ARCHITECTURAL PROJECT MANAGEMENT SUCCESS: A COMPARATIVE CASE STUDY BETWEEN YEMEN AND MALAYSIA

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DEDICATION

To Amal Ahmed my wife:

You support me and give me the courage to go on with your loving and caring ways. You left all your family and friends back home just to be beside me on my journey. Amal… You have been always a special part of my life.

To my Family:

Father and mother, for the years of selfless devotion, love and sacrifice you have given in order to prepare me for life. For giving me the chance to improve myself through all aspects of life. Little sister, little brother, I have always wanted to be the big brother that you would be proud of; I hope that I set a good example for you in life.

ABSTRACT

Although most project management experts agree that successful project management must involve control of quality, cost, and time, the management of architectural projects in Yemen remains inadequate. Therefore, Yemeni professionals must change their method of managing architectural projects to help conserve time, money, and natural resources. Most Yemeni architectural projects are implemented with inadequate and expensive design and construction practices, which led to low-quality buildings. The shortage of any approved national codes or standards only aggravates the construction industry's problems. This study aims to establish better methods to manage architectural projects in Yemen. The significant success criteria are evaluated, and the critical success factors required to ensure project success are identified.

Architectural construction in Malaysia has astonished the world with its comprehensive growth and rapid development in the past decades. Yemen should learn and gain from the Malaysian approach, which should be a model for Yemen’s architectural construction. This research aims to compare the Yemeni and Malaysian approach in architectural project management. The objectives of this research are to explore process and project implementation, evaluate the criteria in determining time, cost, and quality, and identify success and failure factors of projects in Yemen and Malaysia. The primary objective is to provide guidelines for project implementation in Yemen, namely, the best practices in project management.

Case study method and structured questionnaire survey method are applied in this research. Fieldwork involves the investigation of the stages of architectural projects in Yemen and Malaysia: from the design stage, the tender stage, and to the construction stage. Thematic narrative analysis is conducted to analyze the case studies. Data are examined with the statistical package for social sciences (SPSS). Percentages, frequency

distribution, averages, and means are calculated and utilized as descriptive statistics. Cronbach's alpha coefficient and Pearson correlation tests are employed for further data analysis.

The results of the case study and survey in Yemen reveal that stakeholders involved in project implementation can develop the construction industry if they are subjected to strict regulations. The problem is not the lack of regulations but the failure of law enforcement officers to apply these regulations. The results of the case study and survey in Malaysia are different from those in Yemen in terms of professional attitude, commitment, innovation, and policies. Working time in Malaysia is respected as well as specialty; everyone has a specific job to do at a precise time. Qualification and technical education are found to be important in project implementation. Project success criteria, success factors, and failure factors are almost similar in both countries; however, their details differ significantly. Sixteen guideline points for project implementation in Yemen are provided.

ABSTRAK

Pakar-pakar pengurusan projek bersetuju bahawa pengurusan projek yang berkesan adalah projek yang meneliti akan kawalan kualiti, kos, dan masa. Walaubagaimanapun, pengurusan projek-projek seni bina di Yaman kebanyakannya masih tidak menitik beratkan perkara-perkara tersebut. Melihat kepada masalah ini, para profesional di Yaman harus mengenalpasti dan mengaplikasikan kaedah pengurusan projek seni bina yang lebih baik supaya penjimatan masa, wang, dan sumber asli dapat dicapai. Kebanyakan projek pembinaan yang dilaksanakan di Yaman adalah melalui pengurusan sistem pembinaan yang tidak sesuai dan mahal lantas mengakibatkan penghasilan bangunan yang berkualiti rendah. Kekurangan kod garis panduan dan ketiadaan piawaian negara yang seragam hanya memburukkan lagi masalah industri pembinaan ini. Kajian ini adalah bertujuan untuk meneliti dan mencadangkan kaedah yang lebih baik untuk pengurusan projek-projek seni bina di Yaman. Kriteria kejayaan yang penting akan dinilai, dan faktor-faktor kritikal kejayaan yang diperlukan untuk memastikan kejayaan projek akan dikenal pasti melalui kajian ini.

Pengurusan pembinaan di Malaysia telah mengagumkan dunia dengan pertumbuhan yang menyeluruh dan pembangunan pesat dalam dekad yang lalu. Yaman seharusnya belajar dan mengambil manfaat daripada pendekatan Malaysia bahkan seharusnya mengambil Malaysia sebagai model contoh bagi pembinaan di Yaman. Matlamat utama Kajian ini adalah untuk membandingkan pendekatan Yaman dan Malaysia dari segi pengurusan projek seni bina kedua-dua negara. Objektif-objektif bagi kajian ini adalah untuk menganalisa proses dan pelaksanaan projek, menilai kriteria yang akan menentukan masa, kos, dan kualiti, dan mengenal pasti faktor-faktor kejayaan dan kegagalan sesuatu projek di Yaman dan Malaysia. Pada akhir kajian ini, sebuah garis panduan bagi amalan-amalan terbaik dalam pengurusan dan pelaksanaan projek di Yaman akan dihasilkan.

Kaedah kajian yang digunakan di dalam kajian ini adalah kajian kes dan tinjauan kaji selidik yang berstruktur. Kerja lapangan akan melibatkan penyiasatan bagi setiap peringkat dalam projek seni bina di Yaman dan Malaysia: dari peringkat reka bentuk, peringkat tender, dan peringkat pembinaan. Analisis naratif bertema pula digunakan untuk menganalisa setiap kajian kes. Data seterusnya dikaji dengan menggunakan perisian Statistical Package for Social Science (SPSS). Peratusan, taburan kekerapan, purata, dan min akan direkod dan digunakan sebagai data statistik deskriptif. Pekali alpha Cronbach dan ujian korelasi Pearson pula akan digunakan untuk analisis data yang selanjutnya.

Hasil kajian kes dan kaji selidik di Yaman menunjukkan bahawa pihak-pihak berkepentingan yang terlibat dalam pelaksanaan projek berupaya untuk membangunkan industri pembinaan sekiranya pihak-pihak tersebut dipertanggungjawabkan melalui peraturan-peraturan yang ketat. Kegagalan para pegawai penguatkuasa undang-undang untuk menguatkuasakan peraturan dilihat antara punca berleluasanya masalah ini. Hasil kajian kes dan kaji selidik di Malaysia didapati berbeza daripada Yaman dari segi sikap profesional, komitmen, inovasi, dan dasar polisi yang dirangka. Waktu bekerja para pekerja di Malaysia dihormati dan setiap pekerja mempunyai bidang khusus mereka - setiap orang mempunyai pengkhususan kerja yang dilakukan pada suatu masa. Kelayakan dan pengetahuan teknikal juga didapati penting dalam pelaksanaan projek. Kriteria bagi kejayaan projek, faktor-faktor kejayaan dan kegagalan sesuatu projek pembinaan didapati hampir sama di kedua-dua negara, walau bagaimanapun perbezaan ketara dapat dilihat pada perincian-perincian data kajian bagi kedua-dua negara. Enam belas elemen penting bagi garis panduan pelaksanaan projek di Yaman dihasilkan.

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LIST OF ABBREVIATIONS

SPSS	Statistical Package for Social Sciences
PMI	Project Management Institute
PMBOK	Project Management Book of Knowledge
PM	Project Management/ Project Manager
ICT	Information and Communications Technology
WBS	Work Breakdown Structure
PMIS	Project Management Information System
ISO	International Organization for Standardization
QA	Quality Assurance
QC	Quality Control
UNIDO	United Nations Industrial Development Organization
CIF	Cost, Insurance and Freight
YR	Yemeni Rials
USD	United States Dollars
RM	Ringgit Malaysia
CIDB	Construction Industry Development Board (Malaysia)
IBS	Industrialized Building System
MALBEX	Market watch – construction industry (Malaysia)
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit
IPPP	Institute of Research Management and Monitoring (UM)
UM	University of Malaya
CM	Construction Management
GMP	Guaranteed Maximum Price
BOT	Build–Operate–Transfer
JKR	Public Works Department (Malaysia)
PhD	Doctor of Philosophy
D & T	Design & Tender
D & C	Design & Construction
T & C	Tender & Construction
D & T & C	Design & Tender & Construction

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CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

This research aims to establish better methods to manage architectural projects in Yemen by studying the Malaysian approach in project cost, time and quality management, and project success factors. The significant success criteria are evaluated, and the critical success factors required to ensure project success are identified. The research is established by introducing the background, scope, questions, and objectives of the research. The approach, limitations, significance, and structure of this research are also introduced.

1.2. RESEARCH BACKGROUND

The construction industry is one of the most important components of any developing country; it has a major contribution to the country's national economy (Sultan, 2005). Yemeni professionals must change their method of managing architectural projects to help conserve time, money, and natural resources.

Most Yemeni construction projects in the past were executed with inappropriate and costly construction and design practices resulting in low-quality buildings. These practices cause further escalation in construction and housing costs to prices beyond the affordability of the majority of the population in Yemen (Sultan, 2008b). This research highlights the implementation of architectural projects in Yemen and the failure and success factors. The same factors are compared with those of Malaysian architectural project implementation. The analysis encompasses the design and tender stage as well as the construction stage.

The comprehensive growth of architectural construction in Malaysia has astonished the world with its rapid development over the past decades. Yemen should learn and gain from the Malaysian approach, which should serve as a model for Yemen's architectural construction. In fact, Sultan and Kajewski (2006) emphasized on the necessity of studying the Yemeni approach for governmental project implementation as further research.

1.3. RESEARCH SCOPE

The Yemeni and Malaysian approach in architectural project management are compared in this study. The primary objective is to provide guidelines for project implementation in Yemen, namely, the best practices in project management.

1.4. RESEARCH STATEMENT AND QUESTIONS

Most project management experts agree that successful project management must involve quality, cost, and time control while adhering to stipulated schedules (Lock, 2007; Dobson and Feickert, 2007; Levy, 2007; PMI, 2008). Management of architectural projects in Yemen is inadequate (Sultan and Kajewski, 2003). The following four questions are answered in this research:

1. How do Yemen and Malaysia implement architectural projects?
2. How criteria are considered in determining time, cost, and quality?
3. What constitutes project success and failure?
4. What project management approach is suitable for project management in Yemen?

1.5. RESEARCH OBJECTIVES

The following are the four objectives of this research. These objectives address the abovementioned questions:

1. To explore the process and project implementation in Yemen and Malaysia.
2. To evaluate the criteria for time, cost, and quality determination.
3. To identify the success and failure factors of project.
4. To provide guidelines for project implementation in Yemen.

1.6. RESEARCH APPROACH

This research begins with exploratory work on (i) project implementation issues in Yemen addressed in governmental publications, documentaries, and reviews by national experts starting from project design through project tender to project construction and (ii) project management in Malaysia. Thus, case study method and structured questionnaire survey method are applied in this research.

The case study method is selected to address the first objective of this research; the structured questionnaire survey method is selected to address the second and third objectives. Fieldwork involves the investigation of all the stages of architectural projects in Yemen and Malaysia, including the design, tender, and construction stages. The questionnaire is analyzed with the statistical package for social sciences (SPSS). The research methodology is further discussed in Chapter 4.

1.7. RESEARCH LIMITATIONS

The limitation of this research is the unavailability of case studies because only one project in Yemen had been completed during the research; the researcher had access to the project's data and was aware of the political situation in Yemen at that time. The project is adopted as a case study for Yemen. The respondents of the questionnaire are professionals involved in the implementation of the case projects, namely, designers, contractors, and officials in Yemen and Malaysia.

1.8. RESEARCH SIGNIFICANCE

This research is important because it attempts to evaluate significant success criteria and identify critical success factors to ensure project success. Furthermore, this research aids in changing the method of architectural project implementation in Yemen to help conserve time, money, and natural resources.

1.9. STRUCTURE OF THE DISSERTATION

This research is structured as follows:

Chapter 1 Introduction: A brief discussion of the topic.

Chapter 2 Literature review: This chapter provides the definition of architectural project management. It also includes discussions on project cost, time and quality management, and success and failure factors that affect architectural project implementation in Yemen and Malaysia.

Chapter 3 Research methodology: This chapter presents the methodology utilized in this research.

Chapter 4 Analysis and findings of case study projects: This chapter includes the analysis and findings of the case study projects in Yemen and Malaysia.

Chapter 5 Analysis and findings of research questionnaire: This chapter presents the results of the survey.

Chapter 6 Conclusion: This chapter presents the findings of the research and several recommendations for Yemeni architectural project implementation.

1.10. SUMMARY

This chapter presented discussions on the topic and research area of the dissertation. It provided a general overview of the criteria and factors that affect project success. In addition, it described the limitation and importance of this research.

The following chapter provides a literature review for the topic in general, project success criteria, project success factors, and project implementation in Yemen and Malaysia.

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

The concept of project management is described in this chapter. The chapter begins by defining and highlighting issues concerning project management and implementation. Project success criteria, success factors, and failure factors are investigated by referring to various documents and publications.

One of the main references is the Project Management Body of Knowledge (PMBOK) Guide (PMI, 2008). Most experts consider the approaches in this book standard in project management. Other studies are also adopted as references to provide further understanding on project management and establish an initial idea what project management is in Yemen and Malaysia.

2.2. ARCHITECTURAL PROJECT MANAGEMENT

An architectural project is a facility, structural form, or building designed and planned by an architect, constructed under the administration of an architect or engineer, and built to fulfill a specific function. Architectural buildings can be categorized into several types. The main types of architectural buildings are as follows:

- Residential buildings
- Commercial buildings
- Governmental buildings
- Educational buildings

According to Lock (2007), a project is a step into the unknown. Describing it as filled "with risk and uncertainty," he alludes that no one can predict what a project process is. The Project Management Body of Knowledge (PMBOK) Guide (PMI, 2008) indicates that a project has "a definite beginning and end," adding that "the end is reached when the project's objectives have been achieved." These definitions clearly indicate that a project must have a beginning where objectives are planned and an end where the objectives of the project are met. The entire life cycle of the project revolves around the project's objectives, which can be affected by culture and the different methods utilized to achieve the project's goals.

Yu et al. (2005) believed that different project definitions warrant different success criteria. Another important concept is project life cycle, with which the concepts project management and product operation can be clearly envisaged.

The PMBOK Guide (PMI, 2008) defines project management as "the application of knowledge, skill, tools, and techniques to project activities to meet the project requirements." Dobson and Feickert (2007) clarified the meaning of project management by stating that "managing projects is the art of creating a deliverable under difficult and in some cases impossible constraints."

Lock (2007) explains the purpose of project management in a very simple manner.

> *"The purpose of project management is to foresee or predict as many of the dangers and problems as possible and to plan, organize and control activities so that the project is completed as successfully as possible in spite of all the risks." (Lock, 2007: 3)*

Thus, process of project management "starts before any resources are committed, and must continue until all work is finished." In addition, the satisfaction achieved from completing a project "within the promised timescale and without using more money and other resources than those that were originally set aside or budgeted" is the aim of the final result of the project (Lock, 2007).

Tan (2004) defined project management as the process by which the appointed project manager takes the lead to plan, organize, schedule, implement, manage, monitor, control, track, solve problems, make decisions, lead, inspire, and motivate the entire project consortium team involved in a project. The process consumes resources in terms of time, personnel, space, money, computers, machineries, plants, landscaping materials, ICT/Internet, knowledge-based experts, and so on. The final stage of the process addresses the stipulated project objectives, the three primary objectives (time, cost, and quality), the secondary objectives (promoting shareholders, stakeholders, and company's interests), and the tertiary objectives (i.e., excellence in all aspects of design, finance, and construction). The final stage also involves enhancing the aesthetics of the built environment, addressing the client's interests in terms of functional and financial definitions, and monitoring the well being as well as the social and moral obligations of end users to the society, community, nation, and the world at large.

As shown in Figure 2.1, project management is the accomplished activities of five groups (PMI, 2008) of project processes: initiating, planning, executing, monitoring and controlling, and closing.

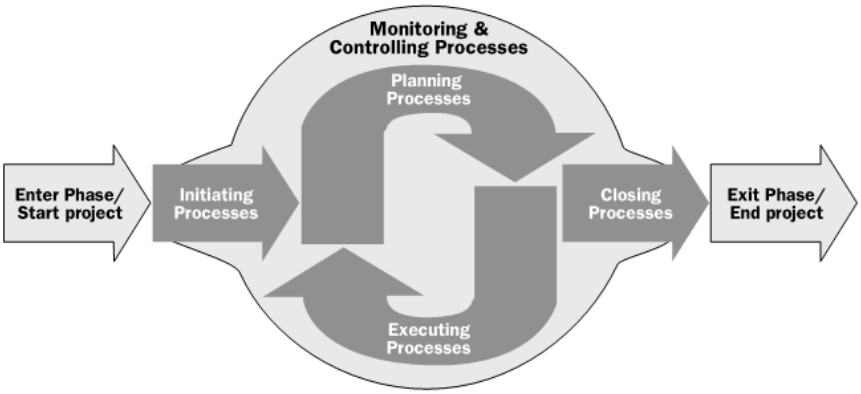

Figure 2.1: Diagram showing the relationship among project management process groups

Source: PMI (2008)

The PMBOK Guide (PMI, 2008) provides examples of the best project management practices that can be utilized to compare Yemeni and Malaysian approaches in project management. As stated above, project management is divided into five groups. Understanding these groups would provide important insights into the entire process of project management.

The initiating process group involves defining the new project by obtaining authorization to start the project, defining the initial scope, committing the initial financial resources, identifying the internal and external stakeholders who will interact and influence the overall outcome of the project, and selecting the project manager.

The planning process group involves establishing the total scope of the project, defining and refining the objectives, developing the course of work to achieve the objectives, and developing the project management plan that will be utilized to conduct the project. According to PMI (2008), this group includes the following project management processes: develop a project management plan, collect requirements, define the scope, create a work breakdown structure (WBS), define activities, arrange activities, estimate activity resources, estimate activity durations, develop schedules, estimate costs,

determine the budget, plan quality, develop a human resource plan, plan communications, plan risk management, identify risks, perform qualitative and quantitative risk analyses, plan risk responses, and plan procurements.

The executing process group involves completing the work defined in the project management plan to satisfy the project specifications, coordinating people and resources, and performing the activities of the project in accordance with the project management plans. Planning updates and re-baselining are also required as well as changing expected activity durations, resource productivity and availability, and unanticipated risks (PMI, 2008). In other words, this group includes the following project management processes: direct and manage project execution; perform quality assurance; acquire, develop, and manage a project team; distribute information; manage stakeholder expectations; and conduct procurements.

The monitoring and controlling process group involves tracking, reviewing, and regulating the progress and performance of the project; identifying any areas in which changes to the plan are required; and initiating the corresponding changes. The fundamental advantage of this group is the observation of performance as well as the consistent identification of variances within the project management plan (PMI, 2008). The following processes are also included in this group:

- controlling changes and recommending preventive action in anticipation of possible problems
- monitoring ongoing project activities and ensuring that these are in accordance with the project management plan and project performance baseline
- influencing the factors that could circumvent integrated change control such that only approved changes are implemented

According to PMI (2008), the monitoring and controlling process group includes the following: monitoring and control of project work, execution of integrated change control, verification of scope, control of scope, control of schedule, control of costs, execution of quality control, reporting of performance, monitoring and control of risks, and administration of procurements.

The closing process group involves finalizing all activities across all project management process groups to formally complete the project (PMI, 2008). The following processes could occur during closing of a project:

- obtain the acceptance of the customer or sponsor
- conduct a post-project review
- record the impact of tailoring on any process
- document the lessons learned
- apply appropriate updates to organizational process assets
- archive all relevant project documents in the project management information system (PMIS) to be utilized subsequently as historical data
- close out procurements

Edum-Fotwe and McCaffer (2000) stated that project managers in construction are responsible for the overall success of delivering the owner's physical development plan within the constraints of cost, schedule, quality, and safety requirements. Professional competency in project management is attained by combining knowledge acquired during training and skills developed through experience as well as applying acquired knowledge. Much of the knowledge required to manage construction projects is unique to project management. Such knowledge includes critical path analysis and project cash

flow forecast. After studying the stages of project management, the constraints in managing a project and the methods to control them must be analyzed (Edum-Fotwe and McCaffer, 2000).

Hwang and Ng (2013) reported that the Project Management Institute (PMI) was the first to document the nine knowledge areas, namely, integration, time, cost, procurement, quality, communication, human resource, scope, and risk. These areas have been documented as well in the PMBOK Guide in 1987 in an attempt to document and standardize generally accepted project management information and practices (PMI, 2008). Each of the nine knowledge areas contains processes that need to be accomplished within their discipline to establish an effective project management program. For instance, project cost management encompasses processes required to ensure that the project is completed within the approved budget; it involves resource planning, cost estimating, cost budgeting, and cost control.

According to Eriksson and Westerberg (2011), the construction industry has been criticized for its inefficiency in terms of outcome, such as time and cost overruns, low productivity, poor quality, and low customer satisfaction (Egan, 1998; Yasamis et al., 2002; Chan et al., 2003).

Lock (2007) reported that the objectives of any project can be grouped under three headings: performance and quality, budget, and time of completion. Clearly considered quality, cost, and time as the main constraints in completing a project. Dobson and Feickert (2007) concurred with Lock by establishing what they call “the three essential questions of project management.” Dobson and Feickert believed that answering these questions should be the first concern of a project manager in managing any project. The questions are as follows:

- How long do I have? (pertains to time)
- How much can I spend? (pertains to cost)
- At what quality or performance?

Another matter that requires consideration is sorting these three constraints based on priority. The concept of perfect order or the best arrangement of constraints does not exist in project management. Dobson and Feickert (2007) concurred with this claim by posing this simple question: "What's worst? Miss a deadline, go over budget, or fail to deliver every iota of the expected performance?" No one can answer this question in an exact manner because in practice, success depends on the situation of the project; thus, Dobson and Feickert (2007) considered project management constraints "the triple constraints" as shown in Figure 2.2.

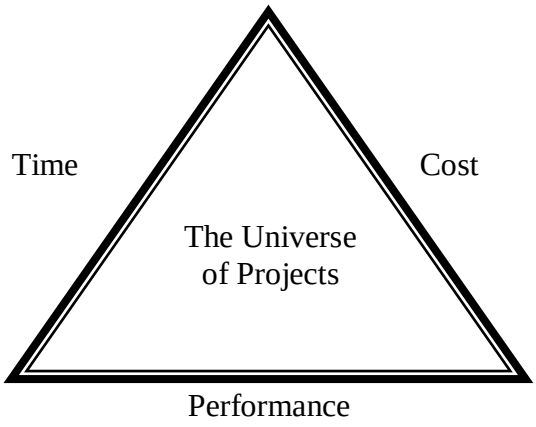

Figure 2.2: Three fundamental constraints, namely, time, cost, and performance, that set the borders of a project universe

Source: Dobson and Feickert (2007)

Figure 2.2 shows the three fundamental constraints that must be controlled in any project. These constraints are time, cost, and performance.

Table 2.1 shows that the hierarchy of driver, middle, and weak constraints is the secret of the triple constraints. Given that the three are not equally constraining, the driver must be met or the project fails. The weak constraint has the greatest flexibility, which provides opportunities. Thus, "the driver of the project isn't chosen or decided on but is rather discovered growing organically out of the project's purpose" (Dobson and Feickert, 2007).

Table 2.1: Six dimensions of the triple constraints

Driver	Time	Time	Cost	Cost	Performance	Performance
Middle	Cost	Performance	Time	Performance	Cost	Time
Weak	Performance	Cost	Performance	Time	Time	Cost

Source: Dobson and Feickert (2007)

The PMBOK Guide (PMI, 2008) acknowledged that "the most common constraints for many projects is a limited project budget;" delivery dates, available skilled resources, and organizational policies are examples of other constraints. The PMBOK Guide also includes the following in project management:

- identifying requirements
- addressing the various needs, concerns, and expectations of the stakeholder as the project is planned and implemented
- balancing the competing project constraints, including, but not limited to, scope, quality, schedule, budget, resources, and risk

At least one other factor is likely to be affected if any factor changes; for instance, "when the project experiences a negative risk event, the near-term cost of the project will usually increase, and there will sometimes be a delay in the project schedule" (PMI, 2008).

"Remember that TIME IS MONEY!" – Benjamin Franklin's advice to a young tradesman, c. 1780

The abovementioned statement is how Lock (2007) viewed project management constraints. He defined what he called "time/cost relationship" as a straight relationship between time and cost; the longer the time, the higher the cost and vice versa. He also classified cost into several types: direct, indirect (overhead), financing, and penalty costs. These costs have an effect on the overall cost and time of the project. Similar to other researchers, Lock (2007) insisted on the existence of the performance/cost/time triangle, which is based on the three main constraints in project management. Hence, budget pertains to the cost of the project, time pertains to time, and performance could have the same meaning and a direct relationship with the quality of the project.

Although project management involves numerous aspects and constraints, this research focuses on managing cost, time, and quality. The PMBOK Guide (PMI, 2008) is utilized as a reference for the comparative analysis of architectural projects in Yemen and Malaysia.

2.2.1. PROJECT COST MANAGEMENT

Venkataraman and Pinto (2008) believe that effective project cost management is an extremely complex process that begins very early during the life cycle of a project, long before the project's actual implementation. Although the actual steps involved in the cost management process depend on the nature of the project, the most commonly utilized sequence consists of cost estimating, budgeting, and control. The PMBOK Guide (PMI, 2008) adopts the same sequence to complete a project within the approved budget.

In several projects, particularly those of small scope, cost estimating and cost budgeting are tightly linked that they are viewed as a single process that can be performed by a single person over a relatively short period of time. Cost management processes and their associated tools and techniques are usually selected during the definition of the project's life cycle and are documented in the cost management plan. The cost management plan establishes the following (PMI, 2008):

- level of accuracy
- units of measure
- organizational procedure links
- control thresholds
- rules of performance measurement
- report formats
- process descriptions

Consequently, the first step in cost management is estimating the cost of the project. Cost management benefits from cost estimation through a created standard with which actual expenditures can be compared. Such comparison provides a basis for cost control. Cost estimates provide mechanisms for managing cash flow during the course of a project and for revising project activity duration; they provide a framework for allocating resources as the project progresses (Venkataraman and Pinto, 2008).

The focus of cost management is the cost of the resources required to complete project activities. Cost management planning efforts are exerted early in project planning and set the framework for each of the cost management processes to ensure that the processes are efficient and coordinated (PMI, 2008).

Another point that Venkataraman and Pinto (2008) mentioned is the importance of managing cash flow, which is the net difference between the inflow and outflow of money. Cash flow management is a vital process inextricably linked to project cost management; effective cost management cannot be achieved without it. A project budget is essentially a plan that integrates resource allocation, project schedule, and project goals. Time phasing of project work is absolutely critical to achieve effective cost control because controlling time is a method to control cost. Project costs can be classified as direct or indirect, recurring or nonrecurring, fixed or variable, and normal or expedited (Venkataraman and Pinto, 2008). Major project costs include costs of labor, materials, and equipment and facilities.

The PMBOK Guide (PMI, 2008) defines cost estimation as the process of developing an approximation of the monetary resources required to complete project activities. Cost estimates are predictions based on known information at a given point in time. Cost estimation includes the identification and consideration of costing alternatives to initiate and complete the project. Cost trade-offs and risks, such as make versus buy and buy versus lease, as well as sharing of resources must be considered to achieve optimal costs.

Costs are estimated for all resources charged to the project, including but not limited to labor, materials, equipment, services, and facilities, as well as special categories such as inflation allowance or contingency costs. One basic decision that must be made in project cost estimation is whether to limit the estimates to direct project costs only or to include indirect costs. Indirect costs are costs that cannot be directly traced to a specific project; these costs would be accumulated and allocated equitably to multiple projects through several approved and documented accounting procedures (PMI, 2008).

The PMBOK Guide (PMI, 2008) defines budget determination as the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline. This baseline includes all authorized budgets but excludes management reserves. Project budgets are funds approved for the execution of the project. Project cost performance is measured against the authorized budget.

Control cost is the process of monitoring the status of the project to update the project budget and managing changes to the cost baseline. Updating the budget involves recording actual costs spent. The key to effective cost control is the management of the approved cost performance baseline and the changes to that baseline (PMI, 2008).

Due to the massive cost overruns that occur in the Yemeni approach of project implantation (Sultan and Kajewski, 2003), cost is a very important criterion, which is evaluated in this research.

