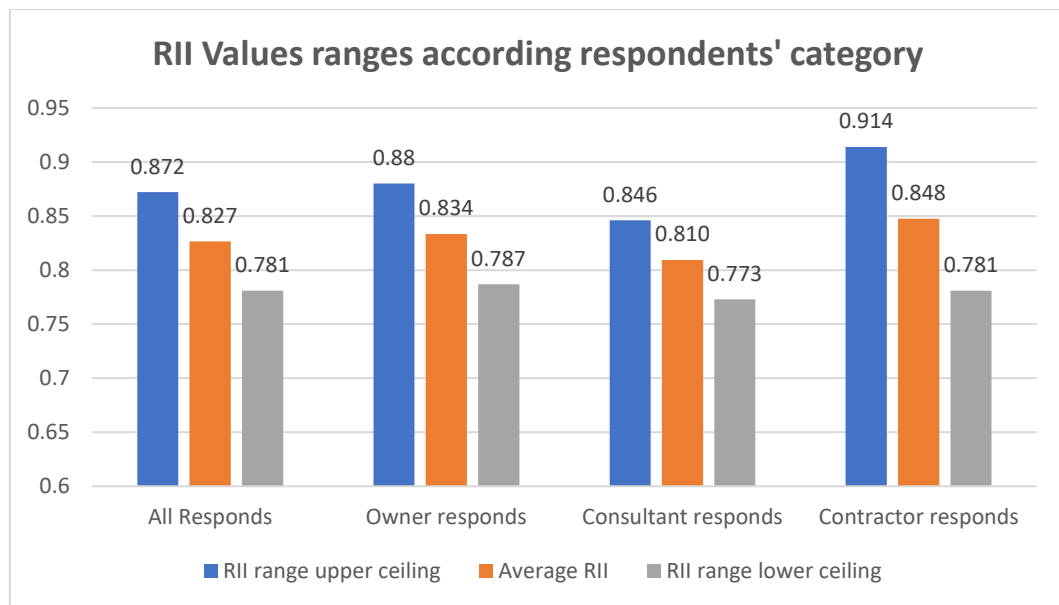


Figure 4.2: RII Values ranges according respondents' category

4.4.2 Respondents' comparison for all owners' related factors ranking

This section compares the results of various analysis approaches on the top five owner-related factors. All sample respondents categorized owner-related factors into 3 financial, 1 contractual, and 1 administrative categories. Owners' respondents categorized owner-related factors into 2 financial, 1 contractual, 1 administrative, and 1 planning factor.

3 financial and 2 contractual factors were categorized as owner-related by consultant respondents, as shown by the results. According to the responses of contractors, there are 2 financial, 1 contractual, 1 administrative, and 1 planning factor.

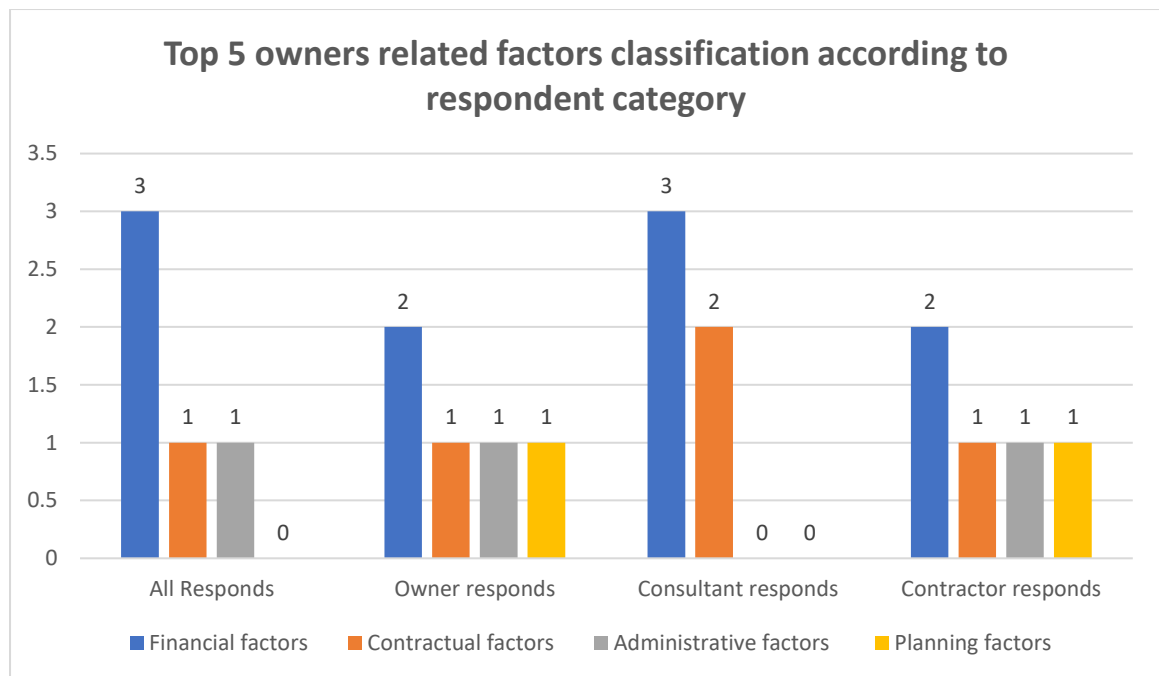


Figure 4.3: Top 5 owners related factors classification according to respondent category

The lack of sufficient financing for the project by the owner is the most significant factor related to the owner, as it topped the lists compiled by all respondents, owners, and consultants. Contractors ranked the selection of the contractor by the owner based on the lowest price as the owner-related factor with the highest RII.