2.2.2. PROJECT TIME MANAGEMENT

According to Chan and Kumaraswamy (1997), completing projects on time is an indicator of an efficient construction industry (NEDO, 1988). Moreover, Rwelamila and Hall (1995) found that the timely completion of a project was frequently seen as a major criterion of project success. Severe criticisms of the industry arise if it takes much longer than stipulated to construct buildings (Bennett et al., 1979; Flanagan et al., 1986).

The life cycle of a project is a collection of generally sequential and sometimes overlapping project phases whose names and numbers are determined by the management and control needs of the organization or organizations involved in the project. A project's life cycle is documented with a methodology. Project time management includes the processes required to manage the timely completion of the project (PMI, 2008).

Project time management processes include the following:

1. Definition of activities
2. Sequencing of activities
3. Estimation of activity resources
4. Estimation of activity durations
5. Schedule development
6. Schedule control

The project time management processes and their associated tools and techniques are documented in the schedule management plan. The schedule management plan is contained in, or is a subsidiary plan of, the project management plan and may be formal or informal and highly detailed or broadly framed; this particular plan is based on the needs of the project and includes appropriate control thresholds. Project schedule development requires the outputs of the processes to define activities, sequence activities, estimate activity resources, and estimate activity durations with the scheduling tool to produce the schedule. The final approved schedule is the baseline that would be utilized in the control schedule process (PMI, 2008).

PMI (2008) also stated the definition of activities as the process of identifying the specific action to be performed to produce the project deliverables. The deliverables at the lowest level in WBS or the work package is identified in the process of creating the WBS. Work packages are typically divided into small components called activities that represent the work necessary to complete the work package.

Sequencing of activities is the process of identifying and documenting relationships among project activities. Activities are sequenced through logical relationships. Every activity and milestone, except the first and last, are connected to at least one predecessor and one successor. The allotment of lead or lag time between activities may be

necessary to establish a realistic and achievable project schedule (PMI, 2008). Furthermore the estimation of activity resources is defined as the process of estimating the type and quantity of materials, people, equipment, or supplies required to perform each activity. This process is closely related to cost estimation.

Estimation of activity duration is the process of approximating the number of work periods necessary to complete individual activities with estimated resources. Estimation of activity duration involves the use of information on scope of work, required resource types, estimated resource quantities, and resource calendars. The amount of work or effort required and the amount of resources applied to complete the activity are estimated in this process (PMI, 2008). Schedule development is the process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule. Incorporating the activities, durations, and resources into the scheduling tool generates a schedule with planned dates for the completion of project activities. Developing an acceptable project schedule is often an iterative process. The planned start and finish dates for project activities and milestones are predetermined.

Schedule control is the process of monitoring the status of the project to update progress and manage changes to the schedule baseline. Schedule control includes the following:

- determining the current status of the project schedule
- influencing the factors that cause schedule changes
- determining whether the project schedule has changed
- managing actual changes as they occur

Because of the enormous delays that occur in the Yemeni approach of project implantation (Sultan and Kajewski, 2003), the period of the project implementation is essential, which is assessed in this research.

2.2.3. PROJECT QUALITY MANAGEMENT

The key to project quality is to perform an effective, meaningful transfer of proven quality methods to a general project management domain. Several definitions of quality already exist. Juran and Godfrey (1999) state that quality has two meanings that are critically important to its management. Quality means "features of products which meet customer needs and thereby provide customer satisfaction." Quality improvement related to features usually costs much. Quality also means "freedom from deficiencies." These deficiencies are errors that require rework (doing something over again); otherwise, they could result in failure after a product has been delivered to a customer. Such failure may result in claims, customer dissatisfaction, or dire consequences to the user. Quality improvement related to deficiencies usually costs less. Juran and Godfrey (1999) view considers products, defects, and customers. Quality processes that maintain cost and schedule constraints ensure the quality of the project (Rose, 2005).

"We do not have time" is the response of organizations that provide projects or products of poor quality. The reality is that we always have time; we merely opt not to use it wisely. The old adage "there's never enough time to do it right, but always enough time to do it over" is not a mere collection of clever words; it is true. Poor quality in production leads to rework. Delivery of poor quality products leads to replacement, warranty charges, lost customers, and loss of reputation. In the long run, quality saves time and much more (Rose, 2005).

Quality management in projects must be addressed from two different perspectives: the quality of the product of the project and the quality management process of the project. The elements of project quality are the project's product (outcome), management processes, quality planning, quality assurance, quality control, and corporate culture (Venkataraman and Pinto, 2008).

Standard procedures and guidelines must be followed to ensure the quality of management processes. The standard procedures adopted by the project firm should be sufficiently flexible such that they can be modified to meet the requirements of individual projects. A quality culture should prevail in the entire project organization to achieve the highest level of project quality. Total quality management is based on the following key principles: customer satisfaction, continuous improvement, competitive benchmarking, empowering employees, team orientation, decisions based on actual data, and supplier involvement (Venkataraman and Pinto, 2008). The quality management methods for a project organization are as follows:

- certification
- accreditation
- quality award models
- benchmarking
- audits and reviews, including document analysis, interviews, observations, and self-assessment

The PMBOK Guide as quoted by the American Society for Quality defines project quality management as "the degree to which a set of inherent characteristics fulfill requirements" (Dobson and Feickert, 2007). Project quality management includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities to satisfy the needs for which the project was undertaken. Project quality management involves the implementation of the quality management system through policy and procedures with continuous process improvement activities conducted throughout, as appropriate (PMI, 2008). Project quality management processes include planning quality, performing quality assurance, and performing quality control. Failure to meet product or project quality requirements

could have serious negative consequences for any or all the project stakeholders. Below are several examples:

- Meeting customer requirements by overworking the project team may result in increased employee attrition, errors, or rework.
- Meeting project schedule objectives by rushing planned quality inspections may result in undetected errors.

Quality and grade are not synonymous terms. Quality is "the degree to which a set of inherent characteristics fulfill requirements" (ISO9000, 2005). Grade is a category assigned to products or services that have the same functional use but different technical characteristics (ISO8402, 1994). A quality level that fails to meet quality requirements is always a problem, whereas low grade may not be. Similarly, precision is not equivalent to accuracy. Precision means that the values of repeated measurements are clustered and only slightly scattered. Accuracy means that the measured value is very close to the true or actual value. Precise measurements are not necessarily accurate, and a very accurate measurement is not necessarily precise. The project management team must determine the appropriate levels of accuracy and precision. The basic approach to quality management described in this section is compatible with that of the International Organization for Standardization (ISO). Modern quality management complements project management. Both disciplines recognize the importance of the following:

- customer satisfaction
- prevention over inspection
- continuous improvement
- management responsibility

Cost of quality (Figure 2.3) refers to the total cost of all efforts related to quality throughout a product's life cycle.

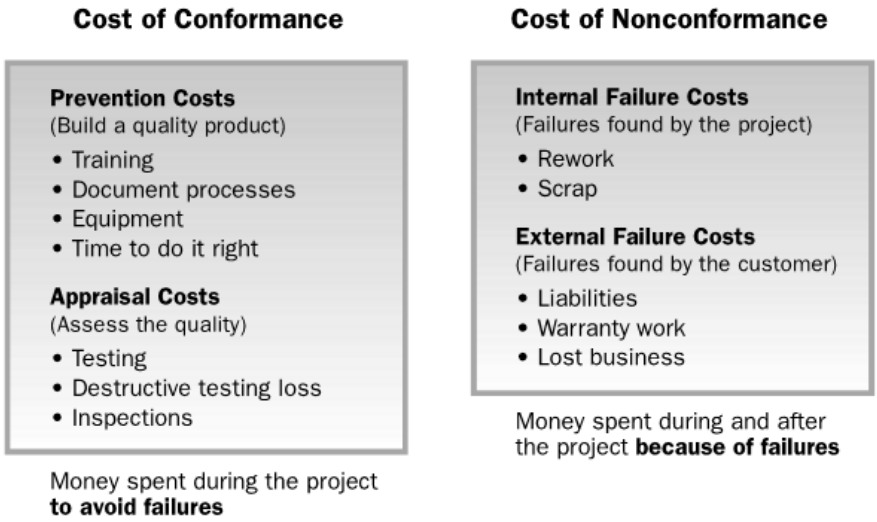

Figure 2.3: Cost of quality

Source: PMI (2008)

Quality planning is the process of identifying quality requirements and/or standards for the project and product and documenting how the project demonstrates compliance to these standards. Quality planning should be performed with other project planning processes (PMI, 2008).

Quality assurance is the process of auditing the quality requirements and results of quality control measurements to ensure that appropriate quality standards and operational definitions are adopted. It is an execution process that utilizes data created during quality control (PMI, 2008). Quality assurance also provides an umbrella for continuous process improvement, which is an iterative means of improving the quality of all processes. Continuous process improvement reduces waste and eliminates insignificant activities, thereby allowing processes to operate at increased levels of efficiency and effectiveness.

Quality control is the process of monitoring and recording the results of quality activities to assess performance and recommend necessary changes. The project management team should have a working knowledge of statistical quality control; the team may find it useful to know the differences between the following pairs of terms (PMI, 2008):

- prevention and inspection
- attribute sampling and variable sampling
- tolerances and control limits

Quality is a complicated thing to measure; therefore the comparison in this research is between the specifications and the final result of the projects individually. Then the percentage of quality as specified is compared between the two case studies.

2.3. FACTORS AFFECTING ARCHITECTURAL PROJECTS

Researchers have attempted to identify the reasons for project success or failure regardless of the success criteria. One of the most common approaches is to search for critical success factors (Morris and Hough, 1987; Pinto and Slevin, 1988; Belassi and Tukel, 1996; Munns and Bjeirmi, 1996). The assumption in these studies is that projects succeed or fail for similar reasons. These studies produced a list of typical factors, including project mission, project manager, planning, communication, politics, control, top management support, technical tasks, and so on (Sauser et al., 2009).

Isik et al. (2009) asserted that project management can be utilized as a tool to maximize the success of projects. Effective project management is key for the successful accomplishment of sophisticated projects (Hubbard, 1990; Chan et al., 2004). Jaselskis and Ashley (1991) mentioned that construction projects commonly experience uncertainty because of shortages in resources and the nature of the project. The factors conducive to successful project management are abundantly discussed in related

literature. For example, Munns and Bjeirmi (1996) suggested that the factors for successful project management include commitment to complete the project, appointment of a skilled project manager, adequate definition of the project, correctly planning the activities in the project, adequate information flow, accommodation of frequent changes, rewarding of employees, and being open to innovations.

The environment in which the project is implemented was also considered by many researchers (Morris and Hough, 1986; Newcombe et al., 1990; Shirazi et al., 1996). Moreover, numerous researchers stressed that the use of appropriate management techniques contributes to successful project management (Duncan and Gorsha, 1983; Kerzner, 1989; Munns and Bjeirmi, 1996).

Enterprise environmental factors refer to both internal and external environmental factors that surround or influence a project's success (PMI, 2008). Enterprise environmental factors include, but are not limited to, the following:

- organizational culture, structure, and processes
- government or industry standards (e.g., agency regulations, codes of conduct, product standards, quality standards, and workmanship standards)
- infrastructure (e.g., existing facilities and capital equipment)
- existing human resources (e.g., skills, disciplines, and knowledge on design, development, law, contracting, and purchasing among others)
- personnel administration (e.g., hiring and firing guidelines, employee performance reviews, training records, overtime policy, and time tracking)
- company work authorization systems
- marketplace conditions
- stakeholder risk tolerances
- political climate

- organization’s established communications channels
- commercial databases (e.g., standardized cost estimating data, industry risk study information, and risk databases)
- Project management information systems (e.g., an automated tool such as a scheduling software tool, a configuration management system, an information collection and distribution system, or Web interfaces to other online automated systems).

Finally, this research identifies and ranks the critical success factors and failure factors that have an effect on the case study projects.

2.3.1. SUCCESS FACTORS

A competent project manager is vital to project success. Several studies have highlighted the critical skills of a project manager (Avots, 1969; Sayles and Chandler, 1971; Belassi and Tukel, 1996; Crawford, 2000). Ahadzie (2007) also confirmed the industry's growing awareness of the relationship between project success and construction project management competency. Successful construction organizations now focus on ensuring that project managers acquire the core competencies required to be successful in their assignments. According to Frank (2002), the project manager has direct influence over 34% to 47% of project success. These previous studies clearly indicate that project managers play an important role in determining the success of a project (Hwang and Ng, 2013). For a project to be successful, the following must be performed by the project team (PMI, 2008):

- select appropriate processes required to meet the project objectives
- use a defined approach that can be adopted to meet requirements
- comply with requirements to meet stakeholder needs and expectations
- balance the competing demands of scope, time, cost, quality, resources, and risk to produce the specified product, service, or result

Project strategy is a direction in a project that contributes to the success of the project (Artto et al., 2007; Milosevic, 1989; Samset, 2003). Many studies have shown that project strategy contributes to project performance in terms of cost, schedule, and operational characteristics (Anderson and Merna, 2003; Srivannaboon and Milosevic, 2006). Project strategy is critical to the success of all types of projects (Yang, 2012). Among the factors that influence success is having a reasonable and accurate system for estimating costs (Venkataraman and Pinto, 2008).

Maimun (2010) conducted an intensive literature review on project success factors and came up with 33 project success factors. The research yielded eighteen significant project success factors as follows: team and leadership, project manager, communication, stakeholder management, monitoring and control, planning, scheduling, quality management, risk management, contracting, contractor, innovation, technical, organizational structure, financial resources, policy and strategy, learning organization, and external environment. Moreover she has classified these factors into four different groups namely management process, human management, contractual and technical, and organization (Maimun, 2010).

Therefore, the eighteen significant project success factors that Maimun (2010) conducted in her study are adapted. In addition to, attitude, behavior and commitment, and culture, to notice the differences of project implementation in Yemen and Malaysia.

2.3.2. FAILURE FACTORS

According to Tan (2004), projects that are poorly planned and managed result in time and cost overrun and poor design quality. Project failure and project management success are not interdependent; one may not lead to the other. Thus, project management failure may not necessarily lead to project failure but is a contributing factor. The following are the main reasons for failure:

- design failures
- lack of proper/adequate supervision
- construction failures
- insufficient funds
- adopting the wrong contract strategy
- contractual disputes
- poor planning, implementation, and documentation
- lack of effective project leadership
- ineffective project management
- assembling an incompatible and incompetent project team
- poor maintenance and upkeep
- natural disasters
- unforeseen circumstances
- other factors

Failure comes in many forms. It can be project management failure or project failure; both are mutually exclusive although they are interlinked. Both the corporate leader (finance) and project leader (technical) are responsible for project success or failure. They set the parameters for project and design excellence. Marketing and PR skills are also crucial for success (Tan, 2004).

Sauser et al. (2009) stated that projects have clearly become a central activity in most organizations and companies are investing increasing resources in projects such as new product development, process improvement, or building new services. Many studies have demonstrated, however, that most projects do not meet time and budget goals, or fail to satisfy customer and/ or company expectations(Tishler et al., 1996; The Standish group, 2001; Zhang et al., 2003; Hammer and Champy, 2003; Evans, 2005; Roush,

2005). Yet, project success means more than just meeting time and budget goals. It involves additional success dimensions such as business results or preparing for the future (Shenhar and Dvir, 2007).

Errors should be avoided as much as possible. Optimum safety factors are often built into designs to allow for human errors to a certain level of tolerance. Over-design would naturally lead to extra costs in construction. Engineers need to achieve the optimum design while ensuring structural performance. Unforeseen circumstances must also be considered. Some forms of failures are mere inconveniences and not serious, whereas others can be fatal and could cost lives (Tan, 2004).

Government leaders have constantly lamented, and rightly so, that both public and private projects are behind schedule with cost overrun and poor quality control in design and construction; these projects normally result in structural failures and building collapse in extreme cases, costing innocent lives (Tan, 2004).

Tan (2004) also mentioned that project failures are caused by several factors. However, the main factor is the lack of funds and competent, effective, efficient, dedicated, and committed consultants, contractors, and project managers who are professionally trained in the art and science of project management. Both corporate and project leaders are responsible for appointing the rest of the project consortium team as well as ensuring their professionalism and competence and supervising their performance.

The list of project failure is extremely long. The standard, quality, and professionalism in all disciplines with project management as the top priority should be improved to avoid project failure (Tan, 2004). The reasons for failure are as follows:

- insufficient funds
- improper focus of the project management system; the network is not the project but should aid in managing the project
- incorrect fixation of first estimate (must be constantly updated)
- wrong level of details; under or over management must be avoided
- awarding tenders to incompetent contractors
- lack of QA/QC in the design process
- lack of QA/QC in construction and supervision
- lack of authority supervision
- "too much, too soon"; utilization of new techniques before the learning the curve is complete
- too many people; overstaffing slows communications and decisions and increases personnel turnover, thereby disrupting smooth progress
- lack of common project goals; awareness must be enhanced, and individuals should know where they fit into the general scheme
- rewarding the wrongs actions; only actions that contribute to progress and achievement of project goals should be rewarded
- others

Because of the unlimited failure factors of projects, this research asked the respondents an open ended question on the failure factors. Thus, new failure factors are identified.

2.4. PROJECT MANAGEMENT IN YEMEN

Yemen has established a unique building tradition. The rich, characteristic, and uniform style of traditional Yemeni architecture and townscape is greatly admired. This tradition was successfully maintained until thirty years ago (Sultan and Kajewski, 2003). Subsequently, the construction blast and rapid urbanization have resulted in shortage of skilled labor and construction materials. Inadequacies in building materials, building

design and project management abilities aggravated the problem. The lack of any approved national system of codes or standards also worsened the construction industry's problems (UNIDO/World Bank, 1981).

According to Sultan (2005), the construction industry is one of the most important components of a developing country, being a major contributor to the national economy of many such countries. The construction industry is largely responsible for the physical provision of housing and infrastructure and is considered the backbone of prosperous economies, providing social development and employment.

Sultan and Kajewski (2003) summarized the specific difficulties associated with the Yemen construction industry as follows:

- High construction costs are the norm although the quality and speed of construction is often merely adequate or inadequate.
- Owing to high construction costs and land prices, clients tend to minimize construction costs by eliminating or minimizing technical and engineering assistance in the aspects of design, evaluation, and supervision. This attempt to reduce overall project cost has led to over-design and increase in cost overruns.
- Construction materials are used excessively to construct traditional and modern–traditional buildings because of unclear unified construction technology and methods.
- Planning and project study are inadequate because of the urgent need for construction projects. This is true for both private small-scale domestic projects and minor and major public infrastructure projects.
- Currency and construction costs are unstable, leading to high risks.

- Prices are unstable; suppliers charge more than the actual price as protection against any future increase in the exchange rate and the foreign currency with which they need to purchase imported materials.
- Contractors and investors always increase the margin of profit as protection against construction market delays and delays in payments and for the continuity of forthcoming work.
- Building materials entail high delivery costs; the costs of handling, warehousing, and transport are also high. By the time a given material has reached its final destination, its cost may be twice the CIF value.
- The management is inefficient and inexperienced in project mobilization and logistics, especially for projects in remote areas.
- Planning and forecasting are always difficult because of the continuing deficiency in dependable basic statistics.
- Comparison and analysis are practically impossible because the project implementation procedure varies among ministries and among private firms.
- Engineers and technicians earn low salaries, leading to a general lack of discipline.
- Design documents are often limited to main architectural and structural drawings of reinforced concrete work. Technical and electrical specifications, sanitation details, and finishing work are simply indicated in a very general form that fails to adequately describe individual projects:
- The contract conditions are often vague and difficult to understand.
- Inadequate and out-of-date tender documents are applied to most contracts.
- Most construction projects have ineffective or inefficient quality control.
- The contractor’s work is insufficiently supervised.

- The overall organization of construction activities lack coordination and clarity in both public and private sectors.
- Effective management skills are lacking, particularly in the areas of estimating, costing programming, and general contract administration.
- Skilled human resource is lacking at all levels, ranging from engineers, technicians, supervisors, and foremen to craftsmen.

What aggravated the industry's problems is poor and inadequate architectural and structural designs that are not in accord with local needs or priorities and do not adapt to local conditions and resources. Inexpensive modern buildings are typically achieved by lowering quality (Sultan, 2008a). Construction projects are executed with inappropriate and costly construction and design practices, resulting in low-quality housing and causing further escalation in construction and housing costs to prices beyond the affordability of the majority of the population in Yemen (Sultan, 2008b).

The problem of increasing construction costs in Yemen can be fully understood by observing the trend of the main construction and material costs along with purchasing power and other economic indicators in the last two decades (Sultan, 2008b). The prices of essential input construction materials such as steel, cement, cement blocks, and ready-mixed concrete delivered to Sana'a and incurred by contractors increased by over 13 times since 1990. Construction costs per unit area (i.e., cost of one square meter for regular housing units as incurred by contractors in Sana'a) have likewise increased from approximately 3,400 YR/m2 in 1990 to as high as 52,000 YR/m2 in 2007, demonstrating clearly that construction prices increased by nearly 15.2 times (Sultan, 2008b).

However, the daily rates for unskilled labor in the same period increased by only five times. Purchasing power per capita changed slightly, maintaining a value of approximately USD 800. Local construction prices increased at a faster rate compared with average income. The increase in construction prices can, in fact, be an artificial indication of the contribution of the construction industry to GDP and the economy (Sultan, 2008b).

Moreover, Sultan and Kajewski (2006) strongly recommended studying the Yemeni approach for governmental project implementation as further research. This affirms the significance of the research

2.5. PROJECT MANAGEMENT IN MALAYSIA

Chan (2001) affirmed that Malaysia is a rapidly developing country in Asia. The key sector that contributes to its continuous growth is manufacturing, which recorded a double-digit growth. The service and construction sectors are also expected to outperform the national average growth.

Al-Tmeemy et al. (2011) indicated that building construction is an essential element of the construction industry in Malaysia, accounting for approximately 67.6% of the overall construction work (CIDB Malaysia, 2008). Alaghbari et al. (2007) reported that the Malaysian government's policy on housing is that traditional building practices must be replaced by an industrialized building system (IBS) to save on labor, cost, and time of construction while ensuring quality and durability (Ismail, 2001). A clear understanding of the current status of IBSs would help establish housing programs under the 8th Malaysia Plan. The first step in any advance study on building systems and their technology should be determining the status quo (Badir et al., 2002).

On the other hand, Songer and Molenaar (1997) mentioned before that there is an increasing trend towards the use of the design-build project procurement method in the public sector (McManamy 1994; Rosenbaum 1995; Yates 1995). This increased use combined with inexperience in the public sector generates a need for fundamental research of the process of design-build (Songer et al. 1994).

The construction sector in Malaysia, a rapidly developing country in Southeast Asia, has also experienced problems in delay (Sambasivan and Soon, 2007). Approximately 17.3% of government contract projects in Malaysia were considered "sick" (more than three months of delay or abandoned) in 2005. The construction sector is one of the important sectors that contribute to Malaysia's economic growth. The huge volume and complexity of projects in Malaysia's construction sector pose a great challenge and provide a wealth of opportunities to various companies in the construction industry. The construction sector in Malaysia can be divided into four broad categories: office, retail, residential, and infrastructure. Moreover, Sambasivan and Soon (2007) affirm that shortages in basic materials such as sand, cement, stones, bricks, and iron cause major delays in projects. Considering that Malaysia is a country that is developing rapidly, demand often exceeds supply; this phenomenon causes prices to increase. The quality and quantity of labor supply have a significant impact on construction projects. Approximately 20% of the workers in the Malaysian construction industry are foreign workers, mainly from Indonesia and Vietnam (MALBEX, 2005).

Tan (1996) listed the stages of construction projects in Malaysia in his bestseller book *"Project management in Malaysia: A comprehensive approach for successful management of property development projects from inception until completion."* He divided construction into seven stages as follows:

1. Feasibility study, identification, and definition
2. Designing, costing, and approving
3. Documenting, tendering, and awarding
4. Constructing and supervising
5. Commissioning and maintaining
6. Marketing
7. Financing

These stages are merged into three main stages, namely, design, tender, and construction stage, to accommodate project implementation in Yemen as indicated in the methodology (Chapter 3). Moreover, the conventional approach is considered because it is the most common approach in the case study countries.

2.6. SUMMARY

Chapter 2 presented the literature review related to the topic and the project success criteria. The chapter highlighted the issues in architectural project management, project cost management, project time management, project quality management, project success factors, and project failure factors. The chapter also provided an overview of project implementation in Yemen and Malaysia.

The literature study supports the development of the research design and the theoretical framework. It also determines the project success criteria with project success factors in this research.

The following chapter describes the methodology utilized in this research.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter describes the methodology utilized in this research. The methodology is an important part of a study because it will eventually determine the reliability of the analysis and findings.

A theoretical model is developed based on the literature review. Case study method and structured questionnaire survey method are applied for data collection. Malaysia is selected because it has exhibited enormous success in construction and development within a modest period of time. In addition, Yemen and Malaysia are both developing countries; their land area and population are almost similar as shown in Appendix 1.

3.2. RESEARCH DESIGN

According to Lester (1980), MAMPU (1987), Biggam (2008), Babbie (2013), and Creswell (2013), a researcher must determine the type of research and how it will be conducted before initiating such. Case study method and structured questionnaire survey method are applied in the present research. The case study method is selected to address the first objective, which is to explore the process of projects and their implementation in Yemen and Malaysia. Structured questionnaire survey method is selected to address the second and third objectives, which are to evaluate the criteria for determining time, cost, and quality and to identify success and failure factors, respectively.

3.2.1. RESEARCH FLOW

The research framework of this study, which is adopted from Al-Sabahi (1994), is divided into seven phases as shown in Figure 3.1. The first phase involves defining the problem after selecting the title. The research questions and objectives are identified and the study is designed in the second phase. The literature review is conducted in the third phase. The questionnaire is prepared and the case studies are selected in the fourth phase. Fieldwork, which involves primary and secondary data collection from Yemen and Malaysia, is conducted in the fifth and sixth phases. The final phase involves analyzing and discussing the results, concluding the research, and providing recommendations.

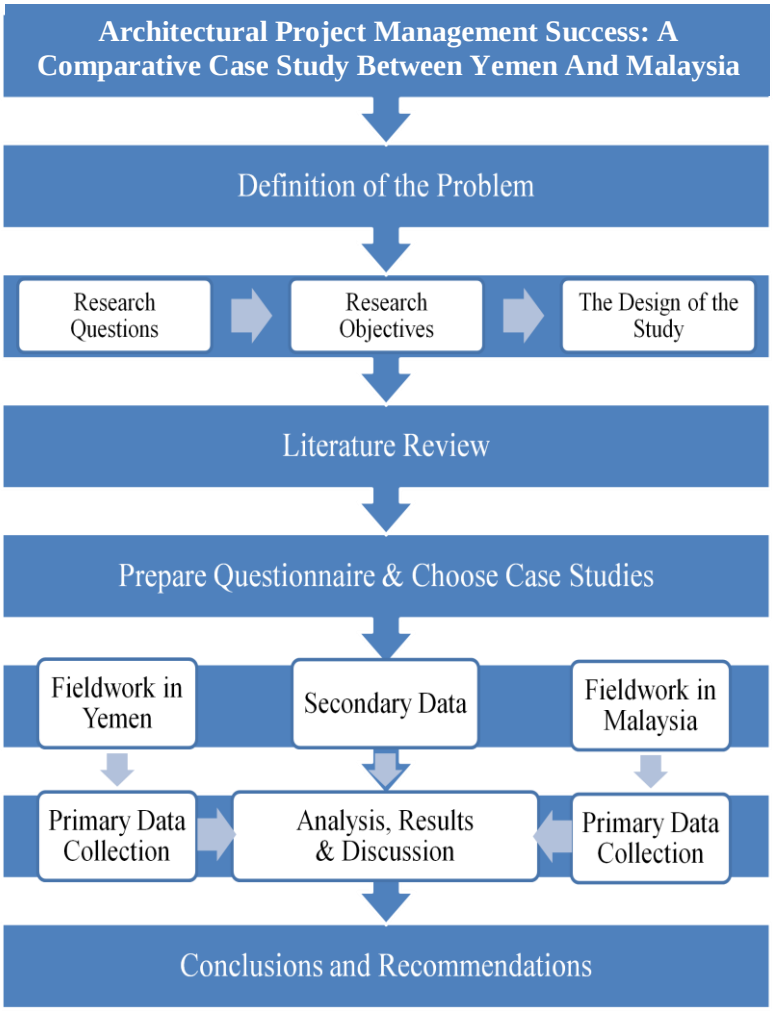

Figure 3.1: Methodology flowchart

Adapted from Al-Sabahi (1994)

3.2.2. THEORETICAL FRAMEWORK

The main objective of developing a theoretical framework is to have a basis and guide for the research (Sekaran, 2000). Most project management experts agree that successful project management must involve quality, cost, and time control (Lock, 2007; Dobson and Feickert, 2007; Levy, 2007; PMI, 2008). Management of architectural projects in Yemen is insufficient (Sultan and Kajewski, 2003). The comparison of the practices in these projects with those of projects in Malaysia, for example, will provide a useful basis to benchmark these projects. The study of the Malaysian approach in managing cost, time, quality, and success factors will also facilitate the realization of project success in Yemen. Figure 3.2 presents the theoretical framework of this study.

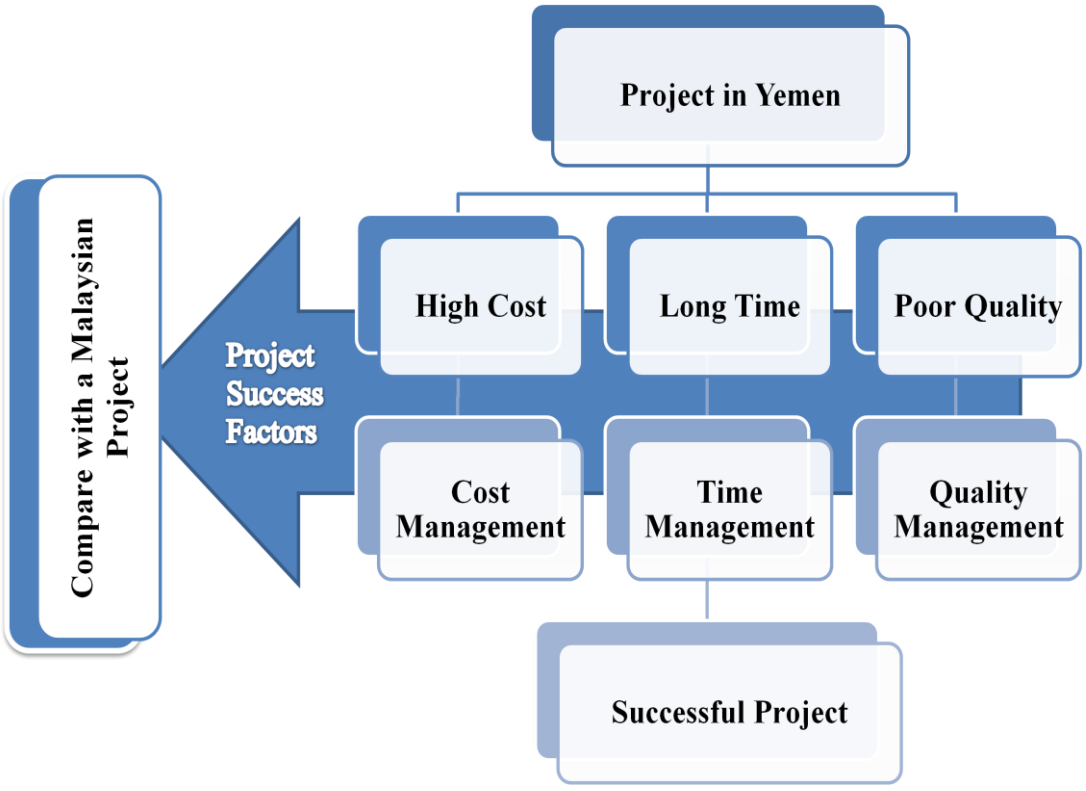

Figure 3.2: Theoretical framework

3.3. CASE STUDY METHOD

An architectural project in Yemen and another in Malaysia are selected as case studies to investigate project implementation in both countries. The designers, contractors, and officials in both case studies are asked to answer a structured questionnaire on project success criteria and project success factors.

A case study is a study of an example of a particular type (Biggam, 2008); the case study researcher typically observes the characteristics of an individual unit (Cohen and Manion, 1995). The fieldwork in this research is based on the investigation of all the stages of an architectural project in Yemen and Malaysia beginning with the design stage and all the way to the construction stage of the project. The purpose of data collection in a case study is to prove and analyze the multifarious phenomena that constitute the life cycle of a particular case (Cohen and Manion, 1995). This method is selected to meet the first objective, which is *'to explore the process and project implementation in Yemen and Malaysia.'*

3.3.1. SELECTION OF THE CASE STUDY PROJECTS

The selected case studies for Yemen and Malaysia have the same characteristics in terms of usage, size, type of structure, and contract type. The two case studies are office buildings that include an auditorium, which is approximately 15,000 m² in size. The case study buildings have a framework structure, and conventional construction contract is applied in both cases.

An office governmental project in Yemen and another similar project in Malaysia are compared. Government projects are selected as case studies for the following reasons:

- They have a huge effect on the country's economy.
- They are difficult to control because of their size and function as well as the number of participants in the project.

- They do not belong to any specific person or group; they are public properties.

The project in Yemen is the Ministry of Youth and Sports building located in Sana'a. The total building area is 16,000 m². The building is selected because it is the only project in Yemen that had been completed during the course of this research. In addition, the project meets the criteria set by the researcher. The project in Malaysia is the Institute of Research Management and Monitoring – IPPP building in the University of Malaya (UM) campus in Kuala Lumpur. The total building area is 14,000 m². This project is selected because of its similarity to the building in Yemen in terms of function, type, and methods of design and construction. The building in Malaysia is smaller by 2,000 m² because of the size of the auditorium.

3.3.2. ARCHITECTURAL PROJECT COMPONENTS

Studying the project success criteria and project success factors of an architectural project by stages provides enhanced results. Thus, breaking down architectural project construction into different stages is fundamental to this research. Architectural project construction is divided into three main stages: design stage, tender stage, and construction stage (Figure 3.3). Design stage contains the stages pre-design, preliminary design, final design, working drawings, and specification. Tender stage includes the stages pre-tender, invitation for tender, opening tenders, and signing the contract. Preparing the site, sub-structure, super structure, finishing, and site cleaning and landscaping stages are within the construction stage.

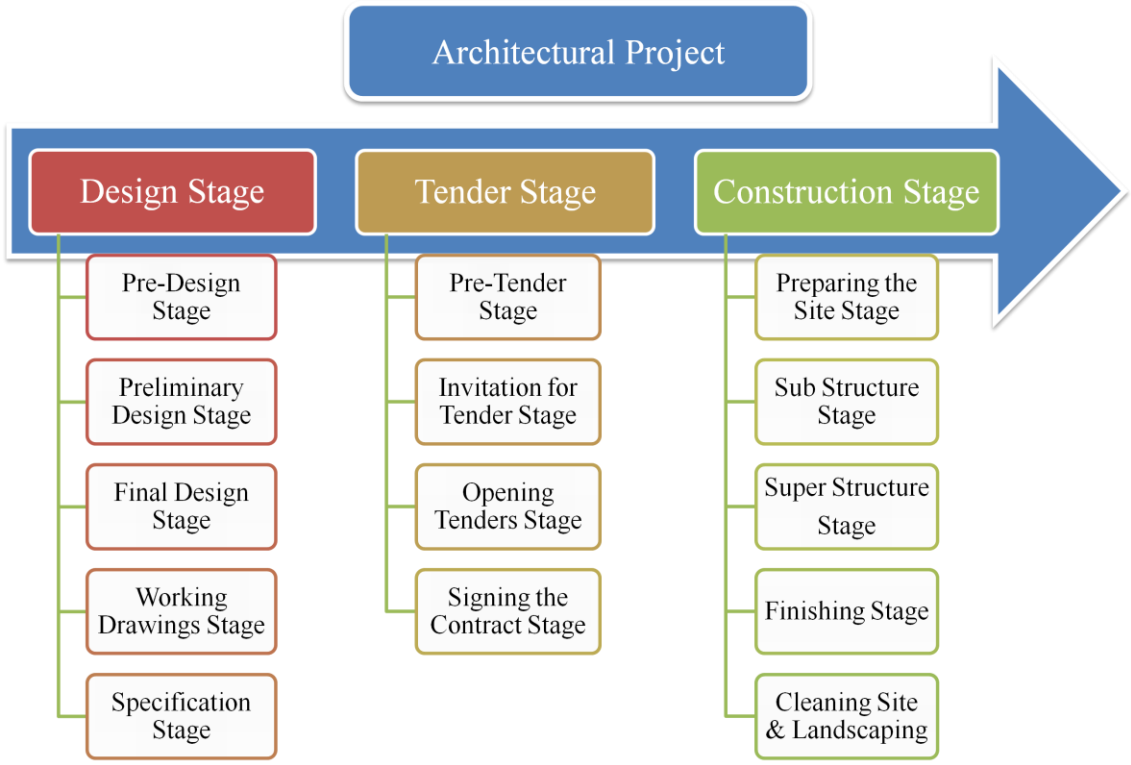

Figure 3.3: Architectural project stages

The design, tender, and construction stages are illustrated in detail in Figures 3.4, 3.5, and 3.6, respectively.

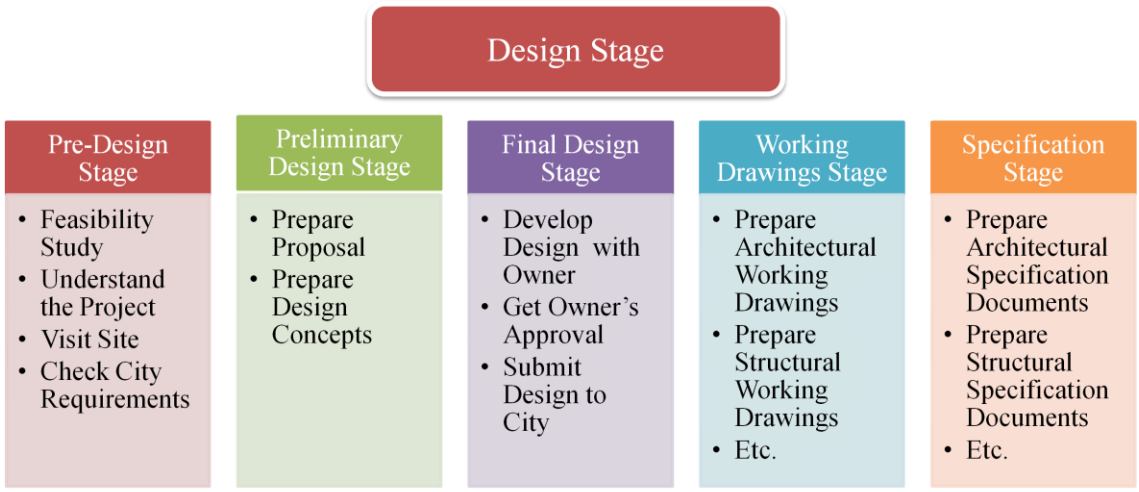

Figure 3.4: Detailed design stage

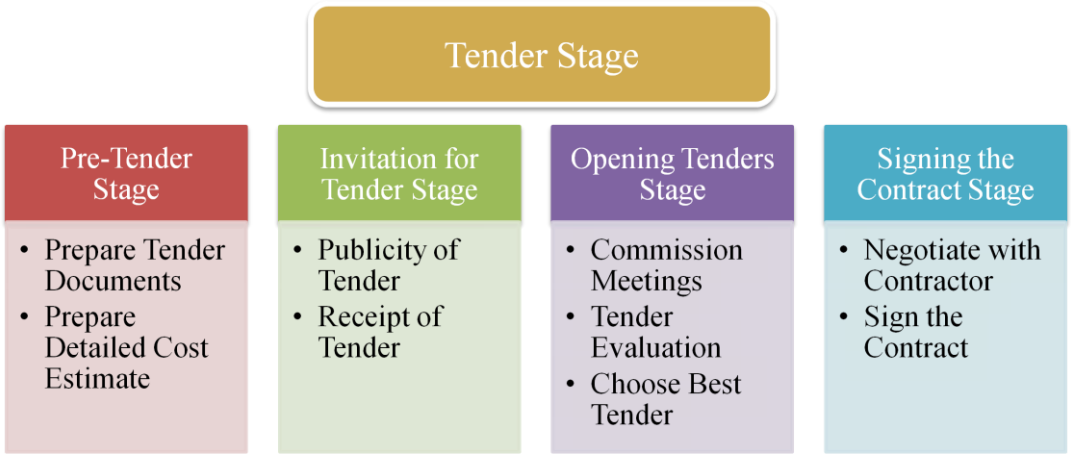

Figure 3.5: Detailed tender stage

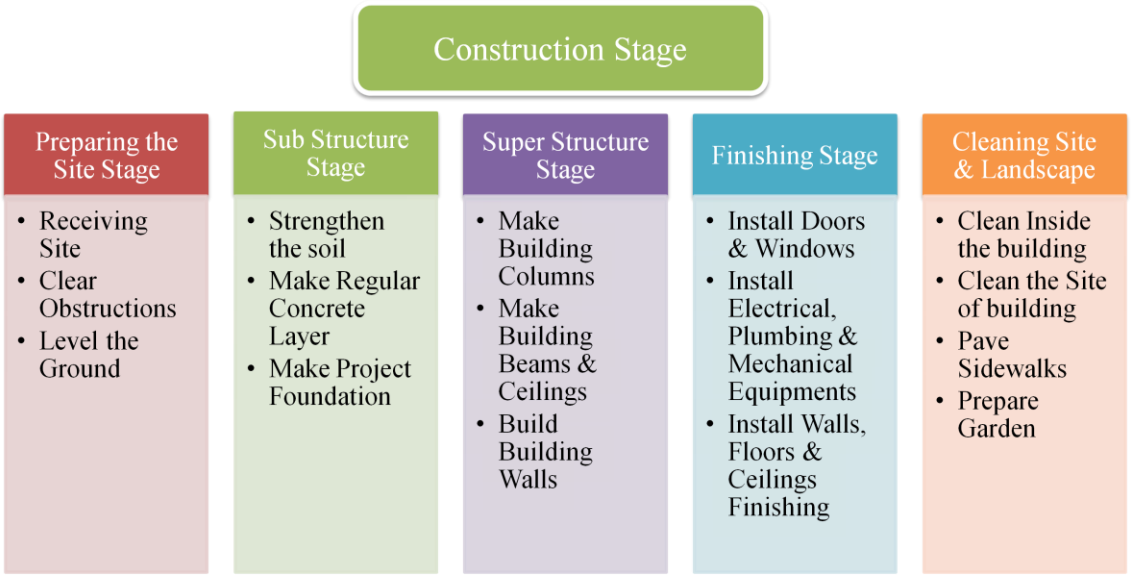

Figure 3.6: Detailed construction stage

Tan (2005) clarified the types of construction contracts utilized in architectural projects. These types include lump sum contract, unit price contract, construction management (CM) contract that includes cost plus fee contract and guaranteed maximum price (GMP) contract, design–build contract, build–operate–transfer (BOT) contract, and conventional contract, which is the type of the two case studies in this research (Figure 3.7).

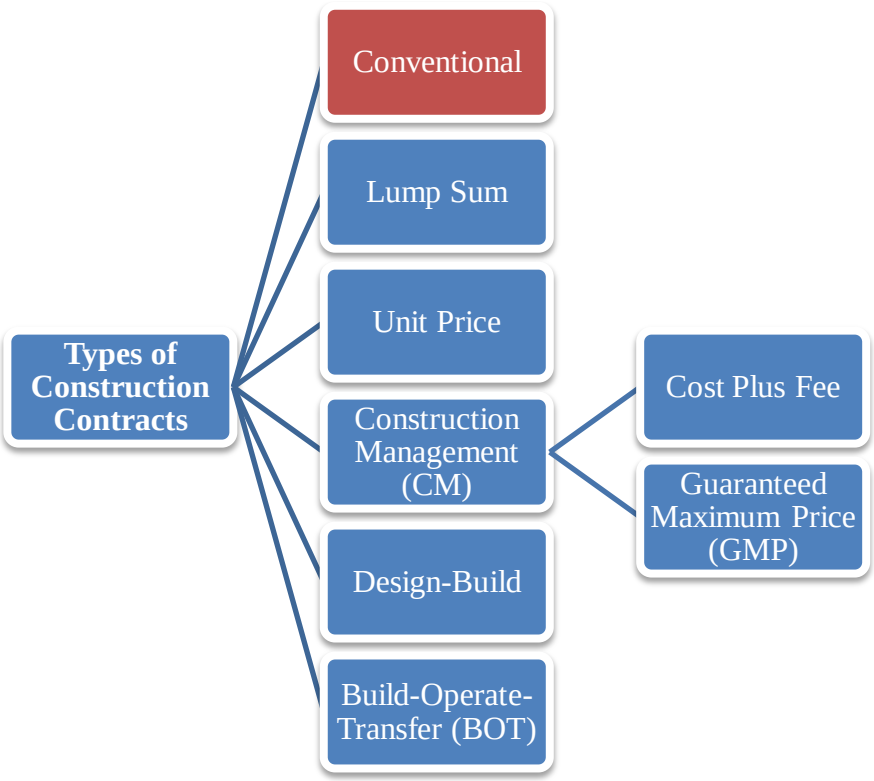

Figure 3.7: Types of construction contracts

3.4. STRUCTURED QUESTIONNAIRE SURVEY METHOD

A survey involves the selection of a representative sample from the population of a particular type (Biggam, 2008). Kerlinger (1986) classified the survey approach according to the methods of obtaining information that is, by personal interview, mailed questionnaire, panel interview, telephone interview, and controlled observation. The structured questionnaire survey method is selected in this research. The questionnaires are answered by the designers, contractors, and officials in the two case studies. All aspects of the case studies are considered, including success criteria, success factors, and failure factors. The questionnaire is analyzed with SPSS. This method is selected to meet the second and third objectives, which are *'to evaluate the criteria for time, cost, and quality determination'* and *'to identify the success and failure factors of projects'* respectively.

3.4.1. QUESTIONNAIRE DESIGN

The primary reason for utilizing the survey approach rather than relying on secondary data alone is that questionnaires can be customized to fit the research objectives (Tricker, 2001). Figure 3.8 demonstrates the relationship among project success, success criteria, success factors, and project stages as well as the relationship between Yemen and Malaysia. Project success criteria and project success factors are determined from the literature review, adopted in the project stage, and then compared and analyzed based on the case studies from Yemen and Malaysia. Peterson (2000) believes that the questionnaire is the "heart and soul" of a research; it must be constructed effectively to ensure that the respondents understand the questions. Answers are then encoded to obtain relevant information (Maimun, 2010).

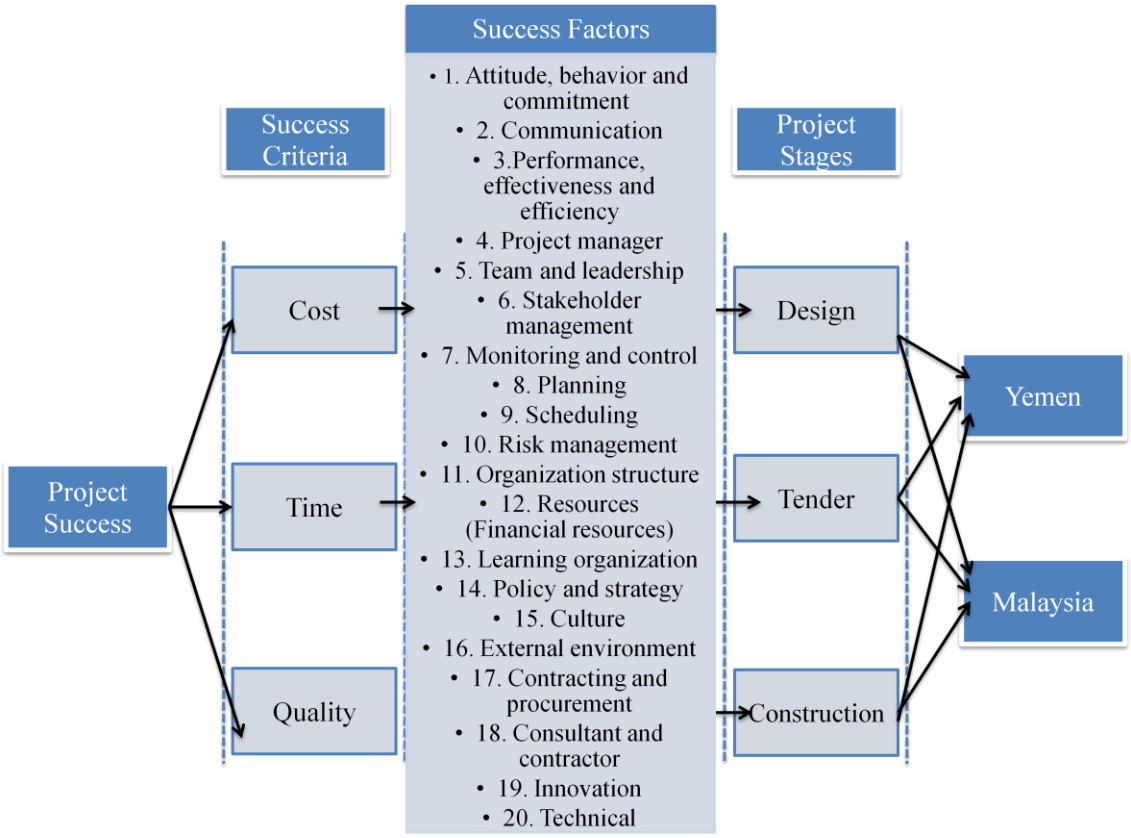

Figure 3.8: Questionnaire on success factors

The success criteria are then evaluated with the other aspects to ensure that project success is covered from different perspectives as shown in Figure 3.9.

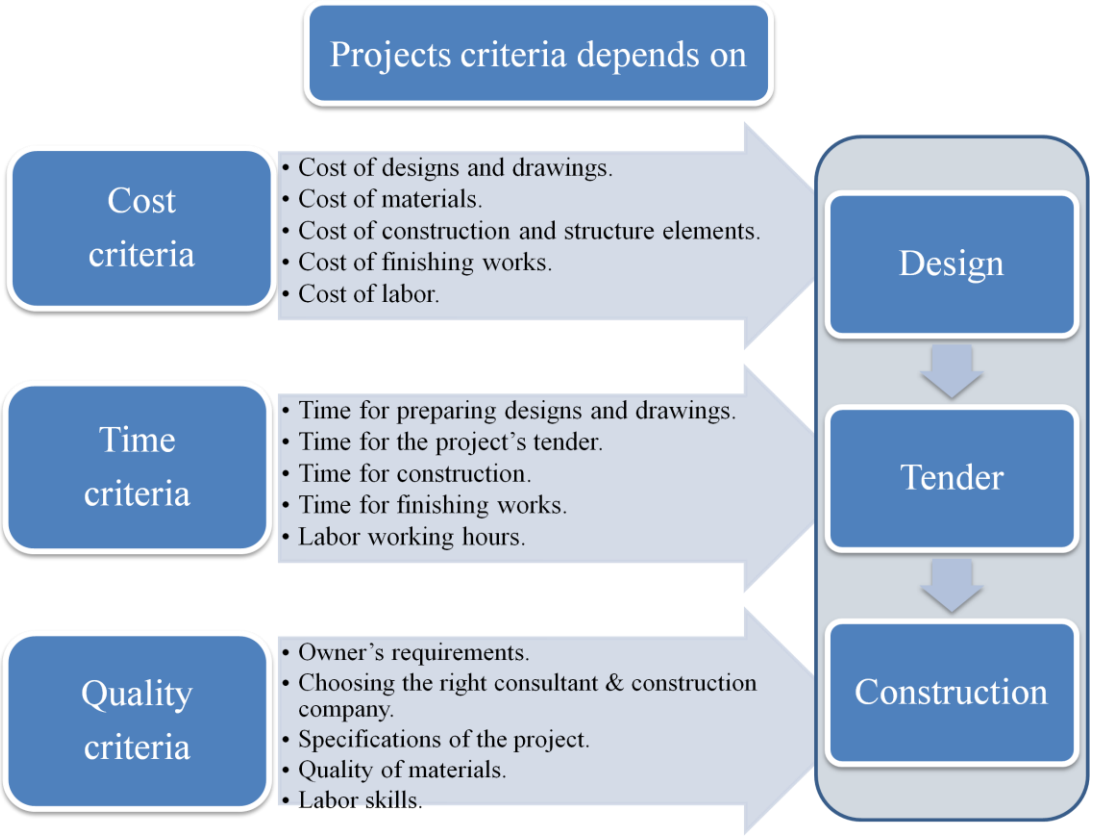

Figure 3.9: Evaluation of success criteria

3.4.2. QUESTIONNAIRE STRUCTURE

The questionnaire in this study addresses three main issues. The aim is to elicit the significance and correlation of project success criteria and factors and to calibrate the project stages. The first issue involves determining the respondents' demographic profiles as required in Section I of the questionnaire. The second issue involves the measurement of importance and agreement in the project success criteria as required in Section II. The third issue is the measurement of importance and agreement in the project success factors as required in Section III. Section IV presents the project success factors according to project stages. The project success criteria according to project stages as well as further comments are presented in Section V. A sample of the

questionnaire is attached in Appendix 2. The questionnaire is divided into five main sections as follows:

- Section I. This section pertains to the respondents' demographic profile.
- Section II. The importance of project success criteria and project success as well as the correlation between success criteria and project success groups are addressed in this section.
- Section III. The importance of the components of project success factors is addressed.
- Section IV. The importance of the group components of project success factors according to the project stages is addressed.
- Section V. This section provides additional comments and views and project failure and success criteria according to the project stages.

The questionnaire is structured with the following scale:

1 = Least important.

2 = Quite important.

3 = Important.

4 = Very important.

5 = Critically important.

3.4.3. SAMPLING DESIGN

A researcher can employ numerous sampling techniques, including random sampling, simple random sampling, stratified sampling, cluster sampling, systematic sampling, quota sampling, and convenience sampling (Biggam, 2008). Bryman (2004) pointed out that convenience or purposive sampling is essentially strategic and attempts to establish good correspondence between the research questions and sampling. Therefore, convenience or purposive sampling is selected in this research.

The respondents are professionals involved in the implementation of the case study projects, namely, designers, contractors, and officials in Yemen and Malaysia (Figure 3.10). The criteria for the selection of respondents are as follows:

- The respondent must be the designer or is a member of the design group of the case study.
- The respondent must have been a member of the tender committee of the project.
- The respondent must be the contractor or is a member of the contracting group of the case study.
- The respondent must be employed by the Ministry of Works for Yemen and by JKR for Malaysia and must have participated in the implementation of the case study projects.

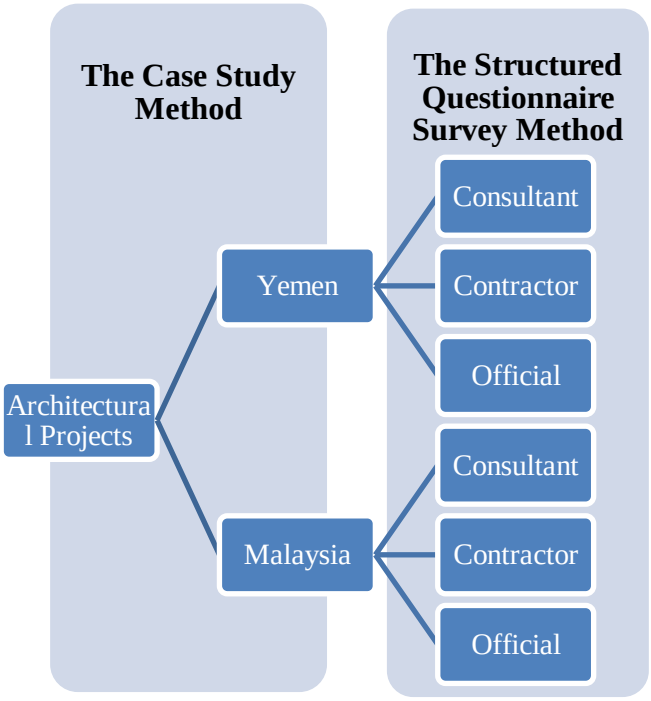

Figure 3.10: Sampling technique

The chief designers, contractors, and officials of the two case study projects are interviewed to obtain a complete overview of the implementation of the projects.

3.5. DATA COLLECTION

According to Sekaran (2000), Zikmund (2003), and Biggam (2008), data sources can be primary and secondary. Both secondary and primary data are employed in this research. Secondary data are obtained from books, professional journals, research publications, governmental sources, the Internet, articles, and magazines. Primary data are obtained through fieldwork and survey.