Relative importance index values varied for different approaches to analysis; for all sample respondents 'analysis approach RII values ranged between 0.871 and 0.794; for owners, the range was between 0.88 and 0.787; for consultants, the range was between 0.846 and 0.791; and for contractors, the range was between 0.914 and 0.848.

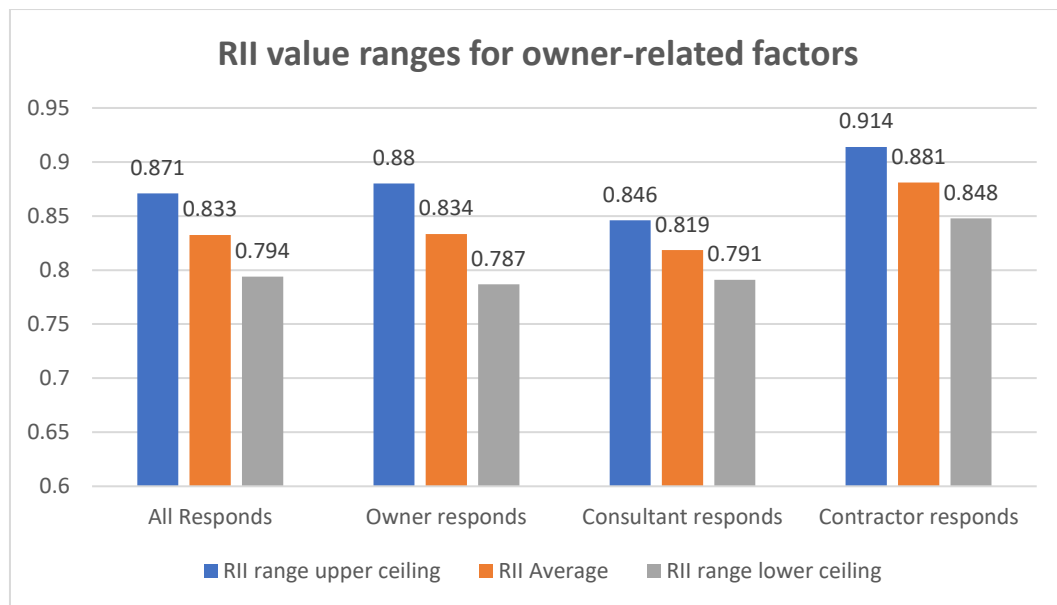


Figure 4.4: RII value ranges for owner-related factors

4.4.3 Respondents' comparison for all consultants' related factors ranking

This section compares various aspects of the analysis results for consultant-related factors. 3 consultant supervisor factors and 2 consultant designer factors comprise all respondents' top 5 factor analysis results. In the owners' respondents' top 5 factors, 1 consultant supervisor factor and 4 consultant designer factors are categorized as owner-related factors.

The top ten list of consultant respondents' analysis includes 3 supervisor-related factors and 2 designer-related factors, while contractor respondents' analysis includes 3 supervisor factors and 2 designer factors.

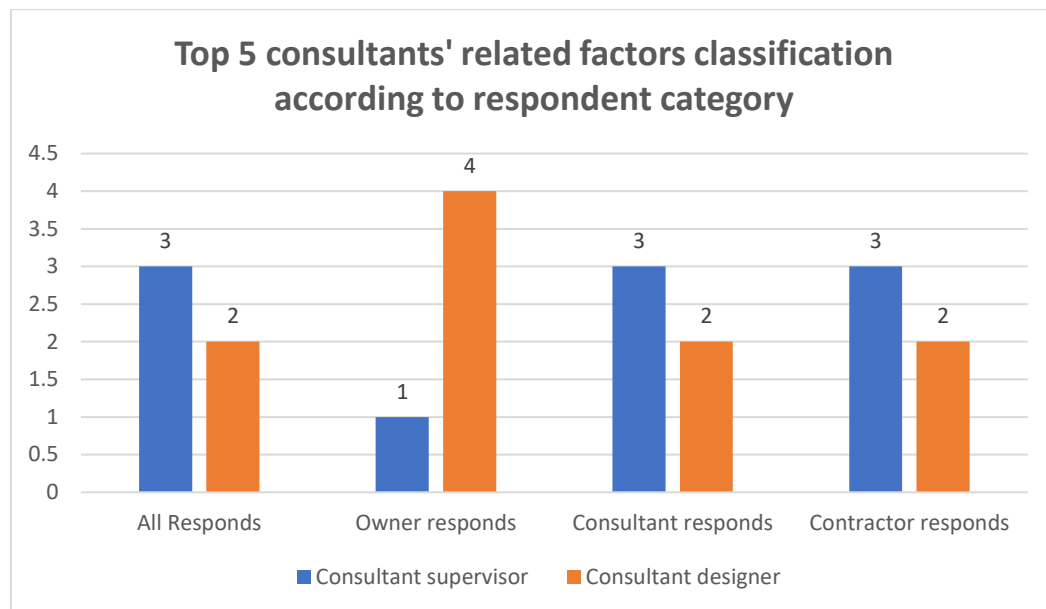


Figure 4.5: Top 5 consultants' related factors classification according to respondent category

In comparing top-ranking factors, "the designer's reliance on an unqualified team" ranks highest in the analyses of all respondents and owners, whereas "continuous design modification" ranks highest in the analyses of consultants, and "lack of technical expertise by the supervising consultant's team in executing the work" ranks highest in the analyses of contractors.

The relative importance index helps rank factors according to their importance, and the RII range expresses the sensitivity of those factors; higher RII values indicate greater importance, while a smaller range indicates greater sensitivity.

All sample respondents' RII range values are between 0.751 and 0.732, while owners' analysis RII range values are between 0.80 and 0.747, consultants' RII range values are between 0.718 and 0.682, and contractors' RII range values are between 0.80 and 0.781.

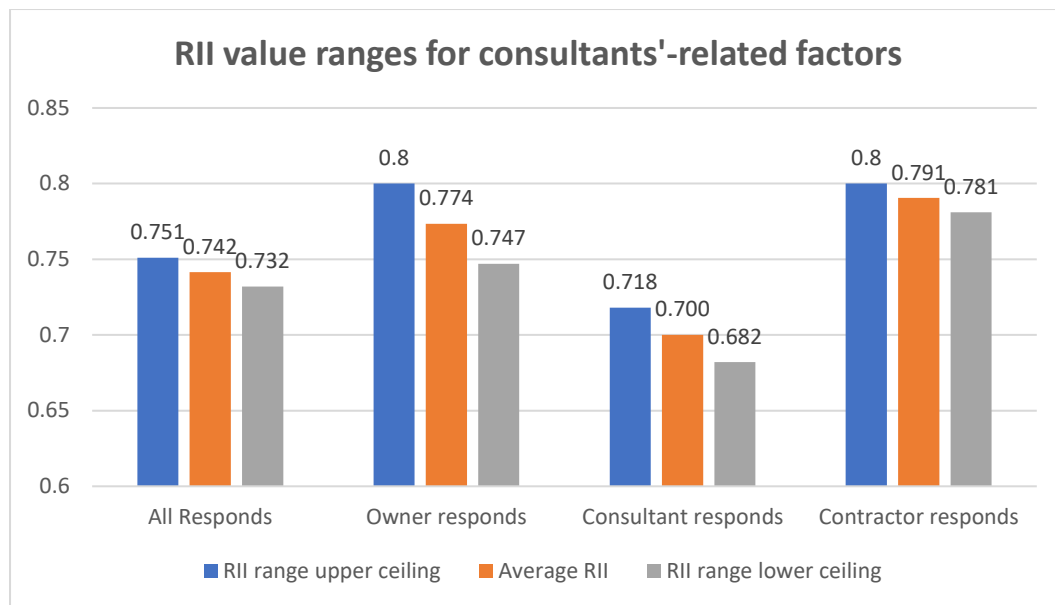


Figure 4.6: RII value ranges for consultant's-related factors

4.4.4 Respondents' comparison for contractors' related factors ranking

Different analysis approaches evaluated and conducted results for contractor-related factors; comparing different approaches' results for consultant-related causes of cost and time overruns contributes to a deeper comprehension of contractors' role in overrun occurrence from a variety of perspectives.

In this research literature review, contractor-related factors are not categorized, however, reviewing results for different aspects reveals that the top ten factors for respondents include technical and performance factors, subcontractor-related factors, financial factors, and administrative factors. Almost identical factors were included on each of the top ten lists, but their rankings and relative importance index values varies.

All respondents' analyses indicates that the top-ranking factor is "poor performance by the contractors' subcontractor," whereas in the owners' respondents' analyses, the top-ranking factor is "technical errors in the implementation phase." The consultant respondents' analyses indicate that the top-ranking factor is "the contractor selecting an

inappropriate subcontractor to perform the work," and from the contractors' perspective, the contractor-related top-ranking factor is "the contractor selecting an inappropriate subcontractor to perform the work."

The RII value range varied for various analysis approaches; for all respondents' analyses, the RII value range was between 0.80 and 0.7534, while the RII value range for owners' respective analyses was between 0.8067 and 0.7533, for consultants' perspectives, between 0.80 and 0.7364, and for consultants' respondents, between 0.8191 and 0.7619.

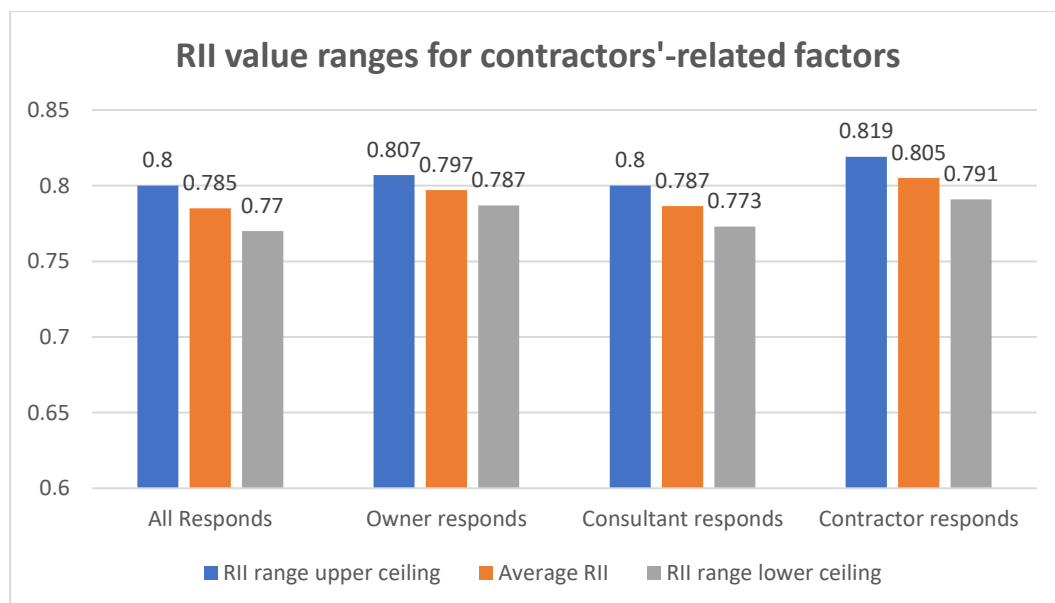


Figure 4.7: RII value ranges for contractors'-related factors

4.5 Reliability of factor Analysis

Cronbach Alpha was used to estimate the reliability of the psychometric test. It was calculated for the four groups and the overall factors, as shown in the next table. The results of Cronbach's alpha were all more than 0.9, thus indicating an excellent level of reliability was achieved.