The research begins with exploratory work on the issues of project implementation in Yemen from project design through project tender to project construction; these issues were addressed in governmental publications as well as by national experts. A comparative study of project implementation in Yemen and Malaysia is then performed.

The abovementioned exploratory work was conducted from October 2010 to June 2011; relevant books, journals, and articles were considered. Investigative interviews and discussions with industry experts, university lecturers, and government officials were also conducted. The exploratory work and the literature provide a general view of project implementation in the two countries.

3.6. DEVELOPMENT AND ORGANIZATION OF THE FIELDWORK

The period of fieldwork and data collection in Yemen is six months, within which the case study is selected. Secondary data of the project include the following:

- designs and working drawings
- specifications
- tender documentations
- construction reports

The chief designers, contractors, and officials of the case study projects are interviewed to obtain a complete overview of the implementation of the case study projects. Afterward, the questionnaires are distributed to other professionals involved in the implementation of the projects. Some technical and political situations in Yemen delayed the field survey.

Fieldwork and data collection in Malaysia lasted three months. The same secondary data as those in Yemen are collected. This process includes all the procedures and methods of data collection as well as interviews.

3.7. DATA ANALYSIS

According to Bryman (2004), narrative analysis is an approach for the elicitation and analysis of data that is sensitive to the sense of temporal sequence that people, as tellers of stories about their lives or events around them, detect in their lives and surrounding episodes and inject into their accounts. Thematic narrative analysis is selected in this study to analyze the case studies; emphasis is placed on *what* is said rather than on *how* it is said.

The questionnaire is analyzed with SPSS. Norusis (1990) and Babbie (2013) stated that analysis of data would generate acceptable conclusive results through statistical means. Kamaruddin and Roslim (1990) and Creswell (2013) pointed that statistical means construct a detailed description of a phenomenon to provide recommendations for the problems identified (cited in Maimun, 2010). Data analysis in survey design is mainly performed through descriptive statistics and statistical testing (Edwards and Talbot, 1999). Consequently, the percentage, frequency distribution, average, and mean provided by descriptive statistics are calculated to analyze the questionnaire and to provide recommendations for the problems identified.

Nunally (1978) and Helms et al. (2006) indicated that data consistency is measured by the value of the alpha coefficient obtained. The higher the value of the coefficients obtained, the more consistent data sets are. A mark below 0.70 is considered lacking in internal consistency. Correlation analysis establishes and describes the strength and direction of the relationship between two variables. One of the common statistical methods is the Pearson correlation (Williams and Monge, 2001). Cronbach's alpha coefficient and Pearson correlation tests are adopted in this study to determine the consistency and relationship of the questionnaire's variables.

3.8. SUMMARY

Chapter 3 described the methodology employed in this research. Case study method and structured questionnaire survey method are adopted. Fieldwork is based on the investigation of all the stages of architectural project construction in Yemen and Malaysia beginning with the design stage, the tender stage, and all the way to the construction stage; whereas the questionnaire is analyzed with SPSS. Table 3.1 summarizes the methodology approached in this research.

Table 3.1: Research Methodology Summary

<table>
<tr><th>Problem Statement</th><th>Research Question</th><th>Research Objective</th><th>Method approached</th><th>Purpose of Method</th><th>Type of Analysis</th></tr>
<tr><td rowspan="4">Most project management experts agree that successful project management must involve quality, cost, and time control while adhering to stipulated schedules (Lock, 2007; Dobson and Feickert, 2007; Levy, 2007; PMI, 2008). Management of architectural projects in Yemen is inadequate (Sultan and Kajewski, 2003).</td><td>Q.1. How do Yemen and Malaysia implement architectural projects?</td><td>1st objective: To explore the process and project implementation in Yemen and Malaysia.</td><td>A case study investigation of all the stages of an architectural project. (Cohen and Manion, 1995; Biggam, 2008)</td><td>To prove and analyze the multifarious phenomena that constitutes the life cycle of a particular case (Cohen and Manion, 1995).</td><td>Thematic narrative analysis is selected in this study to analyze the case studies, it is sensitive to the sense of temporal sequence (Bryman, 2004),</td></tr>
<tr><td>Q.2. How criteria are considered in determining time, cost, and quality?</td><td>2nd objective: To evaluate the criteria for time, cost, and quality determination.</td><td rowspan="2">The structured questionnaire survey method (Kerlinger, 1986; Biggam, 2008).</td><td rowspan="2">The primary reason for utilizing the survey approach rather than relying on secondary data alone is that questionnaires can be customized to fit the research objectives (Peterson, 2000; Tricker, 2001)</td><td rowspan="2">The questionnaire is analyzed with SPSS (Norusis, 1990; Babbie, 2013). Statistical means construct a detailed description of a phenomenon to provide recommendations for the problems identified (Kamaruddin and Roslim,1990; Edwards and Talbot, 1999; Creswell, 2013). Cronbach's alpha coefficient (Nunally,1978; Helms et al., 2006) and Pearson correlation (Williams and Monge, 2001) tests are adopted in this study to determine the consistency and relationship of the questionnaire's variables.</td></tr>
<tr><td>Q.3. What constitutes project success and failure?</td><td>3rd objective: To identify the success and failure factors of project.</td></tr>
<tr><td>Q.4. What project management approach is suitable for project management in Yemen?</td><td>4th objective: To provide guidelines for project implementation in Yemen.</td><td colspan="3">After the findings of the first three objectives, recommendations for project implementation in Yemen are provided.</td></tr>
</table>

The following chapter presents the analysis and findings of the case study projects.

CHAPTER 4

ANALYSIS AND FINDINGS OF CASE STUDY PROJECTS

4.1. INTRODUCTION

This chapter presents the analysis and findings of the case study projects. The project in Yemen is the Ministry of Youth and Sports building located in Sana'a. The project in Malaysia is the Institute of Research Management and Monitoring – IPPP building in the UM campus in Kuala Lumpur.

4.2. GOVERNMENTAL PROJECT IN YEMEN (CASE STUDY 1)

The Ministry of Youth and Sports building in Yemen has a total building area of 16,000 m². Conventional contract was applied in this project. After appointing a consultant, the selected contractor began the tender process and construction. A description of the project implementation is obtained from secondary data as designs and working drawings, specifications, tender documents, and construction reports (attached in Appendix 3). Primary data are also obtained from interviews with designers, contractors, officials of the projects. Figure 4.1 presents the perspective of the case study, and Figure 4.2 presents the site plan of the project.

Figure 4.1: Perspective of case study 1

Figure 4.2: Site plan of case study 1

4.2.1. MANAGING THE DESIGN STAGE

A feasibility study was conducted in 1995 in the pre-design stage as a part of a ministerial plan because the ministry building was on lease until 2012. A new minister was elected in 2001. The implementation of the project began by selecting a consultant. The consultant analyzed the project and all its requirements and visited the site. The consultant verified the city requirements to begin the preliminary design stage. This stage lasted two months without a contract or fees.

The consultant prepared the proposal in the preliminary design stage. Several presentations and discussions were held with the minister and other officials of the ministry. Afterward, the consultant prepared the design concepts. Several presentations and discussions were held again. This stage lasted 21 months without a contract or fees. The consultant signed the contract after all the preliminaries. The main elevation, ground floor plan, and side elevation of the project are shown in Figures 4.3, 4.4, and 4.5, respectively.

Figure 4.3: Main elevation of case study 1

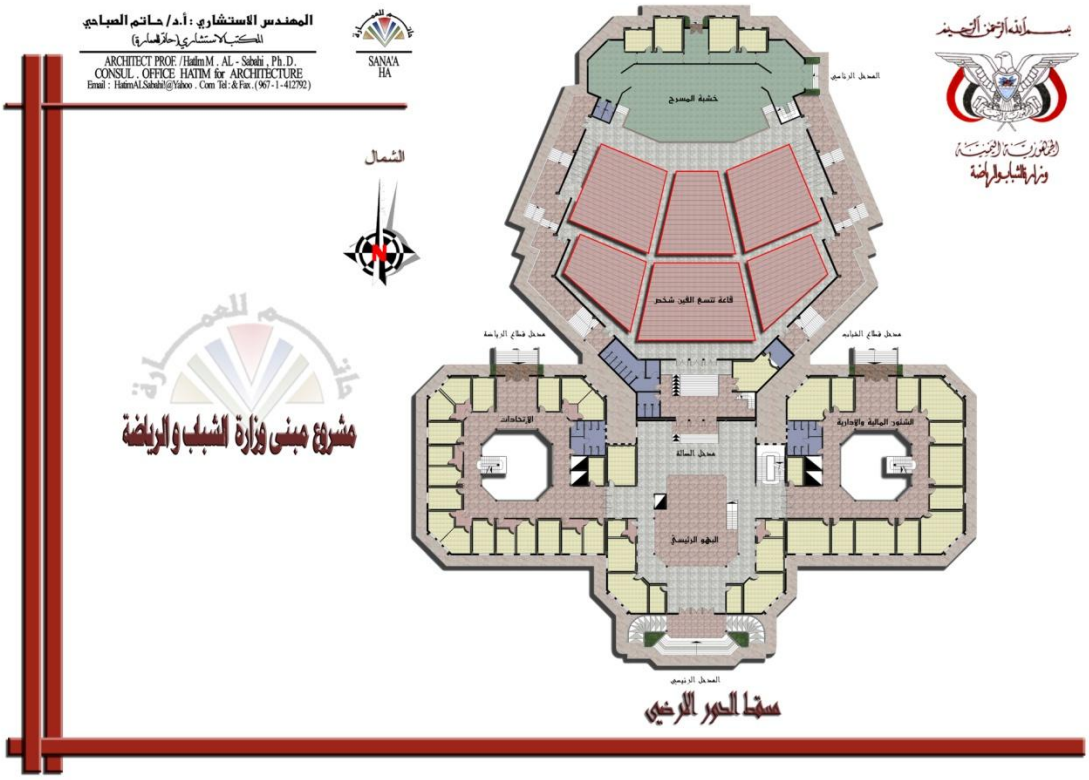

Figure 4.4: Ground floor plan of case study 1

Figure 4.5: Side elevation of case study 1

The contract value was USD 100,000. Deferred payments were made until the final submission of the working drawings and specification documents (period of 1 month). The final design stage began after the signing of the contract. The consultant developed the design with the owners, obtained their approval, and then submitted the final design to the owners. In Yemen, designs are not submitted to the city office for approval.

The working drawings stage is linked to the previous stage. The consultant hired other consultants of different specialties in this stage. Architectural, structural, electrical and mechanical working drawings were prepared. The working drawings were delivered on time as stated in the contract.

The last stage of designing is the specification stage, which is connected to the working drawings stage. Architectural, structural, electrical, and mechanical specification documents were prepared and delivered on time with the working drawings. The consultant was paid within a month after the submission.

4.2.2. MANAGING THE TENDER STAGE

The consultant prepared the tender documents and the detailed cost estimate, which was 539,000,000 YR or 3,097,700 USD, in the pre-tender stage. The invitation for tender stage took place with the publication of the tender in the official newspaper. A-grade contractors joined the tender with a fee of 50,000 YR (280 USD) to buy the tender documents.

The opening of tender stage began a month later with commission meetings with the minister and chief officials of the ministry, the consultant, and the contractors. The criteria for selecting the best contractor bid depended on the lowest-priced bid, experience and previous projects of the contractor, and construction assurances and warranties. The contract was offered to the contractor who met all the criteria. The value of the contract was 540,000,000 YR (3,100,000 USD). Construction period was 24 months as stated in the contract. The tender stage was managed by the owner (Ministry of Youth and Sports administration). This stage lasted nine months.

4.2.3. MANAGING THE CONSTRUCTION STAGE

The construction stage began with the preparation of the site stage. However, the owner (Ministry of Youth and Sports administration) changed the location of the project for several reasons. This action delayed the contractor for four months and required new soil testing procedures for the new site. Eight months passed before the new results were obtained. The new results needed new designs for the foundation and the structure in general. The new designs, working drawings, and specification documents for the structure were prepared by the project consultant in five months. The contractor cleared the obstructions, leveled the ground, strengthened the soil, and applied a regular concrete layer while waiting for the new project foundation designs.

The contractor demanded different rates for construction because the price of concrete materials increased. The price increase was due to the decrease of the value of the Yemeni rial compared with the US dollar. The initial strengthening of the soil and regular concrete layer applied by the contractor were abolished because they were not suitable for the new design. The contractor strengthened the soil again, applied another regular concrete layer, and demanded indemnity. This process lasted five months.

Construction continued for three months, and then the contractor terminated the construction work because he received no response to his demands. The Ministry of Works interfered, and a committee was formed to resolve the conflict. The committee studied the project situation, and discussions were conducted with the minister and chief staff of the ministry for 15 months. After the discussions, the committee decided to grant the contractor indemnity.

Afterward, the Council of Ministers opted to adopt the recommendation of the Supreme Committee for State Tenders and Procurement and signed a new contract with the same contractor to complete the project. The new contract valued 1,238,000,000 YR (5,500,000 USD) was signed after eight months. Construction was set for 24 months in the contract.

Super structure stage began with the contractor establishing the building columns, beams, ceilings, and walls. The finishing stage followed with the installation of doors, windows, and electrical, plumbing, and mechanical equipment as well as conducting finishing work for walls, floors, and ceilings. Cleaning inside the building and its surrounding site, paving sidewalks, and preparing the garden were the final tasks of the contractor. These stages lasted 30 months. The auditorium was built in another 20 months. The defects liability period was 12 months after the completion of the project.

The main reason for cost overrun in this project was the increase in the price of materials owing to the decrease of the value of the Yemeni Rial against the US dollar. Other reasons, such as the changes made by the stockholder and the additional work, contributed to cost overrun. The main reasons the project exceeded the set period were changing the location of the project and the additional work required by the stockholder.

The delays in payments after each claim by the contractor also contributed to the extension of the project period. The project was supervised not by the consultant but by individuals from the Ministry of Youth and Sports paid by the contractor himself. According to the supervisors (individuals from the Ministry of Youth and Sports), the quality of this project reached 80% of the required specifications.

4.3. GOVERNMENTAL PROJECT IN MALAYSIA (CASE STUDY 2)

The project in Malaysia is the Institute of Research Management and Monitoring – IPPP building in the UM campus in Kuala Lumpur. The building has a total building area of 14,000 m². Conventional contract was adopted in this project. After appointing the consultant, the tender process took place and construction began. A description of the project implementation is obtained from secondary data in the form of designs and working drawings, specifications, tender documents, and construction reports of the project (attached in Appendix 4). Primary data is obtained through interviews with the designers, contractors, and officials of the project. Figure 4.6 shows the perspective of the case study, and Figure 4.7 shows the site plan of the project.

Figure 4.6: Perspective of case study 2

Source: University of Malaya (2007)

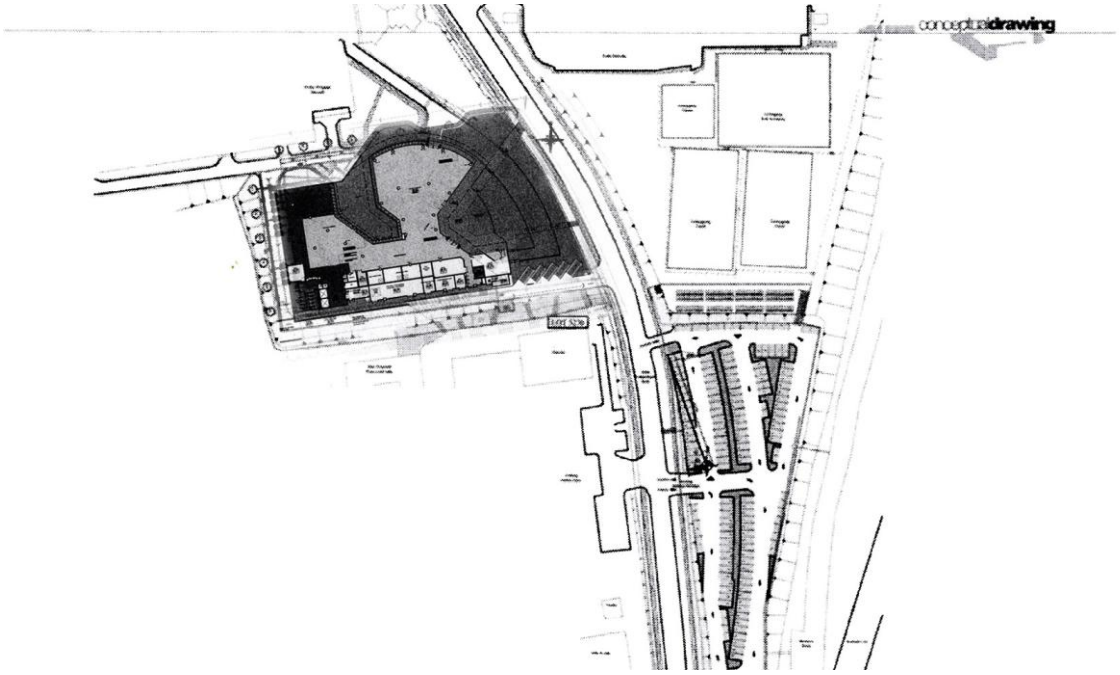

Figure 4.7: Site plan of case study 2

4.3.1. MANAGING THE DESIGN STAGE

The feasibility study conducted as a part of UM's development plan was adopted in the pre-design stage. The stockholder of this project, which is UM, presented the idea to JKR. JKR is responsible for the implementation of all government projects in Malaysia. JKR selected a consultant from its registered waiting list. The consultant is selected based on his experience and previous projects in the same field.

The consultant analyzed the project and its requirements and visited the site. The consultant verified the city requirements to begin the preliminary design stage. The consultant prepared the proposal and design concepts in the preliminary design stage (schematic design), and then several presentations and discussions were held with the stockholder. The consultant developed the design with the owner, obtained the owner's approval, and then submitted the final design to the owner and to the city office for approval. This stage lasted three months. Figure 4.8 shows the first floor plan of the building. The north elevation of the project is shown in Figure 4.9.

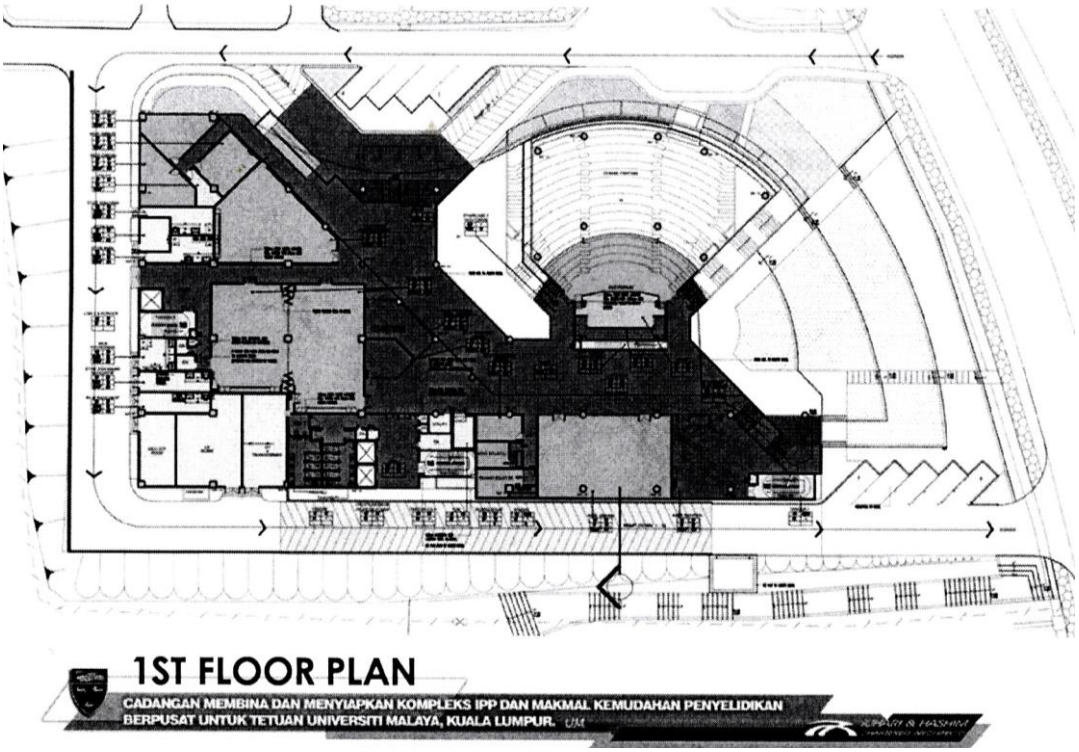

Figure 4.8: First floor plan of case study 2

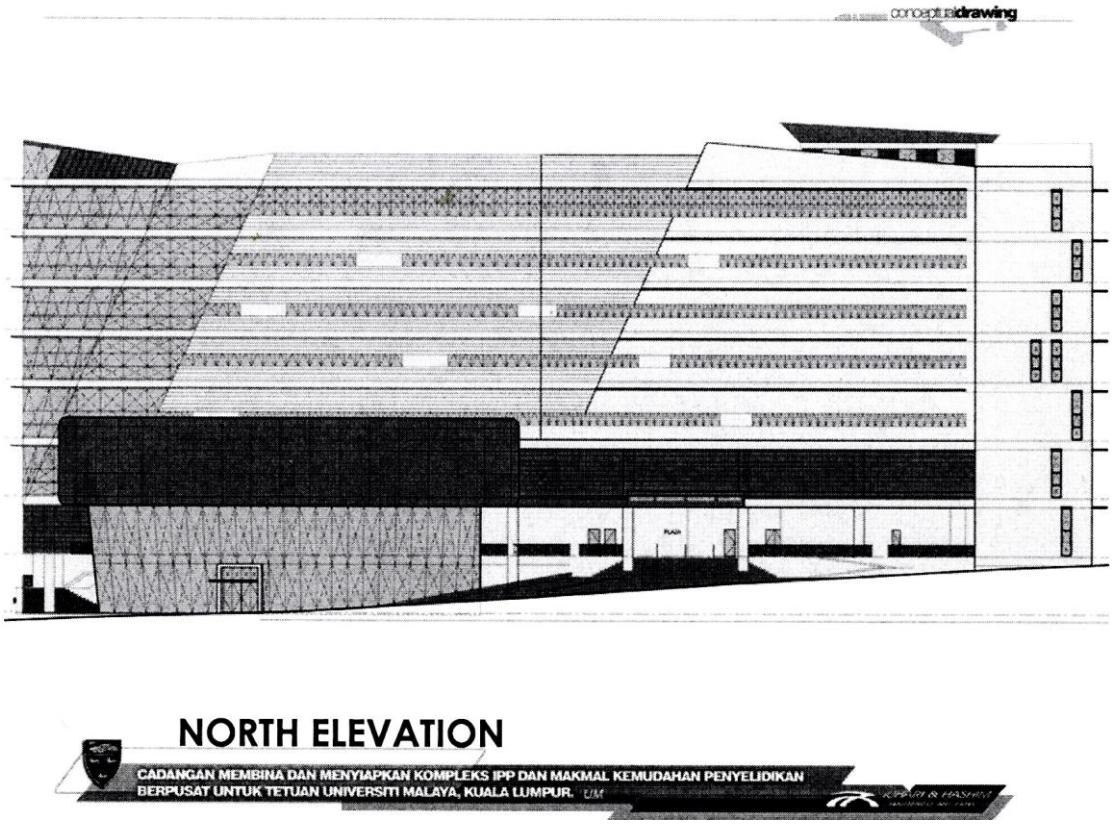

Figure 4.9: North elevation of case study 2

In the working drawings (design development) stage, the consultant hired other consultants of different specialties. Architectural, structural, electrical, and mechanical working drawings were prepared. The working drawings were delivered on time as the contract required. Architectural, structural, electrical, and mechanical specification documents were prepared and delivered on time with the working drawings. This stage lasted three months. The cost of the design stage was approximately 5% of the project construction cost, which is RM 3,200,000 (1,000,000 USD).

4.3.2. MANAGING THE TENDER STAGE

The consultant prepared the tender documents and the detailed cost estimate in the pre-tender stage. Afterward, the invitation for the tender stage took place with the publication of the tender in the official newspaper. A-grade contractors joined the tender with a fee of RM 1,000 (320 USD) to buy the tender documents.

The opening of tenders stage began with commission meetings attended by the tender opening committee. The criteria for selecting the best contractor bid depended on the experience and previous projects of contractor, the lowest-priced bid, and construction assurances and warranties. The contract valued at RM 64,000,000 (20,640,000 USD) was offered to the contractor who met all the criteria. The tender stage, which lasted three months, was finalized by JKR.

4.3.3. MANAGING THE CONSTRUCTION STAGE

The construction stage began with the preparation of the site (preliminaries) stage. The contractor cleared the obstructions, leveled the ground, and prepared the preliminary requirements. Piling, including strengthening the soil, foundation, and all substructures, was then conducted. Super structure stage began with the establishment of the building columns, beams, ceilings, and walls. Finishing stage followed with the installation of doors, windows, and electrical, plumbing, and mechanical equipment as well as finishing work for walls, floors, and ceilings. The auditorium was built afterward.

A built-in furniture stage came before the infrastructure stage in this project. Cleaning inside the building, paving sidewalks, and preparing the parking area and garden were the last tasks of the contractor. These stages continued for 24 months as planned in the contract. The defects liability period was 12 months after the completion of the project. The quality of this project according to the required specifications was 100%, and the cost was budgeted.

4.4. SUMMARY

Chapter 4 presented the analysis and findings of the case study projects. The project in Yemen is the Ministry of Youth and Sports building located in Sana'a. The project in Malaysia is the Institute of Research Management and Monitoring – IPPP building in

the UM campus in Kuala Lumpur. Table 4.1 shows the difference in duration of each stage of the projects.

Table 4.1: Duration of the case study projects

<table>
<tr><th>Project stage</th><th colspan="2">Detailed stages</th><th>Yemen (Case Study 1)</th><th>Malaysia (Case Study 2)</th></tr>
<tr><td rowspan="5">Design stage</td><td>Pre-design</td><td rowspan="3">Schematic design (Malaysia)</td><td>2 months</td><td rowspan="3">3 months</td></tr>
<tr><td>Preliminary design</td><td rowspan="2">21 months</td></tr>
<tr><td>Final design</td></tr>
<tr><td>Working drawings</td><td rowspan="2">Design development (Malaysia)</td><td rowspan="2">1 month</td><td rowspan="2">3 months</td></tr>
<tr><td>Specification</td></tr>
<tr><td rowspan="4">Tender stage</td><td colspan="2">Pre-tender</td><td rowspan="2">1 month</td><td rowspan="4">3 months</td></tr>
<tr><td colspan="2">Invitation for tender</td></tr>
<tr><td colspan="2">Opening tenders</td><td rowspan="2">9 months</td></tr>
<tr><td colspan="2">Signing the contract</td></tr>
<tr><td rowspan="5">Construction stage</td><td colspan="2">Preparing the site</td><td>17 months</td><td rowspan="5">24 months</td></tr>
<tr><td colspan="2">Sub structure</td><td>8 months</td></tr>
<tr><td colspan="2">Super structure</td><td rowspan="3">73 months</td></tr>
<tr><td colspan="2">Finishing</td></tr>
<tr><td colspan="2">Cleaning site & landscaping</td></tr>
<tr><td colspan="3">Defects liability period</td><td>12 months</td><td>12 months</td></tr>
<tr><td colspan="3">Total period</td><td>132 months</td><td>33 months</td></tr>
</table>

Table 4.2 shows the enormous difference in the time and cost of the projects. The Yemeni project was implemented in 11 years.

Table 4.2: Time and cost of the case study projects

Project stage	Yemen (Case Study 1)		Malaysia (Case Study 2)	
	Time	**Cost**	**Time**	**Cost**
Design stage	24 months	100,000 USD	6 months	1,000,000 USD
Tender stage	10 months	280 USD (Tender documents)	3 months	320 USD (Tender documents)
Construction stage	98 months	5,500,000 USD	24 months	20,640,000 USD
Total	132 months	5,600,000 USD	33 months	21,640,000 USD

The findings of the case study analysis shown in Table 4.3 are remarkably significant, confirming the importance of this research. With comparative principals in mind, the project in Malaysia is selected because of its similarity to the Yemeni project in terms of type and methods of design and construction. Its size is smaller by 2,000 m² because the auditorium is smaller.

Table 4.3: Comparative analysis of the two case study projects

Description	**Yemen (Case Study 1)**	**Malaysia (Case Study 2)**
Project name	Ministry of Youth & Sports Building	Institute of Research Management and Monitoring – IPPP
Stockholder (owner)	Ministry of Youth & Sports	University of Malaya (UM)
Location	Sana'a	Kuala Lumpur
Type of project	Governmental project	Governmental project
Components	Office building & auditorium	Office building & auditorium
Total building area	16,000 m²	14,000 m²
Implementing organization	The owner (Ministry of Youth and Sports administration)	JKR
Type of contract	Conventional contract	Conventional contract
Cost of design	100,000 USD	1,000,000 USD
Grade of consultant and contractor	A	A
Cost of tender documents	280 USD	320 USD
Cost of construction at tender	3,100,000 USD	20,640,000 USD
Final cost of construction	5,500,000 USD	20,640,000 USD
Time for design	24 months	6 months
Time for tender	10 months	3 months
Time for construction at tender	24 months	24 months
Quality of construction	80% as specified	100% as specified
Final time for construction	98 months	24 months
Supervising authority	Individuals from the Ministry of Youth and Sports	The consultant + JKR
Supervising expenses paid by	The contractor	JKR
Defects liability period	12 month	12 month

The following chapter presents the analysis and findings of the research questionnaire.

CHAPTER 5

ANALYSIS AND FINDINGS OF RESEARCH QUESTIONNAIRE

5.1. INTRODUCTION

This chapter presents the analysis of the research. The first part of this chapter presents the respondents' background. The second part presents the project success criteria and project success factors, which are then adopted in the project stage. These success criteria and success factors are ranked based on importance. The questionnaire is analyzed with SPSS.

5.2. RESPONDENTS' BACKGROUND

The demographic characteristics of the respondents in Yemen and Malaysia are summarized in Table 5.1. The respondents are categorized by age, highest educational attainment, years of experience, qualification, organization type, and position in organization. Twenty respondents (33.3%) in Yemen and 23 respondents (38.3%) in Malaysia are less than 30 years old. Fifty respondents (83.3%) in Yemen have a bachelor's degree, and 20 respondents (33.3%) in Malaysia have a two-year diploma. Fifteen respondents (25.0%) in Yemen have experience of less than five years, and 17 respondents (28.3%) in Malaysia have experience between five to ten years. Twenty-eight respondents (46.7%) in Yemen are architects. Twenty respondents (33.3%) in Malaysia are architects as well, and another 20 respondents (33.3%) are civil engineers. Twenty-seven respondents (45.0%) in Yemen work in a government agency (Ministry of Works), whereas 28 respondents (46.7%) in Malaysia work in a government agency (JKR). Fifteen respondents (25.0%) in Yemen are project managers, and 15 respondents (25.0%) are project consultants. Nineteen respondents (31.7 %) in Malaysia have diverse positions in their organizations.

Table 5.1: Demographic characteristics of the respondents

Demographic	Characteristics	Yemen		Malaysia	
		Frequency	Percentage	Frequency	Percentage
Age	Less than 30 years	20	33.3 %	23	38.3 %
	Between 30 – 39	15	25.0 %	18	30.0 %
	Between 40 – 49	13	21.7 %	11	18.3 %
	Between 50 – 59	12	20.0 %	7	11.7 %
	More than 60 years	0	0.0 %	1	1.7 %
Highest education	High School	2	3.3 %	13	21.7 %
	Diploma (2 years)	0	0.0 %	20	33.3 %
	Bachelor Degree	50	83.3 %	18	30.0 %
	Master Degree	5	8.3 %	7	11.7 %
	PhD	3	5.0 %	0	0.0 %
	Others	0	0.0 %	2	3.3 %
Years of experience	Less than 5 years	15	25.0 %	16	26.7 %
	Between 5 – 10	14	23.3 %	17	28.3 %
	Between 11 – 15	10	16.7 %	8	13.3 %
	Between 16 – 20	7	11.7 %	8	13.3 %
	Between 21 – 25	5	8.3 %	6	10.0 %
	More than 25 years	9	15.0 %	5	8.3 %
Qualification	Architecture	28	46.7 %	20	33.3 %
	Civil Engineering	24	40.0 %	20	33.3 %
	Quantity Survey	2	3.3 %	4	6.7 %
	Management	4	6.7 %	7	11.7 %
	Semi-professional	1	1.7 %	4	6.7 %
	Others	1	1.7 %	5	8.3 %
Organization type	Government Agency	27	45.0 %	28	46.7 %
	Consulting Firm	12	20.0 %	12	20.0 %
	PM Consultant	6	10.0 %	2	3.3 %
	Contracting Firm	15	25.0 %	10	16.7 %
	Professional Crafts	0	0.0 %	1	1.7 %
	Others	0	0.0 %	7	11.7 %
Position in organization	Chairman or Director	11	18.3 %	4	6.7 %
	Project Manager	15	25.0 %	12	20.0 %
	Project Consultant	15	25.0 %	4	6.7 %
	Site Engineer/Arch	13	21.7 %	9	15.0 %
	Site Resident	3	5.0 %	12	20.0 %
	Others	3	5.0 %	19	31.7 %

As shown in Tables 5.2 to 5.19, Yemen and Malaysia have 60 respondents each. Tables 5.2 and 5.3 show the number of respondents in Yemen and Malaysia, respectively, according to their qualification and the type of organization they belong to. Both tables indicate that the majority of the respondents are architects working in a government agency followed by civil engineers.

Table 5.2: Respondents in Yemen according to their qualification and organization type

Yemen		Organization type						Total
		Government Agency	Consulting Firm	PM Consultant	Contracting Firm	Professional Crafts	Others	
Qualification	Architecture	14	8	3	3	0	0	28
	Civil Engineering	12	3	3	6	0	0	24
	Quantity Survey	0	1	0	1	0	0	2
	Management	1	0	0	3	0	0	4
	Semi-professional	0	0	0	1	0	0	1
	Others	0	0	0	1	0	0	1
Total		27	12	6	15	0	0	60

Table 5.3: Respondents in Malaysia according to their qualification and organization type

Malaysia		Organization type						Total
		Government Agency	Consulting Firm	PM Consultant	Contracting Firm	Professional Crafts	Others	
Qualification	Architecture	13	2	1	2	1	1	20
	Civil Engineering	7	5	1	6	0	1	20
	Quantity Survey	2	1	0	1	0	0	4
	Management	1	3	0	1	0	2	7
	Semi-professional	3	1	0	0	0	0	4
	Others	2	0	0	0	0	3	5
Total		28	12	2	10	1	7	60

Tables 5.4 and 5.5 show the number of respondents in Yemen and Malaysia, respectively, according to their qualification and years of experience. Both tables indicate that architects with experience between 5 to 10 years constitute the majority of the respondents in both countries.

Table 5.4: Respondents in Yemen according to their qualification and years of experience

Yemen		Years of experience						Total
		Less than 5 years	Between 5 – 10	Between 11 – 15	Between 16 – 20	Between 21 – 25	More than 25 years	
Qualification	Architecture	7	8	6	3	1	3	28
	Civil Engineering	7	4	2	4	2	5	24
	Quantity Survey	1	0	0	0	1	0	2
	Management	0	2	1	0	1	0	4
	Semi-professional	0	0	1	0	0	0	1
	Others	0	0	0	0	0	1	1
Total		15	14	10	7	5	9	60

Table 5.5: Respondents in Malaysia according to their qualification and years of experience

Malaysia		Years of experience						Total
		Less than 5 years	Between 5 – 10	Between 11 – 15	Between 16 – 20	Between 21 – 25	More than 25 years	
Qualification	Architecture	4	7	3	4	1	1	20
	Civil Engineering	5	5	3	3	1	3	20
	Quantity Survey	1	1	0	0	2	0	4
	Management	1	2	0	1	2	1	7
	Semi-professional	1	1	2	0	0	0	4
	Others	4	1	0	0	0	0	5
Total		16	17	8	8	6	5	60

Tables 5.6 and 5.7 show the number of respondents in Yemen and Malaysia, respectively, according to their qualification and position in their respective organization. Ten architects in Yemen are project consultants, and six civil engineers in Malaysia are project managers.

Table 5.6: Respondents in Yemen according to their qualification and position in their organization

Yemen		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Qualification	Architecture	3	8	10	6	1	0	28
	Civil Engineering	4	6	4	7	0	3	24
	Quantity Survey	0	0	1	0	1	0	2
	Management	3	1	0	0	0	0	4
	Semi-professional	0	0	0	0	1	0	1
	Others	1	0	0	0	0	0	1
Total		11	15	15	13	3	3	60

Table 5.7: Respondents in Malaysia according to their qualification and position in their organization

Malaysia		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Qualification	Architecture	0	4	2	4	5	5	20
	Civil Engineering	2	6	0	4	3	5	20
	Quantity Survey	1	1	0	0	1	1	4
	Management	1	1	2	1	0	2	7
	Semi-professional	0	0	0	0	3	1	4
	Others	0	0	0	0	0	5	5
Total		4	12	4	9	12	19	60

Tables 5.8 and 5.9 show the number of respondents in Yemen and Malaysia, respectively, according to their years of experience and position in their organization. Eight project consultants in Yemen have less than five years of experience, and seven respondents in Malaysia have five to ten years of experience in various positions.

Table 5.8: Respondents in Yemen according to their years of experience and position in their organization

Yemen		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Years of experience	Less than 5 years	0	0	8	5	0	2	15
	Between 5 – 10	2	3	5	3	1	0	14
	Between 11 – 15	1	4	2	2	1	0	10
	Between 16 – 20	0	5	0	2	0	0	7
	Between 21 – 25	2	1	0	1	1	0	5
	More than 25 years	6	2	0	0	0	1	9
Total		11	15	15	13	3	3	60

Table 5.9: Respondents in Malaysia according to their years of experience and position in their organization

Malaysia		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Years of experience	Less than 5 years	1	1	1	4	3	6	16
	Between 5 – 10	0	2	0	4	4	7	17
	Between 11 – 15	0	2	1	1	2	2	8
	Between 16 – 20	0	4	1	0	1	2	8
	Between 21 – 25	1	3	0	0	1	1	6
	More than 25 years	2	0	1	0	1	1	5
Total		4	12	4	9	12	19	60

Tables 5.10 and 5.11 show the number of respondents in Yemen and Malaysia, respectively, according to their highest educational attainment and position in their organization. Fifteen project consultants in Yemen have a bachelor's degree, and nine respondents in Malaysia occupying various positions have a two-year diploma.

Table 5.10: Respondents in Yemen according to their highest educational attainment and position in their organization

Yemen		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Highest education	High School	1	0	0	0	1	0	2
	Diploma (2 years)	0	0	0	0	0	0	0
	Bachelor Degree	8	11	15	12	2	2	50
	Master Degree	1	2	0	1	0	1	5
	PhD	1	2	0	0	0	0	3
	Others	0	0	0	0	0	0	0
Total		11	15	15	13	3	3	60

Table 5.11: Respondents in Malaysia according to their highest educational attainment and position in their organization

Malaysia		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Highest education	High School	0	2	1	1	7	2	13
	Diploma (2 years)	0	5	0	4	2	9	20
	Bachelor Degree	3	4	2	2	3	4	18
	Master Degree	1	1	1	2	0	2	7
	PhD	0	0	0	0	0	0	0
	Others	0	0	0	0	0	2	2
Total		4	12	4	9	12	19	60

Tables 5.12 and 5.13 show the number of respondents in Yemen and Malaysia, respectively, according to their highest educational attainment and organization type. Twenty-four respondents in Yemen have a bachelor's degree and work in a government agency (Ministry of Works). Thirteen respondents in Malaysia have a two-year diploma and work in a government agency (JKR).

Table 5.12: Respondents in Yemen according to their highest educational attainment and organization type

Yemen		Organization type						Total
		Government Agency	Consulting Firm	PM Consultant	Contracting Firm	Professional Crafts	Others	
Highest education	High School	0	0	0	2	0	0	2
	Diploma (2 years)	0	0	0	0	0	0	0
	Bachelor Degree	24	9	5	12	0	0	50
	Master Degree	1	2	1	1	0	0	5
	PhD	2	1	0	0	0	0	3
	Others	0	0	0	0	0	0	0
Total		27	12	6	15	0	0	60

Table 5.13: Respondents in Malaysia according to their highest educational attainment and organization type

Malaysia		Organization type						Total
		Government Agency	Consulting Firm	PM Consultant	Contracting Firm	Professional Crafts	Others	
Highest education	High School	7	3	1	1	1	0	13
	Diploma (2 years)	13	4	0	3	0	0	20
	Bachelor Degree	7	1	1	5	0	4	18
	Master Degree	1	3	0	1	0	2	7
	PhD	0	0	0	0	0	0	0
	Others	0	1	0	0	0	1	2
Total		28	12	2	10	1	7	60

Tables 5.14 and 5.15 show the number of respondents in Yemen and Malaysia, respectively, according to their highest educational attainment and years of experience. Fourteen respondents in Yemen with a bachelor's degree have less than five years of experience; another 14 respondents with a bachelor's degree have five to ten years of experience. On the other hand, 10 respondents in Malaysia with a two-year diploma have five to ten years of experience.

Table 5.14: Respondents in Yemen according to their highest educational attainment and years of experience

Yemen		Years of experience						Total
		Less than 5 years	Between 5 – 10	Between 11 – 15	Between 16 – 20	Between 21 – 25	More than 25 years	
Highest education	High School	0	0	1	0	0	1	2
	Diploma (2 years)	0	0	0	0	0	0	0
	Bachelor Degree	14	14	9	4	4	5	50
	Master Degree	1	0	0	2	0	2	5
	PhD	0	0	0	1	1	1	3
	Others	0	0	0	0	0	0	0
Total		15	14	10	7	5	9	60

Table 5.15: Respondents in Malaysia according to their highest educational attainment and years of experience

Malaysia		Years of experience						Total
		Less than 5 years	Between 5 – 10	Between 11 – 15	Between 16 – 20	Between 21 – 25	More than 25 years	
Highest education	High School	3	1	4	3	0	2	13
	Diploma (2 years)	1	10	3	4	2	0	20
	Bachelor Degree	7	5	1	0	4	1	18
	Master Degree	5	0	0	0	0	2	7
	PhD	0	0	0	0	0	0	0
	Others	0	1	0	1	0	0	2
Total		16	17	8	8	6	5	60

Tables 5.16 and 5.17 show the number of respondents in Yemen and Malaysia, respectively, according to their years of experience and organization type. Nine respondents in Yemen that work in a government agency (Ministry of Works) have less than five years of experience. Eleven respondents in Malaysia that work in a government agency (JKR) have five to ten years of experience.

Table 5.16: Respondents in Yemen according to their years of experience and organization type

Yemen		Organization type						Total
		Government Agency	Consulting Firm	PM Consultant	Contracting Firm	Professional Crafts	Others	
Years of experience	Less than 5 years	9	3	1	2	0	0	15
	Between 5 – 10	7	2	1	4	0	0	14
	Between 11 – 15	2	2	3	3	0	0	10
	Between 16 – 20	4	1	1	1	0	0	7
	Between 21 – 25	2	1	0	2	0	0	5
	More than 25 years	3	3	0	3	0	0	9
Total		27	12	6	15	0	0	60

Table 5.17: Respondents in Malaysia according to their years of experience and organization type

Malaysia		Organization type						Total
		Government Agency	Consulting Firm	PM Consultant	Contracting Firm	Professional Crafts	Others	
Years of experience	Less than 5 years	5	3	0	2	1	5	16
	Between 5 – 10	11	2	1	1	0	2	17
	Between 11 – 15	4	2	1	1	0	0	8
	Between 16 – 20	1	4	0	3	0	0	8
	Between 21 – 25	4	0	0	2	0	0	6
	More than 25 years	3	1	0	1	0	0	5
Total		28	12	2	10	1	7	60

Tables 5.18 and 5.19 show the number of respondents in Yemen and Malaysia, respectively, according to their age and position in their organization. Eleven project consultants in Yemen are less than 30 years old. Nine respondents in Malaysia occupying different positions are less than 30 years old.

Table 5.18: Respondents in Yemen according to their age and position in their organization

Yemen		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Age	Less than 30 years	0	2	11	5	0	2	20
	Between 30 – 39	3	3	4	3	2	0	15
	Between 40 – 49	1	7	0	4	1	0	13
	Between 50 – 59	7	3	0	1	0	1	12
	More than 60 years	0	0	0	0	0	0	0
Total		11	15	15	13	3	3	60

Table 5.19: Respondents in Malaysia according to their age and position in their organization

Malaysia		Position in organization						Total
		Chairman / Director	Project Manager	Project Consultant	Site Engineer/Arch	Site Resident	Others	
Age	Less than 30 years	1	2	1	5	5	9	23
	Between 30 – 39	0	5	1	4	4	4	18
	Between 40 – 49	0	4	1	0	1	5	11
	Between 50 – 59	3	1	0	0	2	1	7
	More than 60 years	0	0	1	0	0	0	1
Total		4	12	4	9	12	19	60

5.3. INTERNAL CONSISTENCY OF THE SCALE

The scale utilized in this research is based on the order of importance of the variables, which are project success criteria and project success factors. The least important item is given the value of 1 and the most important item the value of 5. Consequently, a high value implies importance and a low value non-importance as perceived by the respondents. The Cronbach's alpha coefficients of reliability are calculated for the items in the questionnaire as shown in Table 5.20. The cut-off point of 0.70 is considered the benchmark.

Table 5.20: Reliability coefficients

Variable	Number of items	Cronbach's alpha	
		Yemen	Malaysia
Project success criteria	4	0.8952	0.9494
Project cost	15	0.8535	0.9395
Project time	15	0.8956	0.9499
Project quality	15	0.9381	0.9457
Project success factors	21	0.9616	0.9646

As shown in Table 5.20, all the items have alpha coefficients greater than 0.70. Therefore, the data sets are consistent and reflect the reliability and validity of the comparisons and assessments made.

5.4. PROJECT SUCCESS CRITERIA

The three project success criteria, namely, cost, time, and quality, are considered. The respondents are asked to rank the importance of the three success criteria, and the means of these values are then computed. The result, which is shown in Table 5.21, reveals that respondents in Yemen and Malaysia agree on the order of importance of the success criteria. Quality comes first, then time, and last is cost. The mean scores are also shown in the same table.

Table 5.21: Importance of the success criteria

Rank	Criteria	Mean score	
		Yemen	Malaysia
1	Quality	4.2833	4.0667
2	Time	3.6833	3.9667
3	Cost	3.5500	3.9166

Table 5.22 shows the detailed evaluation and mean scores of the descriptions of each success criterion. The mean scores of each description of success criteria are computed. With regard to the quality criterion, the most important description for the Yemeni project is *completed according to the required specification, drawings, etc.* followed by *good workmanship and minimum defects* then *minimum scope change.* The most

important description for the project in Malaysia is *good workmanship and minimum defects* followed by *completed according to the required specification, drawings, etc.* then *minimum scope change*. In terms of time, *completed on or before the date of completion* is the most important description for the project in Yemen followed by *delays rectified* then *minimum extension of time*. *Completed on or before the date of completion* is the most important description for the project in Malaysia followed by *minimum extension of time* then *delays rectified*. In terms of cost, the projects in Yemen and Malaysia have the same ranking of descriptions with *completed as budgeted* ranking first, *minimum variations* ranking second, and *minimum delay fines* ranking third.

Table 5.22: Mean scores of each description of success criteria

Rank	Criteria / Description	Mean score	
		Yemen	Malaysia
1	Quality		
	Complete as the required specification, drawings etc.	4.0833	3.9667
	Good workmanship and minimum defects.	3.9833	4.0500
	Minimum scope change.	3.4833	3.6667
2	Time		
	Complete on or before date of completion.	3.7167	3.9000
	Delays rectified.	3.6000	3.5500
	Minimum extension of time.	3.3833	3.6000
3	Cost		
	Complete as budgeted.	3.5500	3.8167
	Minimum variations.	3.4333	3.6667
	Minimum delay fines.	3.2667	3.5667

An additional set of questions is included in the questionnaire to determine the importance of the reasons affecting the success criteria. Table 5.23 indicates the mean scores of the reasons affecting the success criteria for Yemen and Malaysia.

Table 5.23: Mean scores of reasons affecting the success criteria

Rank	Criteria / Reasons affecting	Mean score	
		Yemen	Malaysia
1	Quality		
	Stakeholders' requirements.	3.4667	3.6167
	Choosing the right consultant & construction company.	4.0167	3.8333
	Specifications of the project.	3.6500	3.6167
	Quality of materials.	3.7500	3.6167
	Labor skills.	3.9000	3.7667
	Cost overruns in the project.	3.3500	3.7000
	Exceeding the period of the project.	3.2833	3.6667
2	Time		
	Time for preparing designs and drawings.	2.8667	3.5000
	Time for the project's tender.	2.8667	3.4333
	Time for construction.	3.4833	3.8500
	Time for finishing works.	3.5667	3.9333
	Labor working hours.	3.5333	3.7167
	Cost overruns in the project.	3.6000	3.7833
	Level of quality required for the project.	3.7000	3.8500
3	Cost		
	Cost of designs and drawings.	2.6167	3.6500
	Cost of materials.	3.6167	3.8333
	Cost of construction and structure elements.	3.3333	3.6667
	Cost of finishing works.	3.4167	3.6500
	Cost of labor.	3.1833	3.6167
	Exceeding the period of the project.	3.4667	3.6667
	Level of quality required for the project.	3.5833	3.6500

Given that project success is essential in this research, another set of questions is included in the questionnaire to determine the importance of the success factors for each success criterion. Table 5.24 shows the mean scores of the success factors for each success criterion for Yemen and Malaysia.

Table 5.24: Mean scores of success factors for each success criterion

Rank	Criteria / Factors	Mean score	
		Yemen	Malaysia
1	Quality		
	Human Management.	3.9500	3.8167
	Management Process.	3.9000	3.9333
	Organization.	3.8167	3.7833
	Contractual and Technical.	3.5667	3.9333
2	Time		
	Human Management.	3.7167	3.8667
	Management Process.	4.0000	4.0167
	Organization.	3.6833	3.9000
	Contractual and Technical.	3.5000	3.9167
3	Cost		
	Human Management.	3.7833	3.8500
	Management Process.	3.8667	4.0333
	Organization.	3.5667	3.6667
	Contractual and Technical.	3.4333	3.8167

5.5. PROJECT SUCCESS FACTORS

Aside from the project success criteria, the questionnaire also addresses the project success factors. The respondents are required to rank the importance of the success factors, and the means of these values are then computed. The result, which is shown in Table 5.25, reveals that respondents in Yemen and Malaysia agree on the ranking of the success factors. *Management process* comes first followed by *human management* then *contractual and technical*. The last is *organization.* The mean scores are also shown in the same table.

Table 5.25: Ranking of the success factors in general

Rank	Success factors groups	Average mean score	
		Yemen	Malaysia
1	Management Process	3.9375	3.9333
2	Human Management	3.8027	3.8888
3	Contractual and Technical	3.7624	3.7833
4	Organization	3.5638	3.6444

Table 5.26 shows the mean scores of individual factors within the factor groups. The mean scores of each individual factor within the success factor groups are computed. In the *management process* group, the most important factor for Yemen is *planning* followed by *monitoring and control*, *scheduling*, then *risk management*. The most important factor for Malaysia is *monitoring and control* followed by *scheduling*, *planning*, then *risk management*. In the *human management* group, *team and leadership* is the most important factor for Yemen followed by *project manager*, *performance, effectiveness, and efficiency*, *attitude, behavior, and commitment*, *stakeholder management*, then *communication*. *Team and leadership* is the most important factor for Malaysia followed by *performance, effectiveness, and efficiency*, *project manager*, *communication*, *attitude, behavior, and commitment*, then *stakeholder management*. In the *contractual and technical* group, the most important factor for Yemen is *consultant and contractor* followed by *technical*, *innovation*, then *contracting and procurement*. The most important factor for Malaysia is *technical* followed by *consultant and contractor*, *contracting and procurement*, then *innovation*. In the *organization* group, *resources* is the most important factor for Yemen followed by *learning organization*, *organization structure*, *policy and strategy*, *culture*, then *external environment*. *Resources* is the most important factor for Malaysia followed by *policy and strategy*, *organization structure*, *external environment*, *learning organization*, then *culture*.

Table 5.26: Mean scores of individual factors within the factor groups

Rank	Success factors	Mean score	
		Yemen	Malaysia
1	Management Process		
	Monitoring and control.	3.9167	4.0500
	Planning.	4.3000	3.9667
	Scheduling.	3.8667	3.9833
	Risk management.	3.6667	3.7333
2	Human Management		
	Attitude, behavior and commitment.	3.7000	3.8333
	Communication.	3.5833	3.9000

Table 5.26, continued

	Performance, effectiveness and efficiency.	3.8000	3.9333
	Project manager.	4.0000	3.9167
	Team and leadership.	4.1000	4.0833
	Stakeholder management.	3.6333	3.6667
3	Contractual and Technical		
	Contracting and procurement.	3.7000	3.7167
	Consultant and contractor.	3.8333	3.8333
	Innovation.	3.7333	3.6500
	Technical.	3.7833	3.9333
4	Organization		
	Organization structure.	3.7000	3.6000
	Resources (Financial resources).	4.0500	3.8833
	Learning organization.	3.8500	3.5500
	Policy and strategy.	3.5833	3.7167
	Culture.	3.2500	3.5333
	External environment.	2.9500	3.5833

5.6. PROJECT SUCCESS FACTORS ACCORDING TO PROJECT STAGES

Another set of questions is included in the questionnaire to determine at what stage of the project the success factors are extremely necessary. Tables 5.27 to 5.30 present the frequency and percentage of respondents that classify project success factors according to project stages in Yemen and Malaysia.

Table 5.27 shows that in the *management process* group, 28 respondents (46.7%) in Yemen and 27 respondents (45.0%) in Malaysia selected the construction stage for the factor *monitoring and control*. For *planning*, 24 respondents (40.0%) in Yemen selected the design stage and 27 respondents (45.0%) in Malaysia selected the tender stage. For *scheduling*, 22 respondents (36.7%) in Yemen selected the construction stage and 27 respondents (45.0%) in Malaysia selected the tender stage. For *risk management*, 38 respondents (63.3%) in Yemen selected the construction stage and 28 respondents (46.7%) in Malaysia selected the tender stage.

Table 5.27: Importance of the individual factors of management process according to the project stages

Success factors		Project stages	Yemen		Malaysia	
			Frequency	Percentage	Frequency	Percentage
Management Process	Monitoring and control	Design	4	6.7 %	7	11.7 %
		Tender	18	30.0 %	22	36.7 %
		Construction	28	46.7 %	27	45.0 %
		D & T	0	0.0 %	0	0.0 %
		D & C	4	6.7 %	3	5.0 %
		T & C	5	8.3 %	1	1.7 %
		D & T & C	1	1.7 %	0	0.0 %
	Planning	Design	24	40.0 %	13	21.7 %
		Tender	8	13.3 %	27	45.0 %
		Construction	16	26.7 %	12	20.0 %
		D & T	0	0.0 %	1	1.7 %
		D & C	6	10.0 %	1	1.7 %
		T & C	0	0.0 %	3	5.0 %
		D & T & C	6	10.0 %	3	5.0 %
	Scheduling	Design	14	23.3 %	9	15.0 %
		Tender	16	26.7 %	27	45.0 %
		Construction	22	36.7 %	15	25.0 %
		D & T	0	0.0 %	1	1.7 %
		D & C	4	6.7 %	1	1.7 %
		T & C	0	0.0 %	2	3.3 %
		D & T & C	4	6.7 %	5	8.3 %
	Risk management	Design	4	6.7 %	7	11.7 %
		Tender	14	23.3 %	28	46.7 %
		Construction	38	63.3 %	23	38.3 %
		D & T	0	0.0 %	0	0.0 %
		D & C	1	1.7 %	0	0.0 %
		T & C	0	0.0 %	2	3.3 %
		D & T & C	3	5.0 %	0	0.0 %

Table 5.28 shows that in the *human management* group, 27 respondents (45.0%) in Yemen and 26 respondents (43.3%) in Malaysia selected the construction stage for the factor *attitude, behavior, and commitment*. For *communication*, 31 respondents (51.7%) in Yemen selected the design stage and 26 respondents (43.3%) in Malaysia selected the tender stage. For *performance, effectiveness, and efficiency*, 29 respondents (48.3%) in Yemen and 24 respondents (40.0%) in Malaysia selected the construction stage. For *project manager*, 38 respondents (63.3%) in Yemen and 24 respondents (40.0%) in Malaysia selected the tender stage, and another 24 respondents (40.0%) in Malaysia selected the construction stage. For *team and leadership*, 32 respondents (53.3%) in

Yemen and 25 respondents (41.7%) in Malaysia selected the construction stage. For *stakeholder management*, 28 respondents (46.7%) in Yemen and 32 respondents (53.3%) in Malaysia selected the tender stage.