Table 4.22: Cronbach Alpha analysis results

Factors Group	No. of Factors	Ca	Result
Owners-related factors	28	0.916	Excellent
Consultants-related factors	31	0.948	Excellent
Contractors-related factors	42	0.955	Excellent
External factors	29	0.939	Excellent
All factors	130	0.976	Excellent

Chapter Five

Conclusion and Recommendations

5.1 Introduction

This chapter includes a conclusion of this research's results and findings, as well as providing recommendations to minimize cost and time overrun occurrence in construction projects. Recommendations are suggested to fulfill stakeholders' prior needs following different perspectives.

5.2 Conclusion

The Palestinian construction sector is an active and productive sector in the Palestinian economy. Cost and time overruns are significant challenges for this industry and a source of conflict among project stakeholders, which in some instances leads to project failure. In an effort to shed light on this issue, this research is conducted in the hopes of enhancing our understanding of these struggles.

The research examined the causes of overruns from both broad and specific perspectives. The overall perspective was reflected in the analysis of causes of project delays based on the evaluation of all-sample members, which is a representative sample of the construction industry's population. Conversely, the evaluation of overrun causes from the perspective of each major stakeholder is addressed individually in order to comprehend their difficulties in relation to overrun occurrences.

In Palestine, the owner's failure to provide adequate funding for the project is deemed by all sample participants to be the most significant contributor to cost and time overruns. As such, this owner-related factor is categorized as the most significant cause of cost and time overruns. In addition, this study found that owners hold the greatest responsibility for project overruns, followed by contractors, external factors, and consultants, in that

order. These findings from Palestine are consistent with those of other studies, including those of Sharma and Gupta (2021) and Alshihri et al. (2022).

The research sample perspective shows that owners' financial factors have the greatest impact on overruns from their side. Furthermore, the study revealed that the consultant designer assumes a more significant role in instances of cost and time overruns compared to the consultant supervisor. Subcontractors also contribute significantly to contractor overruns, whereas the Israeli occupation stands as the most critical external factor inducing such complications.

Different perspectives on project overrun causes are obtained by analyzing the evaluations of the project's three major stakeholders—the owners, the consultant, and the contractor. According to the research, owners place the most responsibility on contractors for cost and time overruns, followed by themselves and the consultant. In Palestine, owners consider inadequate project financing to be the most significant cause of cost overruns.

From the owner's perspective, they believe owners' financial factors are a more significant contributor to overruns; furthermore, the research found that they believe that the consultant-designer has a greater impact on overrun occurrences than the consultant supervisor. Toward the contractors, the owners' perspective is that technical and subcontractor issues are the most important overrun causes from the contractor side, and political factors are the dominant external factors that affect overruns in projects.

From the perspective of the consultants, the lack of sufficient financing for the project is the first factor that causes cost and time overruns in construction projects. Moreover, they believe owners play the major role in overrun occurrences, followed by contractors

and external factors. On the other hand, owners assume that their financial situation significantly affects overrun occurrences, while they believe that the consultant supervisor role is more effective than the designers' in overruns occurrence. Furthermore, the consultants give the contractors' subcontractor the highest responsibility for the overruns from the contractor side, while they give the political causes the highest responsibility among the external factors.

5.3 Recommendations to owners

The owner is the individual who possesses the project's assets, finances the various phases of construction, and hires consultants and contractors to construct the project. This has a substantial effect on the project and could be a factor in its success or failure.

In this research, owner-related factors were analyzed and discussed from a variety of perspectives, including general perspectives that consider the evaluation of all respondents, the owner perspective, which is a form of self-assessment, the consultant perspective, in which consultants evaluate owner-related factors, and the contractor perspective, in which contractors evaluate owner-related factors.

Higher-impact owner-related factors were discussed before. To eliminate these high factors owners involved in construction projects should:

- 1- Ensure adequate funding and develop financial and cash flow plans to t project phases in order to finance them efficiently.
- 2- Eliminate owner's financial impact on project activities and guarantee the availability of the necessary funding.
- 3- Select contractors and consultants based on their expertise, not just on the lowest price, and to evaluate the project's technical requirements. This includes

conducting technical and financial evaluations for competitors as consultants or contractors.

- 4- Develop a follow-up system to accelerate the decision-making process and avoid any delays.
- 5- Develop communication systems and tools with project stakeholders in order to minimize bureaucracy that could result in cost and time overruns.
- 6- Enhance owners' project management skills and authorize project management experts for large projects in order to compensate for owners' insufficient project management experience.
- 7- Before each phase, conduct a thorough analysis and evaluation of the project and compare the owner's goals with the available resources to reduce the number of change orders.
- 8- Depend on qualified people to prepare for initial budget and duration of projects, even in the early stages of the project.

In addition to the above recommendations and in accordance with the responses provided by different stakeholders, owners should increase their budgets for the design and project documentation phases in order to meet consultants' expectations.

To meet the contractor's expectations, owners must pay close attention to financial aspects of projects, delegate complete technical authority to consultants, and improve their general planning skills.

In addition to that, owners must consider external stakeholders, including government, municipality, suppliers, neighbors, and affiliated organizations. If these external stakeholders are neglected, it could have catastrophic effects on project's progress.

5.4 Recommendations to consultants

The main responsibilities of the consultant are to manage the contract between the owner and the contractor and to oversee the implementation of design plans and specifications. These very important responsibilities make the consultant one of the project's most important stakeholders, with the ability to significantly impact the project's progress.

Despite that the results show that all respondents assigned consultant-related factors lower relative importance values than owner- and contractor-related factors, they still have a substantial impact on project overruns.

To eliminate the main causes of cost and time overruns caused by consultants, the following steps are suggested:

- 1- Consultant designers should recruit professional teams to prepare design and contract documents.
- 2- Consultant-designers should pay more attention to projects' final designs and documents in order to reduce errors and design modifications that may lead to cost and time overruns in later phases.
- 3- Consultant-designers should give high priority to accurate cost and time estimate for projects in document preparation phase.
- 4- Consultant supervisors should be more accommodating and should not delay in authorizing work-related requests.
- 5- Consultant supervisors should depend on highly qualified teams to supervise the project and manage the contract between the owner and the contractor.
- 6- Consultant supervisors should develop communication and management skills with different project parties.

Owners' responses analysis shows owners give higher priority to the design phase; in this phase, consultants should pay high attention to work accuracy to eliminate mistakes that cause struggles in later phases. On the contrary, contractor response analysis shows that contractors give higher priorities to the consultant-supervisor role and impact overruns more.

5.5 Recommendations to contractors

Contractor plays a main role in the construction phase's success, which is the most critical phase in the project life cycle. It is widely known that contractors contribute strongly to overrun occurrences, and in this research results, contractors' related factors appeared at the list for higher overrun contribution factors.

To minimize contractors' cost and time overruns, it is recommended that they take the following measures to improve their attitude:

- 1- Develop planning strategies and contingency plans for all kinds of challenges predicted during the various phases of construction.
- 2- Make good selection of the subcontractors in the project since they play a major role in the contractor's success. To do that, it is required to conduct an investigation and evaluation of subcontractors and make strong, detailed agreements to avoid any conflicts.
- 3- Employ highly qualified project teams with good experiences to lead the project and minimize technical and contractual mistakes.
- 4- Give high attention to pricing phases with accurate evaluation and estimation of the project, updating prices for materials and workmanship, actual overhead inclusion, and an adequate profit margin.

- 5- Contractors should organize their financial and managerial capacities and avoid undertaking projects that exceed their ability to manage.
- 6- Avoid team turnover in project management teams such as engineers, construction teams such as subcontractors, or supplier teams as it will lead to project confusion.
- 7- Insure proper skilled labor availability for the project by selecting strong subcontractors with sufficient labor teams to fulfill the project requirements and updating plans to overcome labor shortages, such as dividing work between more than one subcontractor and depending on overlap techniques.

The above recommendations are comprehensive and fulfill contractors' overrun factors from different aspects. However, to fulfill owners' points of view, in addition to the above recommendations, contractors should show more compliance with the supervisor's directions and enhance communication skills with other project parties.

5.6 General recommendations

The following is a discussion of some recommendations for the project's external stakeholders. External stakeholders are people or organizations related to the construction project but are not the owner, consultant, or contractor. Examples of major external stakeholders are the government, municipalities, suppliers, labor unions, engineering associations, contractors' union, and other related organizations.

The list of top 30 factors contributing to cost and schedule overruns includes three external factors. All are political factors which highlights the impact of political issues on construction industry. The Palestinian government and organizations are responsible for handling the Israeli-Palestinian conflict and should endeavor to resist the occupation and minimize its impact on Palestinian industrial sectors.

Moreover, the government can play an effective role in the construction industry. This can happen through organizing the industry by law, regulating the relationship between the projects' stakeholders, encouraging development, and using modern techniques and tools in management, design, and construction.

Stakeholders complain of difficulty and delays in obtaining needed approvals and permissions for the construction industry and the absence of a unified construction code in the West Bank. The government should take these complaints seriously and develop technology to speed up obtaining approvals, review and shortcut the unneeded documents from different governmental departments. Regarding construction codes, the different departments should unify their requirements, and all construction projects in different cities should work to the same standards.

Economy factors are within major stakeholders' priorities; the government and other external stakeholders, such as suppliers and unions, should work on economic stability, materials affordability, price fluctuations control, and construction sector stimulation actions.

Municipalities are the ones usually responsible for organizing and planning. Delays in obtaining construction licenses and complications in construction organization are common municipal causes of cost and time overruns. The government, through the municipalities, must develop its service system, avoid delays in granting permissions, and maintain control over proper and effective city planning.

Engineering associations play a significant role in organizing the construction industry; all construction projects must be assessed and authorized by engineering association prior to obtaining a construction license. The engineering association should focus on the development of auditing systems that detect design errors, the transition to modern

design requirements, the development of consultant qualifications through training courses, and similar endeavors.

Contractors' unions and labor unions can both play a role in the organization of their members' professions; the contractors union must have greater control over its members and help them advance their careers, while the labor union must support workers and protect their rights.

In conclusion, it should be noted that construction project overruns are an extensive topic that requires further study and research; they involve significant challenges in an important sector that directly or indirectly supports thousands of people in the West Bank of Palestine. The development of this sector requires the collaboration of several individuals from diverse backgrounds. Major stakeholders hold the greatest responsibility for the success of the project and its delivery within the target budget and time plans.