Table 5.28: Importance of the individual factors of human management according to the project stages

Success factors		Project stages	Yemen		Malaysia	
			Frequency	Percentage	Frequency	Percentage
Human Management	Attitude, behavior and commitment	Design	5	8.3 %	9	15.0 %
		Tender	13	21.7 %	21	35.0 %
		Construction	27	45.0 %	26	43.3 %
		D & T	0	0.0 %	0	0.0 %
		D & C	3	5.0 %	0	0.0 %
		T & C	3	5.0 %	1	1.7 %
		D & T & C	9	15.0 %	3	5.0 %
	Communication	Design	31	51.7 %	7	11.7 %
		Tender	12	20.0 %	26	43.3 %
		Construction	5	8.3 %	22	36.7 %
		D & T	0	0.0 %	1	1.7 %
		D & C	6	10.0 %	1	1.7 %
		T & C	0	0.0 %	2	3.3 %
		D & T & C	6	10.0 %	1	1.7 %
	Performance, effectiveness and efficiency	Design	2	3.3 %	8	13.3 %
		Tender	16	26.7 %	22	36.7 %
		Construction	29	48.3 %	24	40.0 %
		D & T	0	0.0 %	0	0.0 %
		D & C	8	13.3 %	1	1.7 %
		T & C	0	0.0 %	2	3.3 %
		D & T & C	5	8.3 %	3	5.0 %
	Project manager	Design	6	10.0 %	5	8.3 %
		Tender	7	11.7 %	24	40.0 %
		Construction	38	63.3 %	24	40.0 %
		D & T	2	3.3 %	0	0.0 %
		D & C	3	5.0 %	3	5.0 %
		T & C	1	1.7 %	4	6.7 %
		D & T & C	3	5.0 %	0	0.0 %
	Team and leadership	Design	7	11.7 %	5	8.3 %
		Tender	9	15.0 %	21	35.0 %
		Construction	32	53.3 %	25	41.7 %
		D & T	0	0.0 %	0	0.0 %
		D & C	10	16.7 %	5	8.3 %
		T & C	0	0.0 %	3	5.0 %
		D & T & C	2	3.3 %	1	1.7 %
	Stakeholder management	Design	2	3.3 %	4	6.7 %
		Tender	28	46.7 %	32	53.3 %
		Construction	20	33.3 %	19	31.7 %
		D & T	1	1.7 %	1	1.7 %
		D & C	3	5.0 %	2	3.3 %
		T & C	1	1.7 %	2	3.3 %
		D & T & C	5	8.3 %	0	0.0 %

Table 5.29 shows that in the *contractual and technical* group, 30 respondents (50.0%) in Yemen and 34 respondents (56.7%) in Malaysia selected the tender stage for the factor *contracting and procurement*. For *consultant and contractor*, 26 respondents (43.3%) in Yemen selected the construction stage and 26 respondents (43.3%) in Malaysia selected the tender stage. For *innovation*, 27 respondents (45.0%) in Yemen selected the design stage and 30 respondents (50.0%) in Malaysia selected the tender stage. For *technical*, 19 respondents (31.7%) in Yemen selected the construction stage and 22 respondents (36.7%) in Malaysia selected the tender stage.

Table 5.29: Importance of the individual factors of contractual and technical according to the project stages

Success factors		**Project stages**	**Yemen**		**Malaysia**	
			Frequency	**Percentage**	**Frequency**	**Percentage**
Contractual and Technical	Contracting and procurement	Design	5	8.3 %	5	8.3 %
		Tender	30	50.0 %	34	56.7 %
		Construction	16	26.7 %	16	26.7 %
		D & T	0	0.0 %	1	1.7 %
		D & C	0	0.0 %	0	0.0 %
		T & C	4	6.7 %	4	6.7 %
		D & T & C	5	8.3 %	0	0.0 %
	Consultant and contractor	Design	7	11.7 %	12	20.0 %
		Tender	14	23.3 %	26	43.3 %
		Construction	26	43.3 %	15	25.0 %
		D & T	0	0.0 %	0	0.0 %
		D & C	10	16.7 %	1	1.7 %
		T & C	0	0.0 %	5	8.3 %
		D & T & C	3	5.0 %	1	1.7 %
	Innovation	Design	27	45.0 %	14	23.3 %
		Tender	16	26.7 %	30	50.0 %
		Construction	6	10.0 %	11	18.3 %
		D & T	0	0.0 %	0	0.0 %
		D & C	8	13.3 %	1	1.7 %
		T & C	0	0.0 %	3	5.0 %
		D & T & C	3	5.0 %	1	1.7 %
	Technical	Design	14	23.3 %	15	25.0 %
		Tender	17	28.3 %	22	36.7 %
		Construction	19	31.7 %	15	25.0 %
		D & T	0	0.0 %	0	0.0 %
		D & C	5	8.3 %	2	3.3 %
		T & C	0	0.0 %	5	8.3 %
		D & T & C	5	8.3 %	1	1.7 %

Table 5.30 shows that in the *organization* group, 23 respondents (38.3%) in Yemen selected the construction stage and 25 respondents (41.7%) in Malaysia selected the tender stage for the factor *organization structure*. For *resources*, 25 respondents (41.7%) in Yemen selected the construction stage and 33 respondents (55.0%) in Malaysia selected the tender stage. For *learning organization*, 23 respondents (38.3%) in Yemen selected the design stage and 28 respondents (46.7%) in Malaysia selected the tender stage. For *policy and strategy*, 26 respondents (43.3%) in Yemen and 32 respondents (53.3%) in Malaysia selected the tender stage. For *culture*, 21 respondents (35.0%) in Yemen and 25 respondents (41.7%) in Malaysia selected the tender stage. For *external environment*, 23 respondents (38.3%) in Yemen selected the construction stage and 26 respondents (43.3%) in Malaysia selected the tender stage.

Table 5.30: Importance of the individual factors of organization according to the project stages

Success factors		Project stages	Yemen		Malaysia	
			Frequency	Percentage	Frequency	Percentage
Organization	Organization structure	Design	12	20.0 %	10	16.7 %
		Tender	20	33.3 %	25	41.7 %
		Construction	23	38.3 %	20	33.3 %
		D & T	0	0.0 %	0	0.0 %
		D & C	0	0.0 %	2	3.3 %
		T & C	0	0.0 %	3	5.0 %
		D & T & C	5	8.3 %	0	0.0 %
	Resources (Financial resources)	Design	9	15.0 %	3	5.0 %
		Tender	16	26.7 %	33	55.0 %
		Construction	25	41.7 %	22	36.7 %
		D & T	0	0.0 %	0	0.0 %
		D & C	3	5.0 %	1	1.7 %
		T & C	3	5.0 %	1	1.7 %
		D & T & C	4	6.7 %	0	0.0 %
	Learning organization	Design	23	38.3 %	6	10.0 %
		Tender	18	30.0 %	28	46.7 %
		Construction	6	10.0 %	20	33.3 %
		D & T	2	3.3 %	0	0.0 %
		D & C	6	10.0 %	3	5.0 %
		T & C	0	0.0 %	2	3.3 %
		D & T & C	5	8.3 %	1	1.7 %
	Policy and strategy	Design	13	21.7 %	6	10.0 %
		Tender	26	43.3 %	32	53.3 %
		Construction	10	16.7 %	12	20.0 %
		D & T	2	3.3 %	5	8.3 %

Table 5.30, continued

		D & C	2	3.3 %	1	1.7 %
		T & C	4	6.7 %	4	6.7 %
		D & T & C	3	5.0 %	0	0.0 %
	Culture	Design	20	33.3 %	10	16.7 %
		Tender	21	35.0 %	25	41.7 %
		Construction	6	10.0 %	18	30.0 %
		D & T	1	1.7 %	0	0.0 %
		D & C	4	6.7 %	3	5.0 %
		T & C	1	1.7 %	2	3.3 %
		D & T & C	7	11.7 %	2	3.3 %
	External environment	Design	15	25.0 %	4	6.7 %
		Tender	16	26.7 %	26	43.3 %
		Construction	23	38.3 %	23	38.3 %
		D & T	0	0.0 %	4	6.7 %
		D & C	3	5.0 %	2	3.3 %
		T & C	2	3.3 %	0	0.0 %
		D & T & C	1	1.7 %	1	1.7 %

5.7. RELATIONSHIP OF PROJECT SUCCESS, SUCCESS CRITERIA, AND SUCCESS FACTORS

The correlation coefficients between project success and all other items in the questionnaire are calculated as shown in Table 5.31. The results show that significant relationships exist between project success and all other items in the questionnaire. Project success is highly related to all other items in the questionnaire.

Table 5.31: Relationship between project success and all other items in the questionnaire

Items of project completion	Yemen		Malaysia	
	Pearson correlation	Significant correlation	Pearson correlation	Significant correlation
Project complete within the specified Time	0.775**	High	0.859**	Very High
Project complete within the approved Cost	0.605**	High	0.763**	High
Project complete as the required Quality	0.795**	High	0.744**	High

** Correlation is significant at the 0.01 level (2-tailed).

Further analysis is conducted, and the correlation coefficients between project success criteria (quality) and all other items in the questionnaire are calculated as shown in Table 5.32. The results show that significant relationships exist between project success

criteria (quality) and all other items in the questionnaire. The project success criteria (quality) are highly related to all other items in the questionnaire.

Table 5.32: Relationship between success criteria (quality) and all other items in the questionnaire

Items of project quality	Yemen		Malaysia	
	Pearson correlation	**Significant correlation**	**Pearson correlation**	**Significant correlation**
Complete as the required specification, drawings etc.	0.842**	Very High	0.768**	High
Good workmanship and minimum defects	0.785**	High	0.699**	High
Minimum scope change	0.472**	High	0.662**	High
Stakeholders requirements	0.399**	High	0.479**	High
Choosing the right consultant and construction company	0.715**	High	0.589**	High
Specifications of the project	0.677**	High	0.503**	High
Quality of materials	0.693**	High	0.493**	High
Labor skills	0.739**	High	0.622**	High
Cost overruns in the project	0.426**	High	0.544**	High
Exceeding the period of the project	0.341**	High	0.357**	High
Human Management	0.769**	High	0.676**	High
Management Process	0.731**	High	0.720**	High
Organization	0.729**	High	0.652**	High
Contractual and Technical	0.605**	High	0.797**	High

** Correlation is significant at the 0.01 level (2-tailed).

Additional analysis is conducted, and the correlation coefficients between project success criteria (time) and all other items in the questionnaire are calculated as shown in Table 5.33. The results show that significant relationships exist between project success criteria (time) and all other items in the questionnaire. The project success criteria (time) are highly related to all other items in the questionnaire except for *time for preparing designs and drawings* and *time for the project's tender* for Yemen.

Table 5.33: Relationship between success criteria (time) and all other items in the questionnaire

Items of project time	Yemen		Malaysia	
	Pearson correlation	Significant correlation	Pearson correlation	Significant correlation
Complete on or before date of completion	0.740**	High	0.753**	High
Delays rectified	0.715**	High	0.564**	High
Minimum extension of time	0.437**	High	0.608**	High
Time for preparing designs and drawings	0.152	None	0.644**	High
Time for the project's tender	0.102	None	0.507**	High
Time for construction	0.707**	High	0.855**	Very High
Time for finishing works	0.577**	High	0.800**	Very High
Labor working hours	0.553**	High	0.699**	High
Cost overruns in the project	0.665**	High	0.607**	High
Level of quality required for the project	0.544**	High	0.733**	High
Human Management	0.749**	High	0.821**	Very High
Management Process	0.745**	High	0.741**	High
Organization	0.691**	High	0.833**	Very High
Contractual and Technical	0.483**	High	0.787**	High

** Correlation is significant at the 0.01 level (2-tailed).

Another analysis is conducted, and the correlation coefficients between project success criteria (cost) and all other items in the questionnaire are calculated as shown in Table 5.34. The results show that significant relationships exist between project success criteria (cost) and all other items in the questionnaire. Project success criteria (cost) are highly related to all other items in the questionnaire except for *cost of construction and structure elements* and *cost of labor* for Yemen.

Table 5.34: Relationship between success criteria (cost) and all other items in the questionnaire

Items of project cost	Yemen		Malaysia	
	Pearson correlation	Significant correlation	Pearson correlation	Significant correlation
Complete as budgeted	0.578**	High	0.839**	Very High
Minimum variations	0.472**	High	0.653**	High
Minimum delay fines	0.459**	High	0.672**	High
Cost of designs and drawings	-0.370**	High	0.477**	High
Cost of materials	0.479**	High	0.702**	High
Cost of construction and structure elements	0.301*	Low	0.621**	High
Cost of finishing works	0.475**	High	0.616**	High

Table 5.34, continued

Cost of labor	0.245	None	0.671**	High
Exceeding the period of the project	0.611**	High	0.498**	High
Level of quality required for the project	0.504**	High	0.392**	High
Human Management	0.705**	High	0.824**	Very High
Management Process	0.767**	High	0.823**	Very High
Organization	0.633**	High	0.781**	High
Contractual and Technical	0.434**	High	0.829**	Very High

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

One more analysis is conducted, and the correlation coefficients between project success factors and all other items in the questionnaire are calculated as shown in Table 5.35. The results show that significant relationships exist between project success factors and all other items in the questionnaire. The project success factors are highly related to all other items in the questionnaire.

Table 5.35: Relationship between project success factors and all other items in the questionnaire

Items of project success	**Yemen**		**Malaysia**	
	Pearson correlation	**Significant correlation**	**Pearson correlation**	**Significant correlation**
Attitude, behavior and commitment	0.785**	High	0.535**	High
Communication	0.683**	High	0.663**	High
Performance, effectiveness and efficiency	0.844**	Very High	0.705**	High
Project manager	0.860**	Very High	0.662**	High
Team and leadership	0.822**	Very High	0.731**	High
Stakeholder management	0.601**	High	0.488**	High
Monitoring and control	0.789**	High	0.747**	High
Planning	0.808**	Very High	0.624**	High
Scheduling	0.782**	High	0.700**	High
Risk management	0.567**	High	0.550**	High
Organization structure	0.711**	High	0.662**	High
Resources (Financial resources)	0.753**	High	0.777**	High
Learning organization	0.507**	High	0.577**	High
Policy and strategy	0.571**	High	0.576**	High
Culture	0.342**	High	0.493**	High
External environment	0.396**	High	0.577**	High
Contracting and procurement	0.664**	High	0.697**	High
Consultant and contractor	0.814**	Very High	0.711**	High
Innovation	0.590**	High	0.530**	High
Technical	0.784**	High	0.711**	High

** Correlation is significant at the 0.01 level (2-tailed).

5.8. PROJECT FAILURE FACTORS

Tables 5.36 and 5.37, show the frequencies of project failure factors for Yemen and Malaysia, respectively. The frequencies for each individual factor in the failure factor groups are computed.

In the *management process* group, the most important failure factor for Yemen is *lack of planning* followed by *lack of scheduling (delays)*, *lack of monitoring and control*, *cost overruns*, *insufficient quality*, then *modifications*. The most important failure factors for Malaysia are *lack of scheduling (delays)* and *cost overruns* followed by *lack of planning* and *insufficient quality*, then *lack of monitoring and control*.

In the *human management* group, *inefficiency of the project manager* is the most important failure factor for Yemen followed by *inefficiency of performance, lack of qualified team and leadership, lack of communication*, *improper attitude and behavior* and *lack of commitment*, then *stakeholder mismanagement*. *Lack of communication* is the most important failure factor for Malaysia followed by *inefficiency of the project manager* then *stakeholder 'mismanagement*.

In the *contractual and technical* group, the most important failure factor for Yemen is *inefficiency of the consultant and contractor* followed by *adverse selection of consultant and contractor*, *lack of quality in building materials and implementation* and *lack of modern technical equipment, mechanisms, etc.*, *unstable prices of construction materials*, *lack of clarity in the contract*, then *lack of innovation*. No failure factors are found in the *contractual and technical* group for Malaysia.

In the *organization* group, *inadequate resourcing or lack of funding* is the most important failure factor for Yemen followed by *ignorance of laws and regulations*, *instability because of lower market prices of the Yemeni Rial against foreign currencies* and *delays in paying financial dues, lack of specifications and conditions*, *unstable*

country (crises and wars) and *corruption of organization*, *inappropriate location of the project*, *emergence of new construction work*, *failure to provide infrastructure* and *security in the workplace*, then *unexpected obstacles* and *obstacles and difficulties*. *Authority approval delays* is the most important failure factor for Malaysia followed by *accidents*.

Table 5.36: Project failure factors for Yemen

Yemen	**Project failure factors**			
(Number of frequency)	Management Process	Human Management	Contractual and Technical	Organization
	Lack of planning (23)	Inefficiency of the project manager (21)	Adverse selection of consultant and contractor (14)	Inadequate resourcing or lack of funding (17)
	Lack of monitoring and control (9)	Lack of qualified team and leadership (13)	Inefficiency of consultant and contractor (15)	Lack of specifications and conditions (4)
	Lack of scheduling (delays) (18)	Inefficiency of performance (20)	Lack of quality in building materials and implementation (5)	Ignorance of laws and regulations (5)
	Cost overruns (6)	Lack of Communication (12)	Lack of clarity in the contract (2)	The emergence of new construction works (1)
	Insufficient quality (4)	Improper attitude and behavior, and lack of commitment (9)	Instable prices of construction materials (4)	Instability due to lower market prices of Yemeni Rial against foreign currencies (5)
	Modifications (1)	Stakeholder mismanagement (3)	Lack of modern technical (Equipment - mechanisms, etc.) (5)	Unstable country (Crises and wars) (3)
	----------	----------	Lack of innovation (1)	Delays paying financial dues (5)
	----------	----------	----------	Corruption of organization (3)
	----------	----------	----------	Failure to provide infrastructure and security in the workplace (1)
	----------	----------	----------	Unexpected obstacles (1)
	----------	----------	----------	Inappropriate location of the project (2)
	----------	----------	----------	Obstacles and difficulties (1)

Table 5.37: Project failure factors for Malaysia

Malaysia	Project failure factors			
(Number of frequency)	Management Process	Human Management	Contractual and Technical	Organization
	Lack of planning (2)	Inefficiency of the project manager (2)	----------	Authority approval delays (2)
	Lack of monitoring and control (1)	Lack of Communication (12)	----------	Accidents (1)
	Lack of scheduling (delays) (5)	Stakeholder mismanagement (1)	----------	----------
	Cost overruns (5)	----------	----------	----------
	Insufficient quality (2)	----------	----------	----------

5.9. SUMMARY

Chapter 5 presented the questionnaire utilized in this research. The first part of this chapter presents the respondents' background. The project success criteria and project success factors are then discussed, adopted in the project stages, and ranked based on importance. The questionnaire was analyzed with SPSS.

Table 5.38 shows the ranking of the criteria in Yemen and Malaysia. Table 5.39 shows the ranking of the descriptions of success criteria.

Table 5.38: Importance of success criteria

Rank	Criteria	Ranking	
		Yemen	Malaysia
1	Quality	1	1
2	Time	2	2
3	Cost	3	3

Table 5.39: Ranking of the descriptions of success criteria

Rank	Criteria / Description	Ranking	
		Yemen	Malaysia
1	Quality		
	Complete as the required specification, drawings etc.	1	2
	Good workmanship and minimum defects.	2	1
	Minimum scope change.	3	3
2	Time		
	Complete on or before date of completion.	1	1
	Delays rectified.	2	3
	Minimum extension of time.	3	2
3	Cost		
	Complete as budgeted.	1	1
	Minimum variations.	2	2
	Minimum delay fines.	3	3

The ranking of the reasons affecting success criteria is shown in Table 5.40. The correlation between success factors and success criteria is shown in Table 5.41.

Table 5.40: Ranking of the reasons affecting success criteria

Rank	Criteria / Reasons affecting	Ranking	
		Yemen	Malaysia
1	Quality		
	Stakeholders' requirements.	5	5
	Choosing the right consultant & construction company.	1	1
	Specifications of the project.	4	5
	Quality of materials.	3	5
	Labor skills.	2	2
	Cost overruns in the project.	6	3
	Exceeding the period of the project.	7	4
2	Time		
	Time for preparing designs and drawings.	6	5
	Time for the project's tender.	6	6
	Time for construction.	5	2
	Time for finishing works.	3	1
	Labor working hours.	4	4
	Cost overruns in the project.	2	3
	Level of quality required for the project.	1	2
3	Cost		
	Cost of designs and drawings.	7	4
	Cost of materials.	1	1
	Cost of construction and structure elements.	5	2
	Cost of finishing works.	4	4
	Cost of labor.	6	3
	Exceeding the period of the project.	3	2
	Level of quality required for the project.	2	4

Table 5.41: Ranking of success factors for each success criterion

Rank	Criteria / Factors	Factors ranking	
		Yemen	Malaysia
1	Quality		
	Human Management.	1	2
	Management Process.	2	1
	Organization.	3	3
	Contractual and Technical.	4	1
2	Time		
	Human Management.	2	4
	Management Process.	1	1
	Organization.	3	3
	Contractual and Technical.	4	2
3	Cost		
	Human Management.	2	2
	Management Process.	1	1
	Organization.	3	4
	Contractual and Technical.	4	3

Table 5.42 shows the ranking of success factors in Yemen and Malaysia, and Table 5.43 illustrates the individual success factors within the success factor groups.

Table 5.42: Ranking of the success factors groups

Rank	Success factors groups	Ranking	
		Yemen	Malaysia
1	Management Process	1	1
2	Human Management	2	2
3	Contractual and Technical	3	3
4	Organization	4	4

Table 5.43: Ranking of individual factors within the success factor groups

Rank	Success factors	Factors ranking	
		Yemen	Malaysia
1	Management Process		
	Monitoring and control.	2	1
	Planning.	1	3
	Scheduling.	3	2
	Risk management.	4	4
2	Human Management		
	Attitude, behavior and commitment.	4	5
	Communication.	6	4
	Performance, effectiveness and efficiency.	3	2
	Project manager.	2	3
	Team and leadership.	1	1
	Stakeholder management.	5	6

Table 5.43, continued

3	Contractual and Technical		
	Contracting and procurement.	4	3
	Consultant and contractor.	1	2
	Innovation.	3	4
	Technical.	2	1
4	Organization		
	Organization structure.	3	3
	Resources (Financial resources).	1	1
	Learning organization.	2	5
	Policy and strategy.	4	2
	Culture.	5	6
	External environment.	6	4

Project stage, which is most important for the project success factors, is shown in Table 5.44.

Table 5.44: Project success factors according to project stages

Success factors	**Project stages**	
	Yemen	**Malaysia**
Management Process		
Monitoring and control.	Construction	Construction
Planning.	Design	Tender
Scheduling.	Construction	Tender
Risk management.	Construction	Tender
Human Management		
Attitude, behavior and commitment.	Construction	Construction
Communication.	Design	Tender
Performance, effectiveness and efficiency.	Construction	Construction
Project manager.	Construction	T & C
Team and leadership.	Construction	Construction
Stakeholder management.	Tender	Tender
Contractual and Technical		
Contracting and procurement.	Tender	Tender
Consultant and contractor.	Construction	Tender
Innovation.	Design	Tender
Technical.	Construction	Tender
Organization		
Organization structure.	Construction	Tender
Resources (Financial resources).	Construction	Tender
Learning organization.	Design	Tender
Policy and strategy.	Tender	Tender
Culture.	Tender	Tender
External environment.	Construction	Tender

The following chapter presents the conclusions and recommendations of this study.

CHAPTER 6

CONCLUSION

6.1. INTRODUCTION

The primary concerns of this research are the problems experienced by project management in Yemen from the beginning of the project to its end. The core of this research is the comparison of the Yemeni and Malaysian approach in project management. The main objective is to provide guidelines in project implementation in Yemen and contribute to the country's policy on project management.

This chapter presents the conclusion based on the findings of the study in relation to the research questions and objectives. Recommendations for architectural project implementation in Yemen are also provided.

6.2. EVALUATING THE FINDINGS OF THE STUDY

The construction industry has a significant effect on a country's economy because of the former's massive consumption of resources. A developing country would not finish the development process unless it balances the inputs and outputs of its construction industry. Project implementation in any country can be improved by controlling energy, building materials, money, and time, thereby leading to economic growth in the country.

According to the respondents, Fieldwork in Yemen revealed that professionals involved in project implementation can develop the construction industry if subjected to strict regulations. Moreover, the majority of respondents claim that the problem in Yemen is not the lack of regulations but the failure of law enforcement officers to apply these regulations. The solution to this problem depends on the strategy or policies of the country as well as its inherited culture and the ethical standards in its society.

Fieldwork in Malaysia revealed that the construction professionals in this country are different from those in Yemen in terms of attitude, commitment, innovation, and policies. Working time in Malaysia is respected as well as specialty; everyone has a specific job to do at a precise time. Fieldwork also showed that qualification and technical education are important in project implementation in Malaysia.

The following four questions were answered in this research.

1. How do Yemen and Malaysia implement architectural projects?
2. How criteria are considered in determining time, cost, and quality?
3. What constitutes project success and failure?
4. What project management approach is suitable for project management in Yemen?

Each of the four objectives of this research is related to one of the questions above. Therefore, the objectives of this research are as follows:

1. To explore the process and project implementation in Yemen and Malaysia.
2. To evaluate the criteria for time, cost, and quality determination.
3. To identify the success and failure factors of projects.
4. To provide guidelines for project implementation in Yemen.

The case study is chosen to achieve the first objective, while the structured questionnaire is selected to reach the second and the third objectives. However, the fourth objective is realized by providing guidelines for project implementation in Yemen. The findings of the objectives are concluded as follow:

6.2.1. OBJECTIVE NO. 1: TO EXPLORE THE PROCESS AND PROJECT IMPLEMENTATION IN YEMEN AND MALAYSIA

Comparative analysis of the two case studies indicated that the cost of design and construction in Yemen is extremely low compared with Malaysia. A significant difference was also observed in the rates of consultants, labor cost, and the cost of building materials because (i) the external costs of the project in Malaysia are extremely high owing to the climate and environment, (ii) the cost of the Malaysian project includes built-in furniture and laboratories, and (iii) the electrical, mechanical, information, and communication equipment are extremely expensive because the Malaysian project is more "high-tech" than the Yemeni project. Nevertheless, a cost overrun occurred in the Yemeni project. This occurrence indicates that cost management in Yemen is lacking. The Malaysian project was completed according to the budget.

Furthermore, the Yemeni project exceeded the set period of implementation, whereas the Malaysian project was finished on schedule. In terms of quality, the Yemeni project fulfilled only 80% of the specified quality, whereas the Malaysian project fulfilled 100%.

The implementing organization responsible for controlling and managing the project stages was the owner (Ministry of Youth and Sports administration) in Yemen and JKR (Ministry of Works) in Malaysia. The supervising authority (individuals from the Ministry of Youth and Sports) in Yemen was paid by the contractor, leading to dishonesty and corruption as well as cost overrun and project period extension. However, JKR and the consultant were responsible for supervising governmental projects in Malaysia. Thus, project implementation was well supervised and efficient.

6.2.2. OBJECTIVE NO. 2: TO EVALUATE THE CRITERIA FOR TIME, COST, AND QUALITY DETERMINATION

Analysis of the project success criteria indicated that the ranking of criteria in Yemen and Malaysia is similar. The ranking order is quality, time and then cost.

A difference in ranking was noticed in terms of the descriptions of the success criteria. In terms of quality, *completed according to the required specifications* was most important for Yemen and *good workmanship* and *minimum defects* for Malaysia. In terms of time, *completed on or before the date of completion* was most important for Yemen and Malaysia. *Completed as budgeted* was most important in terms of cost for both countries.

The ranking of the reasons affecting the success criteria was as follows. In terms of quality, selecting the right consultant and construction company came first for Yemen and Malaysia. In terms of time, the level of quality required for the project was most important for Yemen and time for finishing work for Malaysia. Cost of materials was the leading factor in terms of cost for both countries.