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APPENDIX

استبيان حول تقييم العوامل التي تؤدي الى تأخر الاعمال وارتفاع التكاليف في انجاز المشاريع الانشائية

في الضفة الغربية - فلسطين

السادة المالكين، والاستشاريين والمقاولين العاملين في قطاع المشاريع الانشائية في الضفة الغربية:

يقوم الباحث باعداد دراسة تهدف الى تحديد العوامل التي تسبب تأخر انجاز المشاريع الانشائية في الضفة الغربية في فلسطين عن الخطط الزمنية للمشروع وارتفاع التكلفة الحقيقية للمشاريع عن القيمة التقديرية والميزانيات المخصصة لها، وتأتي هذه الدراسة استكمالاً لمتطلبات الحصول على شهادة درجة الماجستير من برنامج ادارة الاعمال في جامعة بيرزيت. لذلك ارجو من حضرتكم الاجابة على الاستبيان بدقة وشفافية لما في ذلك من أثر على دقة نتائج هذه الدراسة، علماً ان البيانات المقدمة في هذا الاستبيان هي لأغراض البحث العلمي وسيتم التعامل معها بسرية وحفظ كامل للخصوصية.

مع جزيل الشكر والتقدير

معد الدراسة: احمد صالح خصيب

مشرف الدراسة: د. سمير بيضون

القسم الاول: معلومات عن مجيب الاستبيان

❖ الاسم - اختياري:

❖ المؤسسة التي تعمل لديها - اختياري:

❖ قطاع العمل الذي تعمل فيه حالياً:

1- القطاع العام 2- القطاع الخاص 3- قطاع المؤسسات الاهلية

❖ طبيعة الجهة التي تعمل لديها حالياً:

1- جهة مالكة 2- مكتب استشاري 3- شركة مقاولات

❖ تصنيف المكتب الاستشاري الذي تعمل فيه - إذا كنت تعمل في مكتب استشاري

1- استشاري 2- درجة اولى 3- اقل من درجة اولى

❖ تصنيف شركة المقاولات التي تعمل لديها - إذا كنت تعمل في شركة مقاولات

1- درجة اولى 2- درجة ثانية 3- اقل من درجة ثانية

❖ موقع الجهة التي تعمل لديها:

1- شمال الضفة الغربية 2- وسط الضفة الغربية 3- جنوب الضفة الغربية

❖ موقعك الوظيفي في مكان عمالك

مالك / مدير المؤسسة 2- مدير مشاريع 3- مهندس موقع 4- غير ذلك ()

❖ المؤهل العلمي:

1- اقل من بكالوريوس 2- بكالوريوس 3- ماجستير او أكثر 4- غير ذلك ()

❖ عدد سنوات الخبرة:

1- سنة الى اقل من خمس سنين 2- خمسة الى اقل من عشرة سنين 3- أكثر من عشر سنين

القسم الثاني: اجابة اسئلة الاستبيان

يقوم الاستبيان على قياس مدى تأثير كل عامل على التأخير الزمني وارتفاع التكلفة في المشروع، ارجو من حضرتكم وضع اشارة تحت الدرجة المقدرة من قبلكم لمدى تأثير هذا العامل على الزيادات الزمنية والمالية في المشروع، حيث ان الدرجات المعطاة من قبلكم تمثل التالي:

الدرجة 5: تمثل ان هذا العامل له مساهمة كبيرة جدا وواضحة في حدوث تأخيرات وارتفاع التكاليف في المشروع.
الدرجة 4: تمثل ان هذا العامل له أثر كبير ولكن بدرجة اقل من الدرجة 5 في حدوث تأخيرات وارتفاع التكاليف في المشروع.

الدرجة 3: ان هذا العامل له تأثير معتدل في حدوث تأخيرات وارتفاع التكاليف في المشروع.

الدرجة 2: ان هذا العامل له تأثير قليل في حدوث تأخيرات وارتفاع التكاليف في المشروع.

الدرجة 1: ان هذا العامل له تأثير قليل جدا يكاد لا يذكر في حدوث تأخيرات وارتفاع التكاليف في المشروع.

1- عوامل مرتبطة بالجهة المالكة للمشروع

الدرجة					العامل	الرقم
1	2	3	4	5		
					عوامل متعلقة بالتخطيط للمشروع	أ
					تغيير نطاق الاعمال في المشروع من قبل المالك	1
					تغيير المالك للتصميم الاولي للمشروع	2
					اخطاء في التخطيط وجدولة المشروع من قبل المالك	3
					اخطاء في التقدير الاولي للميزانية والفترة الزمنية اللازمين للمشروع	4
					عدم وجود خطة ادارة مخاطر من قبل المالك	5
					كثرة الاوامر التغييرية والاعمال الاضافية من قبل المالك	6

					7	سوء اختيار المالك لموقع المشروع وظروفه اللوجستية
					ب -	عوامل متعلقة بالأمور التعاقدية للمشروع
					8	اختيار المالك للاستشاري بناء على اقل الاسعار فقط
					9	اختيار المالك للمقاول بناء على اقل سعر مقدم فقط
					10	اختيار المالك لنوع عقد غير مناسب لطبيعة الاعمال
					11	طلب المالك لشروط اولية عالية جدا ومبالغ فيها من الاستشاري والمقاول
					12	عدم اعطاء مرحلة اعداد وتجهيز المناقصة الفترة الزمنية الكافية لاتمامها بدقة
					13	طلب المالك من أطراف المشروع انجاز الاعمال خلال فترة زمنية غير كافية
					14	تعليق ووقف الاعمال في المشروع من قبل المالك لاسباب خاصة به
					ج -	عوامل متعلقة بالأمور الادارية للمشروع
					15	نقص الخبرة الفنية للمالك او ممثله بالمشاريع
					16	ضعف ادارة المشروع من قبل المالك
					17	تأخر المالك في اتخاذ القرارات المتعلقة به
					18	البيروقراطية المبالغ فيها من قبل المالك في التعاملات الادارية في المشروع
					19	عدم اكتمال وثائق العطاء من جهة المالك عند طرح المناقصة للمتنافسين
					20	بعد الفترة الزمنية بين مرحلة تصميم المشروع ومرحلة طرح مناقصة تنفيذ اعمال المشروع
					21	تأخر المالك في تسليم موقع العمل للمقاول

					عدم وجود اولوية او دافعية قوية من المالك لانجاز المشروع	22
					نقص وعدم كفاءة في التواصل من المالك مع باقي أطراف المشروع	23
					عوامل متعلقة بالأمر المالية للمشروع	د -
					عدم توفر تمويل كاف للمشروع من قبل المالك	24
					رصد ميزانية قليلة من قبل المالك لمرحلة تصميم واعداد وثائق مناقصة المشروع	25
					تأخر المالك في تسديد المستحقات المالية للاستشاري	26
					تأخر المالك في تسديد الدفعات المرحلية للاعمال المنجزة للمقاول	27
					مشاكل مالية عامة ونقص سيولة عند الجهة المالكة	28

2- عوامل مرتبطة باستشاري الاعمال في المشروع

الدرجة					العامل	الرقم
1	2	3	4	5		
					عوامل متعلقة بالاستشاري المصمم للمشروع	أ -
					عدم فهم جيد من المصمم لاحتياجات المالك في المشروع	1
					التغيير المستمر في تصميم المشروع	2
					وقوع الخلافات بين المصمم والمالك	3
					حدوث اخطاء في التصميم النهائي للمشروع	4
					درجة تعقيد عالية لتصميم المشروع	5
					قلة خبرة المصمم في مشاريع مشابهة	6

					7	عدم وجود فحص طبقات التربة مناسب لموقع المشروع خلال مرحلة التصميم
					8	التأخير في انجاز وتسليم تصميم المشروع للمالك
					9	اعداد دراسات اولية غير دقيقة للمشروع
					10	الفروقات الكبيرة بين تقديرات المصمم في مرحلة اعداد وثائق المشروع والعروض المقدمة من قبل المقاولين في مرحلة المناقصة
					11	عدم اكتمال وثائق المناقصة والتصميم عند طرح المشروع على المقاولين لتقديم السعر
					12	طلب مواصفات فنية غير متوفرة في السوق المحلي للمواد المستخدمة في المشروع
					13	وجود تناقضات بين وثائق العطاء المختلفة
					14	تخصيص ميزانية محدودة من قبل الاستشاري لانجاز الاعمال المطلوبة في التصميم والمناقصة
					15	تسريع مبالغ فيه في فترة انجاز مرحلة التصميم وتحضير الوثائق
					16	اعتماد المصمم على فريق عمل غير مؤهل لانجاز التصميم
					ب -	عوامل متعلقة بالاستشاري المشرف على اعمال المشروع
					17	البطء في اتخاذ القرارات المتعلقة بالاعمال في المشروع
					18	التأخير في اعتماد والموافقة على طلبات المخططات التنفيذية والمواد في المشروع
					19	التأخر في اعتماد الاعمال المنجزة في المشروع
					20	ضعف في ادارة وضبط الجودة في المشروع
					21	ضعف في ادارة العقد بين الاطراف من قبل الاستشاري
					22	الخلافات المالية بين المهندس المشرف والمالك

					23	نقص الخبرة الفنية لفريق عمل الاستشاري المشرف في تنفيذ الاعمال
					24	ضعف في التنسيق مع أطراف المشروع المختلفين
					25	عدم وجود مرونة في اتخاذ القرارات في الاعمال
					26	تورط المشرف بشبهات فساد متعلقة بالاعمال في المشروع
					27	طلب الاستشاري متطلبات سلامة عامة مبالغ فيها من المقاول في المشروع
					28	عدم وجود خبرة سابقة للمشرف في المنطقة الجغرافية للمشروع
					29	المركزية المبالغ فيها في اتخاذ القرارات من قبل الاستشاري في المشروع
					30	عدم عقد اجتماعات دورية متقاربة لمناقشة سير الاعمال في المشروع مع أطراف المشروع
					31	نقص وخلل في التواصل بين الاستشاري مع الاطراف الخارجية التي لها علاقة بالمشروع

3- عوامل مرتبطة بمقاول تنفيذ الاعمال في المشروع

الدرجة					العامل	الرقم
1	2	3	4	5		
					1	اخطاء في دراسة المشروع من قبل المقاول في مرحلة التسعير للمناقصة
					2	خلل في تحديث اسعار المواد والمصانعة في مرحلة تسعير المشروع
					3	التخطيط الاولي الغير مناسب للمشروع
					4	عدم وضع اسعار صحيحة مع هامش ربح قليل في المشروع
					5	التأخر في تجهيز الموقع للمباشرة بالاعمال