The correlations between the success factors and criteria are as follows. In terms of quality, human management came first for Yemen and management process and contractual and technical for Malaysia. In terms of time, the most important factor group was management process for Yemen and Malaysia. Management process was also the most important factor in cost criteria for both countries, affirming the importance of the management process in project implementation.

6.2.3. OBJECTIVE NO. 3: TO IDENTIFY THE SUCCESS AND FAILURE FACTORS OF PROJECTS

Analysis of the project success factor groups indicates that the ranking of factors in Yemen and Malaysia is similar. The racking order is management process, human management, contractual and technical, and organization. This ranking shows that the importance of the success factors does not differ in the two countries.

A different ranking was observed in terms of the individual factors within the factor groups. For management process, planning ranked first in Yemen and monitoring and control in Malaysia; risk management ranked last in both countries. For human management, the most important factor was team and leadership for both countries; the least important was communication in Yemen and stakeholder management in Malaysia. For technical, consultant and contractor ranked first in Yemen and contractual and technical in Malaysia; contracting and procurement ranked last in Yemen and innovation in Malaysia. For organization, resources (financial resources) ranked first in both countries; external environment ranked last in Yemen and culture for Malaysia.

The project implementation stages are significant in this study; therefore, respondents were requested to assign each project success factor to a project stage where the factor is deemed most important. Most success factors were allocated to the construction stage in Yemen. However, most success factors were assigned to the tender stage in Malaysia. This result shows that in the Malaysian approach in project management, project control is exerted in the tender stage. In the Yemeni approach, project control is exerted in the construction stage (last stage), thus highlighting the disadvantage of the Yemeni approach.

The project failure factors for Yemen and Malaysia were in the following order. In the management process group, the most important factor for Yemen was lack of planning followed by lack of scheduling (delays), lack of monitoring and control, cost overruns,

insufficient quality, then modifications. The most important factors for Malaysia were lack of scheduling (delays) and cost overruns followed by lack of planning and insufficient quality then lack of monitoring and control.

In the human management group, inefficiency of the project manager was the most important factor for Yemen followed by inefficiency of performance, lack of qualified team and leadership, lack of communication, improper attitude and behavior, lack of commitment, then stakeholder mismanagement. Lack of communication was the most important factor for Malaysia followed by inefficiency of the project manager then stakeholder mismanagement.

In the contractual and technical group, the most important factor for Yemen was inefficiency of the consultant and contractor followed by adverse selection of consultant and contractor, lack of quality in building materials and implementation and lack of modern technical equipment, mechanisms, etc., unstable prices of construction materials, lack of clarity in the contract, then lack of innovation. No failure factors were observed in the contractual and technical group for Malaysia.

In the organization group, inadequate resource or lack of funding was the most important factor for Yemen followed by ignorance of laws and regulations, instability due to the lower market value of the Yemeni Rial against foreign currencies and delays in paying financial dues, lack of specifications and conditions, unstable country (crises and wars) and corruption of organization, inappropriate location of the project, then emergence of new construction work, failure to provide infrastructure and security in the workplace, unexpected obstacles, and obstacles and difficulties. Authority approval delays is the most important factor for Malaysia followed by accidents.

6.2.4. OBJECTIVE NO. 4: TO PROVIDE GUIDELINES FOR PROJECT IMPLEMENTATION IN YEMEN

The findings and analyses in this research proved that the implementation of architectural projects in Yemen is inadequate. Consequently, recommendations for project implementation in Yemen are provided as follows:

- The scope and objectives of the project must be determined at the beginning and must not change dramatically.
- A government agency (e.g., Ministry of Works) must play a role in project implementation.
- Planning in the construction industry must be performed by organizations, not individuals.
- Cost standards must be assigned as construction industry policies to determine design and construction fees based on precise criteria.
- Time must be controlled in a professional manner, and delay penalties must be enforced.
- Technical education and a diploma must be required to increase the level of quality and efficiency.
- An organization must screen architects and engineers and train them to become expert project managers.
- Commitment must be exhibited in every stage of the project by all individuals related to project implementation.
- Corruption in the organization must be eliminated.
- Supervision must be performed by the consultant and paid by the stockholder or the Ministry of Works, not by the contractor.
- Modern technical equipment and mechanisms must be utilized during project implementation.
- Laws and regulations for construction must be strictly enforced.

- Payment of financial dues must be scheduled and organized and must not depend on the mood and connections of individuals.
- Infrastructure and security must be considered essential in the workplace of the project.
- The government must develop regulations to control the relationship among the stockholder, consultant, and contractor of the project.
- The government must develop a national code or standard and national technical specifications for construction.

6.3. PROBLEMS ENCOUNTERED

The problem encountered in this research was the unavailability of case studies because only one project in Yemen was completed during the research. The researcher was granted access to the project's data and was aware of the political situation in Yemen at that time. The respondents of the questionnaire were professionals involved in the implementation of the case study projects (designers, contractors, and officials) in Yemen and Malaysia.

6.4. SIGNIFICANCE OF THE STUDY

The significant success criteria were evaluated in this study, and the critical success factors required to ensure project success were identified. This research helps change the manner architectural projects are implemented in Yemen to conserve time, money, and natural resources.

6.5. RECOMMENDATIONS

The findings of this research highlight the problems in project implementation in Yemen in terms of project success criteria, project success factors, and project failure factors. The findings also provide guidelines for project implementation in Yemen.

Future studies are needed to conduct further analysis in determining and identifying critical criteria and factors of project implementation in Yemen. This can be achieved by studying other case studies to verify the outcome of this research. Future research on project implementation in Yemen should be conducted with different perspectives other than the one adopted in this research.

Comprehensive research on cost management and time management, which are tremendous failures according to the findings of this research, could also be conducted in the future. Future studies could also consider human management and organization as factors of project success. Lastly, the influence of ethics and community on project management could be investigated further.

REFERENCES

Ahadzie, D. K. (2007). *A model for predicting the performance of project managers in mass house building projects in Ghana,* PhD thesis, University of Wolverhampton: Wolverhampton, UK.

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

Al-Sabahi, H. (1994). *The architectural transformations of housing patterns of the city of Sana'a – Yemen,* Ph.D. thesis, Architectural Association School of Architecture: London, UK.

Al-Tmeemy, S. M., Abdul-Rahman, H. and Harun, Z. (2011). Future criteria for success of building projects in Malaysia. *International Journal of Project Management*, 29(3), 337–348.

Anderson, D. K. and Merna, A. (2003). Project management strategy-project management represented as a process based set of management domains and the consequences for project management strategy. *International Journal of Project Management*, 21(7), 387–393.

Artto, K., Kujala, J., Dietrich, P. and Martinsuo, M. (2007). What is project strategy? *International Journal of Project Management*, 26(1), 4–12.

Avots, I. (1969). Why does project management fail? *California Management Review*, 24(4), 77–88.

Babbie, E. R. (2013). *The practice of social research* (12th ed.). Cengage Learning.

Badir, Y., Kadir, M. and Hashim, A. (2002). Industrialized building systems Construction in Malaysia. *Journal of Architectural Engineering*, 8(1), 19–23.

Belassi, W. and Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management*, 14(3), 141–151.

Bennett, J., Flanagan, R., Goodacre, P., Gray, C., McLaugblin, N. and Norman, G. (1979). *UK and US Construction Industries: A Comparison of Design and Contract Procedures.*UK: Surveyors Publications.

Biggam, J. (2008). *Succeeding with your master's dissertation.* Berkshire: McGraw-Hill.

Bryman, A. (2004). *Social research methods.* (2nd ed.). New York: Oxford University Press.

Central Statistical Organization, CSO. (2009). *The statistical annual book,* Yemen.

Chan, A. P. C., Scott, D. and Chan, P. L. (2004). Factors affecting the success of a construction project. *Journal of Construction Engineering and Management,* 130(1), 153–155.

Chan, A., Chan, D. and Ho, K. (2003). An empirical study of the benefits of construction partnering in Hong Kong. *Construction Management and Economics,* 21(5), 523–533.

Chan, A.P.C. (2001). Time-cost relationship of public sector projects in Malaysia. *International Journal of Project Management,* 19(4), 223-229.

Chan, D. W., & Kumaraswamy, M. M. (1997). A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of project management*, 15(1), 55-63.

Cohen, L. and Manion, L. (1995). *Research methods in education.* London: Routledge.

Construction Industry Development Board Malaysia, CIDB, (2008). *Construction Statistics, Kula Lumpur.* Malaysia.

Crawford, L. H. (2000). *Project management competence: the value of standards,* Ph.D. thesis, Henley Management College, Brunel University: London, UK.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. (2nd ed.). Sage.

Department of Statistics Malaysia, DS. (2010). *The official website of department of statistics.* [online]. Retrieved 15 November 2010, from www.statistics.gov.my.

Dobson, M. and Feickert, H. (2007). *The six dimensions of project management: turning constraints into resources.* Vienna: Management Concepts.

Duncan, G. L. and Gorsha, R. A. (1983). Project management: A major factor in project success. *Power Apparatus and Systems, IEEE Transactions on, 102(11),* 3701–3705.

Edum-Fotwe, F. T. and McCaffer, R. (2000). Developing project management competency: perspectives from the construction industry. *International Journal of Project Management,* 18(2), 111–124.

Edwards, A. and Talbot, R. (1999). *The hard-pressed researcher: A research handbook for the caring professions.* London and New York: Longman.

Egan, J. (1998). *Rethinking Construction.* Department of the Environment, Transport and the Regions. London.

Eriksson, P. E. and Westerberg, M. (2011). Effects of cooperative procurement procedures on construction project performance: A conceptual framework. *International Journal of Project Management,* 29(2), 197–208.

Evans M. (2005). Overdue and over budget, over and over again. *The Economist.*7, 55.

Flanagan, R., Norman, G., Ireland, V. and Ormerod, *R.* (1986). *A Fresh Look at the UK and US Construction Industry.*UK: Building Employers Confederation.

Frank, T. (2002). *The superior project manager.* New York: Marcel Dekker.

Google Earth, (2010). Software online system.

Hammer M. and Champy J. (2003). *Reengineering the corporation: a manifesto for business revolution.* New York: Harper Collins.

Helms, J. E., Henze, K. T., Sass, T. L., & Mifsud, V. A. (2006). Treating Cronbach's alpha reliability coefficients as data in counseling research. *The Counseling Psychologist, 34*(5), 630-660.

Hubbard, D. G. (1990). Successful utility project management from lessons learned. *Project Management Journal,* 21(3), 19–23.

Hwang, B. G. and Ng, W. J. (2013). Project management knowledge and skills for green construction: Overcoming challenges. *International Journal of Project Management,* 31(2), 272–284.

International Organization for Standardization. ISO8402. (1994). *Quality management and quality assurance*. Geneva: ISO Press.

International Organization for Standardization. ISO9000. (2005). *Quality management systems-fundamentals and vocabulary.* Geneva: ISO Press.

Isik, Z., Arditi, D., Dikmen, I. and Birgonul M. T. (2009). Impact of corporate strengths/weaknesses on project management competencies. *International Journal of Project Management,* 27(6), 629–637.

Ismail, E. (2001). *Industrialized building system for housing in Malaysia.* Paper presented at the 6th Asia Pacific Science and Technology Management Seminar, Tokyo.

Jaselskis, E. J. and Ashley, D. B. (1991). Optimal allocation of project management resources for achieving success. *Journal of Construction Engineering and Management,* 117(2), 321–340.

Juran, J. M. and Godfrey, A. B. (Eds.). (1999). *Juran's Quality Handbook* (5th ed.). New York: McGraw-Hill.

Kamaruddin, N. and Roslim, M. A. (1990). *Kaedah penyelidikan: Panduan mudah kerja luar.(Research methods: Simple guide fieldwork).* Petaling Jaya: Fajar Bakti.

Kerlinger, F. N. (1986). *Foundations of behavioral research* (3rd ed.). Orlando Florida: Holt, Rinehart & Winston Inc.

Kerzner, H. (1989). *Project management: A systems approach to planning, scheduling, and controlling.* New York: Van Nostrand Reinhold.

Lester, J. D. (1980). *Writing research papers: A complete guide.* London: Scott, Foreman and Co.

Levy, S. (2007). *Project Management in Construction* (5th ed.). Sidney: McGraw-Hill.

Lock, D. (2007). *Project Management* (9th ed.). Hampshire: Gower Publishing Ltd.

Maimun, W. (2010). *Critical factors in project success: A study of public sector construction projects in Malaysia,* Ph.D. thesis, University of Malaya: Kuala Lumpur, Malaysia.

Malaysian Administrative Modernisation and Management Planning Unit, MAMPU. (1987). *A guide to research methodology.* Kuala Lumpur: Malaysia.

MALBEX. (2005). Market watch – construction industry, *Kuala Lumpur Exhibition Center Report*. p. 1–8.

McManamy, R. (1994). Design goes back to the future. *ENR, 233(1),* 26-28.

Milosevic, D. Z. (1989). Systems approach to strategic project management. *International Journal of Project Management*, 7(3), 173–179.

Morris, P. W. G. and Hough, G. H. (1986). *Preconditions of success and failure in major projects.* (Technical Paper No. 3). Oxford, UK: Templeton college, The Oxford Centre for Management Studies.

Morris, P. W. G. and Hough, G. H. (1987). *The anatomy of major projects: A study of the reality of project management.* New York: Wiley Press.

Munns, A. K. and Bjeirmi, B. F. (1996). The role of project management in achieving project success. *International Journal of Project Management,* 14(2), 81–87.

National Information Center, NIC. (2010). *The Official Website of the National Information Center.* [online]. Retrieved 15 November 2010, from www.nic.gov.ye.

NEDO (1988). *Faster Building for Commerce.*UK: HMSO.

Newcombe, R., Langford, D. and Fellows, R. (1990). *Construction management systems.* (vol. 1). London: Mitchell Publishing Co.

Norusis, M. J. (1990). *The SPSS guide to data analysis.* Chicago: SPSS Inc.

Nunaly, J. (1978). *Psychometric theory.* New York: McGraw-Hill.

Peterson, R. A. (2000). *Constructing effective questionnaires.* California: Sage publications Inc.

Pinto, J. K. and Slevin, D. P. (1988). Critical success factors across the project life cycle. *Project Management Journal,* 19(3), 67–75.

Project Management Institute, PMI. (2008). *A Guide to the Project Management Body of Knowledge,* PMBOK Guide. (4th ed.). Pennsylvania, USA: Project Management Institute, Inc.

Rose, K. H. (2005). *Project Quality Management Why, What and How.* Boca Raton, Florida: J. Ross Publishing, Inc.

Rosenbaum, D. B. (1995). Can't we all just get along? *ENR, 235(16),*13.

Roush W. R. (2005). Deficit = inflation. *Technology Review,* July 27.

Rwelamila, P. D. and Hall, K. A. (1995). Total systems intervention: an integrated approach to time, cost and quality management. *Construction Management and Economics,* 13, 235-241.

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

Samset, K. (2003). *Project evaluation: Making Investments Succeed*. Trondheim, Norway: Tapir Academic Press.

Sauser, B. J., Reilly, R. R. and Shenhar, A. J. (2009). Why projects fail? How contingency theory can provide new insights – A comparative analysis of NASA's Mars Climate Orbiter loss. *International Journal of Project Management,* 27(7), 665–679.

Sayles, L. R., Chandler M. K. (1971). *Managing large systems.* New York: Harper & Row.

Sekaran, U. (2000). *Research methods for business: A skill-building approach* (3rd ed.). New York: John Wiley and Sons, Inc.

Shenhar A. and Dvir D. (2007). *Reinventing project management: the diamond approach to successful growth and innovation.* Boston: Harvard Business.

Shirazi, B., Langford, D. and Rowlinson, S. (1996). Organizational structures in the construction industry. *Construction Management and Economics,* 14(3), 199–212.

Songer, A. D., and Molenaar, K. R. (1997). Project characteristics for successful public-sector design-build. *Journal of Construction Engineering and Management*, *123*(1), 34-40.

Songer, A. D., Ibbs, C. W., and Napier, T. R. (1994). Process model for public sector design-build planning. *Journal of Construction Engineering and Management,* 120(4),857-874.

Srivannaboon, S. and Milosevic, D. Z. (2006). A two-way influence between business strategy and project management. *International Journal of Project Management*, 24(6), 493–505.

Sultan, B. (2005). *The construction industry in Yemen: Towards economic sustainability,* Ph.D thesis, Queensland University of Technology: Australia.

Sultan, B. (2008a). Construction in Yemen and sustainable development: Are they sustainable? *The Yemen Times*, 24th of January.

Sultan, B. (2008b). Housing construction costs in Yemen: Affordability & purchasing power. *The Yemen Times*, 6th of March.

Sultan, B. and Kajewski, S. (2003). *The Yemen construction industry: Readying the industry for the successful implementation of sustainability.* Paper presented at the International Conference on Smart and Sustainable Built Environment, 19-21 November, 2003, Brisbane, Australia.

Sultan, B. M., and Kajewski, S. L. (2006). *Requirements for Economic Sustainability in the Yemen Construction Industry.* CIB W107 Construction in Developing Countries International Symposium, "Construction in Developing Economies: New Issues and Challenges", 18 – 20 January, 2006, Santiago, Chile.

Tan, A. A. L. (1996). *Project management in Malaysia: A comprehensive approach for successful management of property development projects from inception until completion.* Kuala Lumpur, Malaysia: Synergy Books International.

Tan, A. A. L. (2004). *Why Projects Fail? 1001 Reasons.* Selangor, Malaysia: Venton Publishing.

Tan, A. A. L. (2005). Successful *project management in Malaysia: An A-Z comprehensive guide in project management for the development & construction industry.* Kuala Lumpur, Malaysia: Asia Pacific Media & Publications.

The Standish group. (2001). *The chaos report.* West Yarmouth, MA: The Standish Group International, Inc.

Tishler A., Dvir D., Shenhar A. and Lipovetsky S. (1996). Identifying critical success factors in defense development projects: a multivariate analysis. *Technological Forecasting and Social Change,* 51(2), 151–171.

Tricker, M. (2001). *Exploring alternative research designs*. Applied research resource pack, Aston University: Birmingham, UK.

United Nations Industrial Development Organization, UNIDO / World Bank Cooperative Programme. (1981). *Yemen Arab Republic: The Construction Industry,* (Report no. 17). Vienna.

University of Malaya. (2007). *UM conference management system*. [online]. Retrieved 5 July 2013, from http://umconference.um.edu.my/Dengue2013=d82118376df344b0010f53909b961db3.

Venkataraman, R. R. and Pinto, J. K. (2008). *Cost and Value Management in Projects.* Hoboken, New Jersey: John Wiley & Sons, Inc.

Wikipedia. (2010). *The Free Encyclopedia.* [online]. Retrieved 17 November 2010, from www.wikipedia.org.

Williams, F. and Monge, P. (2001). *Reasoning with statistics: How to read quantitative research.* California: Harcourt Colleage Publishers.

Yang, L. (2012). Implementation of project strategy to improve new product development performance. *International Journal of Project Management,* 30(7), 760–770.

Yasamis, F., Arditi, D. and Mohammadi, J. (2002). Assessing contractor quality performance. *Construction Management and Economics,* 20(3), 211–223.

Yates, J. K. (1995). Use of design/build in the E/C industry. *Journal of Management in Engineering*, 11(6), 33-39.

Yu, A. G., Flett, P. D. and Bowers, J. A. (2005). Developing a value-centered proposal for assessing project success. *International Journal of Project Management,* 23(6), 428–436.

Zhang L., Lee K.O., Zhang Z., Banerjee P. (2003). Critical success factors of enterprise resource planning systems implementation success in China. *Proceedings of the 36th Hawaii international conference on systems sciences.*

Zikmund, W. G. (2003). *Business research methods.* (7th ed.). Ohio, USA: Thomson South-Western.

APPENDIX 1:
COUNTRIES
BACKGROUND OF THE
STUDY

Geographical Background of Yemen

Yemen, which is in the southwest of Asia on the south and southwest of the Arabian Peninsula (NIC Yemen, 2010), is situated between latitude 12˚10' N and 19˚00' N and longitude 41˚50' E and 54˚30' E (Google Earth, 2010). It oversees the Strait of Bab Al-Mandeb, which links the Red Sea to the Indian Ocean. It is bounded from the north by Saudi Arabia and from the east by Oman, and it has a total of land area of 527,970 km2. Sana'a is the capital city of Yemen (Wikipedia, 2010).

Figure A.1: The location of Yemen

Source: wikipedia.org

The population of Yemen was 19,685,161 according to 2004 count, and about 23,154,000 according to 2010 estimates (CSO Yemen, 2009).

Figure A.2: The map of Yemen

Source: wikipedia.org

Geographical Background of Malaysia

Malaysia, which is in the southeast of Asia, is situated between latitude 00˚50' N and 07˚30' N and longitude 99˚35' E and 119˚15' E (Google Earth, 2010). It consists of thirteen states and three federal territories, which is separated by the South China Sea into two regions, Peninsular Malaysia and Malaysian Borneo. It shares land borders with Thailand, Indonesia, and Brunei, and also has maritime boundaries with Singapore, Vietnam, and the Philippines, and it has a total of land area of 329,847 km2. Kuala Lumpur is the capital city while Putrajaya is the seat of the federal government of Malaysia (Wikipedia, 2010).

Figure A.3: The location of Malaysia
Source: wikipedia.org

The population of Malaysia is 28,362,910 according to the population clock at 08:50 A.M on 15-11-2010 (DS Malaysia, 2010).

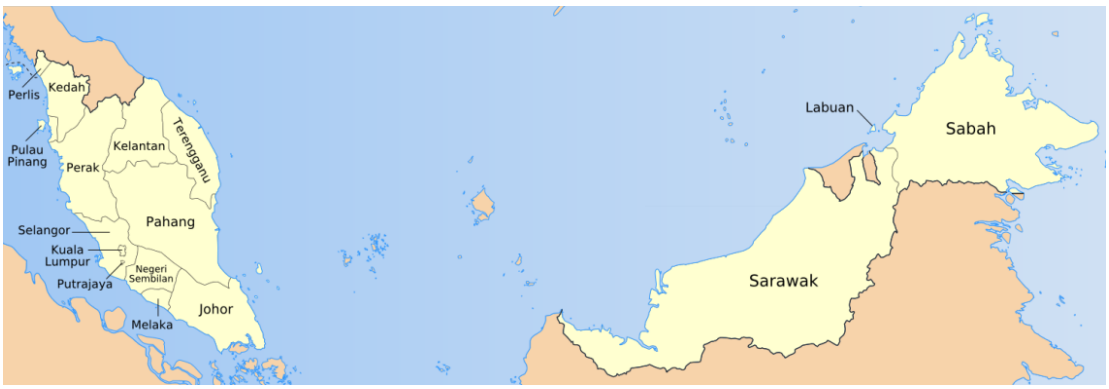

Figure A.4: The map of Malaysia
Source: wikipedia.org

APPENDIX 2:
THE QUESTIONNAIRE SURVEY

Faculty of Built Environment, University of Malaya,
50603, Kuala Lumpur, Malaysia

Project Success Factors: A Comparative Analysis of Architectural Project Management in Yemen & Malaysia

Questionnaire Survey in Malaysia

Part of requirements to fulfill MSc Study for the candidate:

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Supervised by:

Professor Dr *Sr* Hj. Ahmad Ramly
Mr. Kamarudzaman Mat Rejab

This questionnaire is intended for academic purpose. It is hoped that respondents will provide their response based on experience, knowledge and involvement in the implementation of projects.

Identity or views of the respondent will not be revealed and will be treated in strictest confidence.

This questionnaire is structured using the following scale of importance:
1 = Least important
2 = Quite important
3 = Important
4 = Very Important
5 = Critically Important

Section I: Personal Information

Name (optional):.....

Please state or tick √ the appropriate answer

1. Age	2. Highest education	3. Years of experience
1) Less than 30 years ☐	1) High School ☐	1) Less than 5 years ☐
2) Between 30 – 39 ☐	2) Diploma (2 years) ☐	2) Between 5 – 10 ☐
3) Between 40 – 49 ☐	3) Bachelor Degree ☐	3) Between 11 – 15 ☐
4) Between 50 – 59 ☐	4) Master Degree ☐	4) Between 16 – 20 ☐
5) More than 60 years ☐	5) PhD ☐	5) Between 21 – 25 ☐
	6) Others	6) More than 25 years ☐
4. Qualification	**5. Organization type**	**6. Position in organization**
1) Architecture ☐	1) Government Agency ☐	1) Chairman or Director ☐
2) Civil Engineering ☐	2) Consulting Firm ☐	2) Project Manager ☐
3) Quantity Survey ☐	3) PM Consultant ☐	3) Project Consultant ☐
4) Management ☐	4) Contracting Firm ☐	4) Site Engineer/Arch ☐
5) Semi-professional ☐	5) Professional Crafts ☐	5) Site Resident ☐
6) Others	6) Others	6) Others .....

Section II: The Importance of Project Success Criteria

Please state or tick √ the appropriate answer **(please rank)**

1. Project Completion:

	1. What is the level of importance upon project completion?	Importance				
		1	2	3	4	5
1.	Project complete within the specified Time					
2.	Project complete within the approved Cost					
3.	Project complete as the required Quality					
4.	Others (please specify).....					

2. Project Cost:

Please state or tick √ the appropriate answer

	1. What is your response to the following issues regarding success criteria?	Importance				
		1	2	3	4	5
1.	Complete as budgeted.					
2.	Minimum variations.					
3.	Minimum delay fines.					
4.	Others (please specify).....					

	2. What is the level of importance of the following reasons for cost overruns in the project?	Importance				
		1	2	3	4	5
1.	Cost of designs and drawings.					
2.	Cost of materials.					
3.	Cost of construction and structure elements.					
4.	Cost of finishing works.					
5.	Cost of labor.					
6.	Exceeding the period of the project.					
7.	Level of quality required for the project.					
8.	Others (please specify).....					

	3. What is the level of importance of the following factors in ensuring project completed within Cost?	Importance				
		1	2	3	4	5
1.	Human Management. (Leadership, Attitude, Performance… etc.)					
2.	Management Process. (Monitoring, Planning, Scheduling… etc.)					
3.	Organization. (Structure, Resources, Policy, Culture… etc.)					
4.	Contractual and Technical. (Procurement, Innovation… etc.)					
5.	Others (please specify).....					

3. Project Time:

Please state or tick √ the appropriate answer

	1. What is your response to the following issues regarding success criteria?	Importance				
		1	2	3	4	5
1.	Complete on or before date of completion.					
2.	Delays rectified.					
3.	Minimum extension of time.					
4.	Others (please specify).....					

	2. What is the level of importance of the following reasons for exceeding the period of the project?	Importance				
		1	2	3	4	5
1.	Time for preparing designs and drawings.					
2.	Time for the project's tender.					
3.	Time for construction.					
4.	Time for finishing works.					
5.	Labor working hours.					
6.	Cost overruns in the project.					
7.	Level of quality required for the project.					
8.	Others (please specify).....					

	3. What is the level of importance of the following factors in ensuring project completed within Time?	Importance				
		1	2	3	4	5
1.	Human Management. (Leadership, Attitude, Performance… etc.)					
2.	Management Process. (Monitoring, Planning, Scheduling… etc.)					
3.	Organization. (Structure, Resources, Policy, Culture… etc.)					
4.	Contractual and Technical. (Procurement, Innovation… etc.)					
5.	Others (please specify).....					

4. Project Quality:

Please state or tick √ the appropriate answer

	1. What is your response to the following issues regarding success criteria?	Importance				
		1	2	3	4	5
1.	Complete as the required specification, drawings etc.					
2.	Good workmanship and minimum defects.					
3.	Minimum scope change.					
4.	Others (please specify).....					

	2. What is the level of importance of the following reasons for NOT meeting the required quality for the project?	Importance				
		1	2	3	4	5
1.	Stakeholders requirements.					
2.	Choosing the right consultant and construction company.					
3.	Specifications of the project.					
4.	Quality of materials.					
5.	Labor skills.					
6.	Cost overruns in the project.					
7.	Exceeding the period of the project.					
8.	Others (please specify).....					

	3. What is the level of importance of the following factors in ensuring project completed as the required Quality?	Importance				
		1	2	3	4	5
1.	Human Management. (Leadership, Attitude, Performance… etc.)					
2.	Management Process. (Monitoring, Planning, Scheduling… etc.)					
3.	Organization. (Structure, Resources, Policy, Culture… etc.)					
4.	Contractual and Technical. (Procurement, Innovation… etc.)					
5.	Others (please specify).....					