					6	عدم توفير تجهيزات مكتبية مناسبة لطاخم المقاول لمتابعة العمل في المشروع
					7	ارتفاع تكاليف الكفالات البنكية والتأمينات
					8	ضعف في الهيكلة الادارية لطاخم المقاول في المشروع
					9	عدم وجود مدير مشروع مؤهل من طرف المقاول
					10	عدم وجود طاخم اداري كافي ومؤهل من طرف المقاول لإدارة المشروع ومتابعة سير الاعمال بصورة مناسبة
					11	ضعف في ادارة العقد من قبل المقاول وممثليه
					12	ضعف كفاءة الخطط الادارية والفنية الموضوعية لتنفيذ الاعمال في المشروع
					13	ضعف التنسيق والتجانس بين فرق عمل المقاول في المشروع
					14	اختيار مقاولي باطن غير مناسبين لتنفيذ الاعمال
					15	زيادة احمال المشاريع مجتمعة عن قدرة المقاول في العمل
					16	نقص خبرة المقاول في المشاريع مشابهة
					17	نقص خبرة المقاول في المنطقة الجغرافية للمشروع
					18	اخطاء فنية في مرحلة تنفيذ الاعمال مما تؤدي الى اعادة تنفيذ الاعمال مرة ثانية
					19	فشل في الاختبارات الفنية والمخبرية للأعمال والمواد المستخدمة
					20	بطء في تدفق المعلومات والتوجيهات من طاخم المقاول الى مقاولي الباطن
					21	التأخير في تجهيز الرسومات التنفيذية وطلبات الاعتماد للمواد والاعمال من قبل طاخم المقاول
					22	التأخر في شراء المواد وتوفيرها في موقع العمل

				عدم الالتزام المناسب بتعليمات السلامة العامة في المشروع	23
				ضبياع و اهتلاك المواد في موقع العمل	24
				استخدام مواد منخفضة الجودة في تنفيذ الاعمال	25
				استخدام معدات غير مناسبة لتنفيذ الاعمال	26
				تصرفات غير اخلاقية من قبل المقاول لتحقيق ارباح أكبر	27
				نقص في العمالة الماهر في المشروع	28
				ضعف في الاداء من قبل مقاولي الباطن	29
				ضعف في انتاجية العمال في المشروع	30
				تغيير مستمر لمقاولي الباطن في المشروع	31
				مشاكل وصراعات بين المقاول ومقاولي الباطن	32
				سوء العلاقة بين مقاولي الباطن في المشروع	33
				تأخر المقاول في صرف رواتب ومستحقات طواقم المشروع	34
				تأخر المقاول في دفع المستحقات للموردين ومقاولي الباطن	35
				ارتفاع تكاليف واجور العمال	36
				ارتفاع تكاليف النقل والمعدات	37
				غرامات مالية لاسباب متنوعة على المقاول في المشروع	38
				عدم التزام المقاول بتوجيهات الاشراف	39
				الصراعات والخلافات بين المقاول وأطراف المشروع الاخرين	40
				عدم وضع خطط طوارئ وادارة مخاطر من قبل المقاول	41

					عدم التوافق بين الفرق الفنية للمقاول والفرق الفنية لجهة الاشراف	42
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4- عوامل خارجية مرتبطة بتنفيذ الاعمال في المشروع

الدرجة					العامل	الرقم
1	2	3	4	5		
					عوامل اقتصادية	أ -
					الاستقرار الاقتصادي في الدولة	1
					تذبذب اسعار صرف العملات	2
					ارتفاع تكاليف النقل بشكل عام	3
					ارتفاع اسعار الفائدة في الدولة	4
					ارتفاع اسعار المواد الخام في الدولة	5
					ارتفاع مستوى المنافسة بين العاملين في قطاع الانشاءات	6
					نقص المواد اللازمة للعمل في الاسواق	7
					انتاج غير كاف على مستوى الدولة من المواد الاولية	8
					احتكار التجار والموردين للمواد	9
					التأخر في توصيل المواد والمعدات من قبل الموردين حسب المواعيد	10
					عوامل لها علاقة بالجهات الحكومية	ب -
					صعوبة وتأخير في الحصول على موافقات واذونات ضرورية للبدء بالعمل مثل التراخيص وغيرها	11
					مشاكل في تصنيف الاراضي من قبل الدولة	12

					13	تغيير مستمر في سياسات الحكومة في قطاع الانشاءات
					14	الفساد واستغلال المنصب في الدوائر والجهات التي لها علاقة بالمشروع
					15	صعوبات في الحصول على موافقات لاستيراد التكنولوجيا الحديثة والمواد والمعدات ذات العلاقة بالعمل في المشروع
					16	عدم وجود نظام موحد للانشاءات في الدولة
					ج -	عوامل سياسية وخارجية
					17	الاستقرار السياسي في الدولة
					18	الاحتلال الاسرائيلي للاراضي الفلسطينية
					19	الاضرابات الشاملة نتيجة للاحداث السياسية في الدولة
					20	السياسات الاسرائيلية في اعاقه استيراد التكنولوجيا والمواد الى الضفة الغربية
					21	سياسات الجهات المانحة بوضع مواصفات خاصة لا تناسب طبيعة العمل في الضفة
					22	عدم مرونة المانحين في اعطاء فترات زمنية مناسبة للمشاريع
					23	قرارات سياسية تؤثر على تمويل المانحين للمشاريع
					د -	عوامل طبيعية وبيئية
					24	الحالة الجوية غير مناسبة خلال فترة تنفيذ المشروع سواء ارتفاع درجات الحرارة صيفا او امطار مستمرة شتاءا
					25	عدم استقرار طبقات التربة في منطقة المشروع
					26	سوء ظروف الموقع من ناحية طبوغرافية
					27	اكتشاف معالم اثرية في منطقة المشروع

					عوامل دينية وثقافية	هـ -
					مسائل ومناسبات دينية مثل الاعياد وشهر رمضان خلال فترة العمل في المشروع	28
					مسائل ومناسبات لها علاقة بثقافة وعادات وتقاليد البلد خلال فترة عمل المشروع	29