Section III: Importance of Components of Project Success Factors

Please state or tick √ the appropriate answer

	1. What is the level of importance of the following components of project success factors?	Importance				
		1	2	3	4	5
Part 1: Human Management						
1.	Attitude, behavior and commitment.					
2.	Communication.					
3.	Performance, effectiveness and efficiency.					
4.	Project manager.					
5.	Team and leadership.					
6.	Stakeholder management.					
7.	Others (please specify).....					
Part 2: Management Process						
1.	Monitoring and control.					
2.	Planning.					
3.	Scheduling.					
4.	Risk management.					
5.	Others (please specify).....					
Part 3: Organization						
1.	Organization structure.					
2.	Resources (Financial resources).					
3.	Learning organization.					
4.	Policy and strategy.					
5.	Culture.					
6.	External environment.					
7.	Others (please specify).....					
Part 4: Contractual and Technical						
1.	Contracting and procurement.					
2.	Consultant and contractor.					
3.	Innovation.					
4.	Technical.					
5.	Others (please specify).....					

Section IV: Importance of Components According to Project Stages

Please state or tick √ the appropriate answer

	1. What is the level of importance of the following components according to project stages? (Design-Tender-Construction)	Design	Tender	Construction
Part 1: Human Management				
1.	Attitude, behavior and commitment.			
2.	Communication.			
3.	Performance, effectiveness and efficiency.			
4.	Project manager.			
5.	Team and leadership.			
6.	Stakeholder management.			
7.	Others (please specify).....			
Part 2: Management Process				
1.	Monitoring and control.			
2.	Planning.			
3.	Scheduling.			
4.	Risk management.			
5.	Others (please specify).....			
Part 3: Organization				
1.	Organization structure.			
2.	Resources (Financial resources).			
3.	Learning organization.			
4.	Policy and strategy.			
5.	Culture.			
6.	External environment.			
7.	Others (please specify).....			
Part 4: Contractual and Technical				
1.	Contracting and procurement.			
2.	Consultant and contractor.			
3.	Innovation.			
4.	Technical.			
5.	Others (please specify).....			

Section V: Further Comments and Views

1. In your opinion what are the most important criteria to measure project success and why?

2. In your opinion what are the most important factors that contribute in project success and why?

3. In your opinion what are the reasons of project failure?

   1. .....
   2. .....
   3. .....
   4. .....
   5. .....

4. In which stage of the project that the criteria can be controlled?

Please state or tick √ the appropriate answer

Stage / Criteria	Design	Tender	Construction	Others (please specify)
Cost				
Time				
Quality				
Others (please specify)				

5. Do you have any last comment?

Thank you very much for your kind response

APPENDIX 3: PROJECT DOCUMENTATION FOR CASE STUDY IN YEMEN

REPUBLIC OF YEMEN
MINISTRY OF YOUTH & SPORTS

الجمهورية اليمنية
وزارة الشباب والرياضة

Date: .....
No. : .....

التاريخ: .....
الرقم: .....

الاخ / المهندس الاستشاري الدكتور / حاتم الصباحي المحترم

بعد التحية :-

بناءً على قرار مجلس الوزارة بتاريخ ١/٩/٢٠٠٤م والذي وافق على تكليفكم بالقيام بأعمال التصاميم الهندسية لمبنى وزارة الشباب والرياضة .

عليـــه :

تكلفكم باعداد التصاميم بحسب الهيكل المعتمد بالوزارة اذا نرجو سرعة اعداد المخططات المعمارية الاولية حتى يتم مناقشتها معنا للموافقة عليها و يتم محاسبتكم من خلال التعاقد معكم لاستكمال الرسومات التنفيذية .

وتقبلوا خالص التحية والتقدير

وكيل وزارة الشباب والرياضة

* A letter of assignment from the stockholder to the consultant.

REPUBLIC OF YEMEN

MINISTRY OF YOUTH & SPORTS

MINISTER OFFICE

بسم الله الرحمن الرحيم

الجمهورية اليمنية

وزارة الشباب والرياضة

مكتب الـوزيـر

Date: / /

No.:......................

التاريخ / /

الرقم:....................

عقد إعداد الرسومات الهندسية لمبنى وزارة الشباب والرياضة

إنه في يوم الأربعاء الموافق ٤....من شهر سبتمبر ٢٠٠٢م تم الاتفاق بين كلاً من :

أ - وزارة الشباب والرياضة ويمثلها المهندس/ يحيى قائد الروضي مدير عام المشاريع بالوزارة ويسمى (طرف أول)

٢ - المكتب الاستشاري حاتم للعماره ويمثله في هذا العقد الاستاذ الدكتور / حسام المصباحي رئيس المكتب ويسمى (طرف ثاني) أقر الطرفان بصفتيهما في التعاقد على ما يلي :

الباب الاول : النواحي الفنية

البند الاول موضوع العقد :

إعداد الرسومات الهندسية لمبنى وزارة الشباب والرياضة بمدينة صنعاء على النحو التالي :

أولاً : الحسابات لاعداد المساحات اللازمة - الفكرة المعماريه - الرسومات المعماريه (المساقط الافقيـــة - الواجـهات - المناظر)

ثانياً - الرسومات التنفيذية المعمارية

ثالثاً - الرسومات الانشائية

رابعاً - جداول الكميات والمواصفات ووثائق المناقصة

خامساً - الرسومات الكهربائية بما فيها أعمال التكييف للقاعة ومكتب الوزير

سادساً الرسومات الصحية

سابعاً القيام بعمل ثلاث جسات لاختبارات التربة

ثامناً يقوم الطرف الثاني بتسليم خمس نسخ من الرسومات والدراسات ووثائق المناقصة

البند الثاني المساحة الاجمالية للمشروع

المساحة الاجمالية للمشروع (١٦,٠٠٠م ٢) بموجب الرسومات الهندسية

البند الثالث منطقة المشروع

منطقة المشروع المدينة الرياضية الجز الجنوبي الغربي للمدينة

البند الرابع الوثائق المكملة للعقد :

الرسالة الموجهة الى الاستشاري من الاستاذ / حمود محمد عباد وكيل وزارة الشباب والرياضة وذلـــك بـالتكليف للاستشاري بالقيام باعمال التصاميم الهندسية لمبنى وزارة الشباب والرياضة بموجب قـرار مجلـس الـوزارة بتـاريخ ٢٠٠١/٩/١م

* Contract for designing and preparation of engineering drawings for the building of Ministry of Youth and Sports (technical aspects).

REPUBLIC OF YEMEN
MINISTRY OF YOUTH & SPORTS
MINISTER OFFICE

بسم الله الرحمن الرحيم

الجمهورية اليمنية
وزارة الشباب والرياضة
مكتب الوزير

Date: / /
No.:.....

التاريخ / /
الرقم:.....

البند الخامس مدة العقد :

الفترة الزمنية لكافة الاعمال الموضحة في البند الاول هي أربعة أسابيع تبدء من تاريخ توقيع العقد وإستلام الموقع للمشروع واستلام الدفعة الاولى من المبلغ الاجمالي للعقد .

البند السادس :

يقوم الطرف الثاني بعماية الاشراف على التنفيذ ويتم توقيع عقد لاحق للاتفاق على تكاليف الاشراف إذا رغب الطرف الاول

الباب الثاني النواحي المالي

البند السابع قيمة العقد

يقوم الطرف الاول بدفع تكاليف الدراسات الهندسية لمبنى وزارة الشباب والرياضة بمبلغ إجمالي وقدره (١٠٠,٠٠٠) مائة الف دولار أمريكي أو ما يعادلها بالريال اليمني على أن يتم دفع المبلغ على شطرين

البند الثامن طريقة الدفع

١- يقوم الطرف الاول بدفع مبلغ وقدره (٥٠%) من قيمة العقد وذلك عند توقيع العقد وإستلام الموقع مقابل ضمان بنكي)

٢- يقوم الطرف الاول بدفع مبلغ وقدره (٥٠%) من قيمة العقد عند تسليم الرسومات النهائية

يعتبر العقد الموقع بين الطرفان بتاريخه ملزماً لجميع بنوده ومواده وشروطه للطرفين .

حرر هذا العقد من نسختين بيد كل طرف نسخه لها نفس القوه القانونية .

" والله ولي التوفيق "

الطرف الاول :

المهندس/ سيحي فائم الروضي
مدير عام المشاريع بالوزارة

الطرف الثاني :

الاستاذ الدكتور/ حاتم الصباحي
رئيس المكتب الاستشاري حاتم للعماره

يعتمد

عبد الرحمن محمد الاكوع
وزير الشباب والرياضة

* Contract for designing and preparation of engineering drawings for the building of Ministry of Youth and Sports (financial aspects).

بسم الله الرحمن الرحيم

الموضوع: تقرير مختصر لأسباب تعثر تنفيذ مشروع مبنى

ديوان وزارة الشباب والرياضة

إشارة إلى الموضوع أعلاه نوضح لكم ذلك بالنقاط التالية:

أولا: مقدمة عن فترة إنزال المشروع بمناقصة عامة حتى كتابة العقد .

1. تم الإعلان عن المناقصة للمشروع في بداية شهر 2002/11.
2. فتحت المظاريف للمناقصة في 2002/12/15.
3. كتب العقد لتنفيذ المشروع في 2003/8/13 مع المقاول / مكتب البرج بمبلغ وقدره 539,236,039 ريال.

ثانيا: تعثر تسليم الموقع المحدد للمشروع واختيار البديل:

1. كان الموقع المحدد للمشروع في أرضية قاعة المؤتمرات في منطقة عصر ولم تتمكن الوزارة من تسليم هذا الموقع لأسباب عدة.
2. قامت الوزارة بالبحث عن موقع جديد وتم اختيار موقع جديد بمدينة الثورة في نهاية شهر 2003/12، وتم تسليمه للمقاول.
3. نظرا لتأخر تسليم الموقع تقرر البدء في العمل مع عمل اختبارات التربة بالتزامن، حيث كانت المقاومة التصميمية لقابلية تحمل التربة (250كجم/سم2).
4. قام المختبر بعمل الاختبارات وظهرت النتائج منخفضة عن القيمة التصميمية في تاريخ 2004/8/12، وقد تم تحويلها إلى المكتب الاستشاري المصمم والذي قرر ضرورة تعديل التصاميم الإنشائية وفقا لتلك النتائج وعليه تم تكليف المكتب المصمم من قبل الوزارة بذلك، وقد اخذ إعداد التصاميم فترة حتى 2005/1/28، والذي كان نفس تاريخ تسليم التصاميم للوزارة، وقد نجم عن هذا التعديل زيادة في نسبة الحديد وتغير في أبعاد الأساسات خاصة والمقاومة المطلوبة للخرسانة 350كجم/سم2.

* A brief report on stalling reasons for the implementation of the building of the Ministry of Youth and Sports (faltering delivery periods for the project site and choose the alternative).

ثالثا: التأثيرات الناجمة عن تغيير الموقع وتعديل الرسومات للقواعد بحسب نتائج اختبار التربة:

1. بدأت مطالبة المقاول بفوارق أسعار الناجمة عن زيادة الحديد في الرسومات المعدلة والارتفاعات السعرية التي حدثت في السوق أثناء هذه الفترة.
2. تم توجيه المقاول باستئناف العمل بموجب الرسومات المعدلة وإزالة التخشيبات القديمة بموجب الرسومات الأصلية وتم عمل محضر بالإزالة وحصر لها ليتم محاسبته بموجبه في 2005/5/15.
3. وقد تم استئناف العمل بحسب المخططات المعدلة مع استمرار مطالبة المقاول بفوارق الأسعار حيث تم تنفيذ القسم الشرقي لأساسات القواعد الخرسانية حتى تاريخ 2005/9/3. وبعدها توقف المشروع.

رابعا: الحلول المقترحة من الوزارة سابقا:

تم تحويل مطالبة المقاول لعمل مقترح من قبل الأخ/ الوزير إلى إدارة المشاريع بوضع مقترح لحل هذا الإشكال. حيث تم عمل مقترح لم يتم اعتماده. وذلك قبل سنة من الآن.

وبعد ذلك تم تحويل المشروع إلى وزارة الأشغال لعمل حل مشترك من قبل مهندسي وزارة الشباب ومهندسي وزارة الأشغال بموجب التوجيهات الصادرة من رئاسة الوزراء.

خامسا: المقترحات النهائية للجنة المشتركة المشكلة من مهندسي الأشغال والشباب بحسب التوجيهات الصادرة من رئاسة الوزراء.

1. مقترح معالجة للأعمال الغير المنفذة كما يلي:

أ) تم عمل دراسة كلية للأعمال الغير منفذة بحسب الأسعار السائدة كما هو مرفق بالجداول (أساسية ، إضافية ، تغييرية) وكان المبلغ الإجمالي الكلي مبلغ (1,190,232,550 ريال) شاملا قيمة الأعمال التالية:

- عمل حل بإضافة قيمة سقف الصالة المعدني بمبلغ (96,200,000 ريال) بحسب الرسومات المقدمة من الشركة المختصة وعرض سعرها.
- إضافة قيمة خرسانة جدارن وأسقف المصاعد بمبلغ (18,000,000 ريال) حيث والكمية لم تدرج في الجداول الأساسية سابقا.
- تغيير نوعية المباني الحجر من الحجر الجهراني إلى الحجر الهيلاني بحسب طلب الأخ/ الوزير وكانت نسبة فارق قيمتها تصل إلى 30٪ وبمبلغ (6,224,850 ريال).

* A brief report on stalling reasons for the implementation of the building of the Ministry of Youth and Sports (solutions proposed by the engineers working on the project).

- حذف قيمة المولد الكهربائي من جداول الكميات واعتماد قيمة اختبارات التربة والشدات الخشبية المزالة مقابل ذلك.

وبذلك فإن إجمالي قيمة الأعمال التغييرية (120,424,850 ريال)

2. مقترح معالجة الأعمال المنفذة والغير مصروفة حيث تم دراسة أسعارها بالأسعار المناسبة في حينه كما هو مرفق بالكشف المرفق وبمبلغ (48,102,200 ريال).

وبذلك فإن القيمة الكلية للمشروع من الأعمال المنفذة والغير منفذة والتغييرية والإضافية أصبح يساوي مبلغ (1,238,334,750 ريال).

علما بأن الضمانات مجددة من البنك العربي.

هذا وتقبلوا جزيل الشكر،،،

م/ محمد مالك

م / مساعد محمد بدر

م/غانم الدبعي

أ / عبد الله بهيان

أ/ محمد منصر

م/يحي الروضي

2006/12/16

* A brief report on stalling reasons for the implementation of the building of the Ministry of Youth and Sports (continued solutions proposed by the engineers working on the project).

1

بسم الله الرحمن الرحيم

التقرير الخاص بمعالجة تعثر مشروع مبنى ديوان وزارة الشباب والرياضة – أمانة العاصمة

أولا: خلفية عن المشروع:

1. اسم المشروع: مبنى ديوان وزارة الشباب والرياضة.
2. الجهة المالكة للمشروع: وزارة الشباب والرياضة.
3. تمويل المشروع: حكومي.
4. فتح مظاريف المناقصة: 2002/12/15
5. قرار مجلس الوزراء رقم (131) بتاريخ 2003/6/17.
6. اسم المقاول: مكتب البرج للهندسة والمقاولات.
7. قيمة العقد: (539,374,242 ريال).
8. تاريخ توقيع العقد 13 /8/ 2003.
9. مدة العقد: (24 شهر).
10. تاريخ تسليم الموقع 8 ديسمبر 2003، والمباشرة في ديسمبر 2003.
11. تاريخ الاستلام الابتدائي المفترض: ديسمبر 2005.
12. المبالغ المصروفة: قيمة الدفعة المقدمة (107,874,848 ريال)
13. قيمة الأعمال المنجزة بأسعار العقد (22,289,630 ريال)
14. الرصيد المتبقي: (517,084,612 ريال).
15. الجهة المشرفة على المشروع: وزارة الشباب والرياضة.

ثانيا المبررات التي تسببت في التعثر:

قدمت الجهة تقريرا بالمبررات والأسباب التي أدت إلى تعثر المشروع وهي مفصلة على النحو التالي:

أ - تعثر تسليم الموقع المحدد للمشروع في المناقصة واختيار موقع بديل:

1. كان الموقع المحدد للمشروع في أرضية قاعة المؤتمرات في منطقة عصر ولم تتمكن الوزارة من تسليم هذا الموقع لأسباب عدة.
2. قامت الوزارة بالبحث عن موقع جديد وتم اختيار موقع جديد بمدينة الثورة في نهاية شهر 2003/12، وتم تسليمه للمقاول.
3. نظرا لتأخر تسليم الموقع تقرر البدء في العمل مع عمل اختبارات التربة بالتزامن، حيث كانت المقاومة التصميمية لقابلية تحمل التربة (250كجم/سم2).

* Special Report addressing the stalled project of the Ministry of Youth and Sports (About the project and the reasons that caused tripping).

4. قام المختبر بعمل الاختبارات وأظهرت النتائج أن المقاومة للتربة منخفضة عن القيمة التصميمية وتم رفع تقرير المختبر في تاريخ 2004/8/12، وقد تم تحويله إلى المكتب الاستشاري المصمم والذي قرر ضرورة تعديل التصاميم الإنشائية وفقا لتلك النتائج وتم تكليف المكتب المصمم من قبل الوزارة بذلك، وقد اخذ إعداد التصاميم فترة حتى 2005/1/28، والذي كان نفس تاريخ تسليم التصاميم للوزارة، وقد نجم عن هذا التعديل زيادة في نسبة الحديد وتغير في أبعاد الأساسات خاصة والمقاومة المطلوبة للخرسانة 350كجم/سم2.

ب- التأثيرات الناجمة عن تغيير الموقع وتعديل الرسومات للقواعد بحسب نتائج اختبار التربة:

1. بدأت مطالبة المقاول بفوارق أسعار الناجمة عن زيادة الحديد في الرسومات المعدلة والارتفاعات السعرية التي حدثت في السوق أثناء هذه الفترة.
2. تم توجيه المقاول باستئناف العمل بموجب الرسومات المعدلة وإزالة التخشيبات القديمة بموجب الرسومات الأصلية وتم عمل محضر بالإزالة وحصر لها ليتم محاسبته بموجبه في 2005/6/1.
3. تم استئناف العمل بحسب المخططات المعدلة مع استمرار مطالبة المقاول بفوارق الأسعار حيث تم تنفيذ القسم الشرقي لأساسات القواعد الخرسانية حتى تاريخ 2005/9/3. وبعدها توقف العمل في المشروع.

ثالثا: أسس معالجة تعثر المشروع:

تم تضمين التقرير المقدم من الجهة بالمبررات والأسباب التي أدت إلى التعثر. الرأي بأن يتم معالجة الأعمال المنجزة وتصفيتها كتسوية نهائية أما الأعمال المتبقية فتعالج بحسب الأسعار السائدة في السوق وبحسب الجداول المعدة من قبلها وحيث ان المقاول لديه مبالغ متبقية من الدفعة المقدمة بعد التصفية للأعمال المنجزة. فإن الجهة ترى أن يستمر المقاول بالتنفيذ مع أخذ الضمانات اللازمة لتنفيذ المشروع في الفترة الزمنية المحددة له، وقد أرفقت الجهة مع تقريرها جداول بكميات وقيمة الأعمال المنجزة بموجب الأسعار التي تم التوصل إليها مع المقاول لتصفية حساب الأعمال المنجزة في المشروع وحدد الجدول أن قيمة الأعمال المنجزة من تاريخ مباشرة التنفيذ وحتى 2005/9/3 ، مبلغ (60,102,000 ريال)، شاملا قيمة الاختبارات وقيمة الشدات الخشبية للقواعد وفق التصاميم القديمة والتي تم فكها.

* Special Report addressing the stalled project of the Ministry of Youth and Sports (the foundations of project errors handling).

رابعا: تفاصيل معالجة الأعمال المنجزة في المشروع:

قامت الجهة بمعالجة الأعمال المنجزة بموجب الاسعار المتفق عليها بين الجهة والمقاول والتي أشير بأنها الاسعار السائدة في وقت تنفيذ هذه الأعمال مع الأخذ في الاعتبار ما ترتب على التعديل من زيادة في نسبة حديد التسليح لما يخص بند الخرسانة المسلحة للقواعد والشدادات، والصب المركزي للخرسانة.

وفيما يلي جدول يوضح إجمالي قيمة الأعمال المنجزة بموجب أسعار العقد والفوارق المحسوبة لها والقيمة الإجمالي بعد المعالجة:

م	بيان الأعمال	القيمة بحسب العقد	قيمة الفارق المضاف	القيمة بموجب اسعار المعالجة المعتمدة في التصفية
1	إجمالي الأعمال المنجزة الأساسية	22,289,630	25,812,370	48,102,000
2	إجمالي الأعمال المنجزة خارج العقد (أعمال إضافية)	--	--	12,000,000
	الإجمالي الكلي للأعمال المنجزة أساسية وإضافية	--	--	60,102,000

ويوضح الجدول المرفق رقم (1) تفاصيل الأعمال المنجزة وقيمتها بموجب سعر العقد والفوارق المحسوبة لها والقيمة الإجمالية لها بعد المعالجة، وعلى مستوى كل بند.

خامسا: المعالجة للأعمال المتبقية (الغير منفذة) والمطلوبة لاستكمال المشروع:

تم إعداد جداول كميات ومواصفات الأعمال المتبقية (الغير منفذة) من كميات العقد الأساسي بعد إضافة الزيادات الناتجة عن تصحيح الكميات وما ترتب على عملية تغيير الموقع وما ارتبط به من تعديل في التصاميم للأساسات مع البنود المستجدة وسلم نسخة من الجداول للمقاول لتقديم أسعاره وبعد تقديم المقاول للجداول بعد تسعيرها تم مراجعة الأسعار وإجراء التعديلات عليها وفقا لما يتناسب مع الأسعار السائدة حاليا وفيما يلي الخلاصة النهائية لإجمالي التكلفة اللازمة لاستكمال المشروع وفقا لما هو مبين في بنود وكميات وأسعار جداول الكميات المرفقة بهذا ، والموقعة من قبل الجهة والمقاول:

م	البيان	إجمالي الأعمال بموجب أسعار العقد	إجمالي الأعمال بموجب الأسعار المعدة	ملاحظات
.1	إجمالي الأعمال المتبقية من العقد	517,084,612	--	
.2	اجمالي قيمة الاعمال المحذوفة (بحسب الجدول المرفق)	24,880,603	--	
.3	اجمالي قيمة الأعمال المتبقية من العقد بعد تنزيل الأعمال المحذوفة	492,204,009	1,064,032,750	
.4	إجمالي الكميات والأعمال الزائدة عن العقد والمطلوبة لاستكمال المشروع	--	114,200,000	
	الإجمالي النهائي	-	1,178,232,750	

* Special Report addressing the stalled project of the Ministry of Youth and Sports (details of the work carried out and the remaining works).

سادسا: ملاحظات وزارة الأشغال العامة والطرق:

1. يلاحظ أن تعثر المشروع وتوقف العمل فيه ناتج عن عدة عوامل أساسية من أهمها:

أ- طول مدة الفارق الزمني بين تاريخ توقيع العقد 2003/8/13، وتاريخ الانتهاء من اعداد التصاميم المعدلة للأساسات بحسب مقاومة التربة في الموقع البديل وتم تسليمها للمقاول بتاريخ 2005/1/28، ما يقارب العام والنصف وخلال هذه الفترة حدثت تقلبات كبيرة في الأسعار في الأسواق المحلية والدولية.

2. لوحظ أن الأعمال المنجزة في المشروع من الأعمال الواردة في العقد الأساسي خلال المرحلة الأولى وحتى شهر سبتمبر 2005، وهو تاريخ توقف العمل بشكل نهائي بلغت قيمتها بموجب أسعار العقد مبلغ (22,289,630) ريال وبنسبة 4.13%، من قيمة العقد الأساسي كما بلغت قيمتها بموجب الاسعار المتفق عليها بين الجهة والمقاول وفي إطار المعالجة للأعمال المنجزة مبلغ (48,102,000) ريال ويلاحظ أن قيمة الزيادات الناتجة عن الأسعار المعدلة بلغت (25,812,370) ريال أي أن مقدار الزيادة في الأسعار بلغت نسبتها (115.8%) من أسعار العقد.

3. يلاحظ أن الأعمال المتبقية من قيمة العقد الأساسي وبموجب أسعار العقد هي بمبلغ (492,204,009) ريال في حين بلغت القيمة الإجمالي للأعمال المتبقية والمطلوبة لاستكمال المشروع وبموجب الأسعار المتفق عليها بين الجهة والمقاول عند معالجة وضع المشروع مبلغ (1,178,232,750) ريال وتشمل المعالجة الآتي:

أ- إجمالي قيمة الكميات المتبقية من بنود العقد الأساسي بالأسعار المقترحة (1,064,032,750) ريال.

ب- إجمالي قيمة الكميات والبنود الزائدة عن العقد الأساسي بالأسعار المقترحة (114,200,000)ريال.

وبالمقارنة بين قيمة كميات بنود الأعمال المتبقية من العقد الأساسي بموجب أسعار العقد وقيمتها بموجب الأسعار المقترحة يلاحظ أن مبلغ الزيادات المترتبة على تعديل الأسعار قد بلغ (571,828,741) ريال أي أن الزيادة في الأسعار بلغت حوالي نسبة (116.18%) من أسعار العقد، ويرجع السبب في ارتفاع نسبة الزيادة إلى تدني الأسعار المقدمة من المقاول في المناقصة.

* Special Report addressing the stalled project of the Ministry of Youth and Sports (Notes of the Ministry of Public Works).

4. المقارنة بين أسعار الوحدات لأهم بنود أعمال المشروع المتبقية وذلك بموجب سعر العقد والسعر المعتمد للمعالجة وفق مقترح الجهة :

م	بيان الأعمال	الوحدة	سعر الوحدة	
			السعر بموجب العقد	السعر المعتمد
.1	الخرسانة عادية	م3	7,760	17,500
.2	الخرسانة مسلحة			
	▪ القواعد والشدات	م3	26,675	75,500
	▪ الأعمدة والهياكل	م3	31,950	94,000
	▪ البلاطات الهوردي	م3	21,340	52,000
3	المباني			
	▪ حجر كرسي مربوع	م2	3,880	7,000
	▪ حجر حبش	م2	7,275	12,500
	▪ حجر منجور للواجهات (تم تغيير نوعية الحجر من ... الى هيلاني)	م2	7,857	13,500
.4	أعمال البلاط			
	▪ بلاط مزايكو	م2	1,358	2,500
	▪ سيراميك	م2	2,134	3,500
.5	اعمال الألمونيوم	م2	10,185	14,500
.6	أعمال النجارة + أبواب خشب	م2	14,938	26,000

سابعا: رأي وزارة الأشغال العامة والطرق:

بناء على قيام وزارة الشباب والرياضة برفع مذكرة إلى الأخ/ رئيس مجلس الوزراء بشأن التعثر في تنفيذ المشروع ووجه الأخ/ رئيس مجلس الوزراء برسالة رقم (رو/2558/4) تاريخ 2006/7/10، إلى الأخ/ وزير الأشغال العامة والطرق بتشكيل لجنة فنية متخصصة لدراسة ما تضمنته مذكرات الأخ/ وزير الشباب والرياضة التي منها المذكرة الخاصة بالمشروع وإعداد تقرير عن ما نتوصل إليه من نتائج ومقترحات متضمنا رأيا فنيا بشأن الكيفية التي يمكن من خلالها معالجة كافة الإشكالات التي تعاني منها تلك المشاريع.

* Special Report addressing the stalled project of the Ministry of Youth and Sports (opinions of the Ministry of Public Works).

وبعد الإطلاع على وضع المشروع والمعالجات التي تمت من قبل الجهة ترى وزارة الأشغال العامة والطرق الموافقة على المعالجة الخاصة باستكمال تنفيذ مشروع مبنى وزارة الشباب والرياضة وفق الأسعار المتفق عليها بين وزارة الشباب والرياضة والمقاول مكتب البرج الهندسي لتنفيذ بقية الأعمال وبمبلغ إجمالي قدره (1,178,232,750 ريال) وعلى مسئولية الجهة.

شريطة أن يتم الالتزام بما يلي:

1. أن يتم التنفيذ طبقا للمخططات والمواصفات والشروط العامة والخاصة للتعاقد.
2. على الجهة إلزام المقاول المنفذة بتقديم برنامج زمني مفصل للتنفيذ في المدة المحددة وهي (24 شهر).
3. على الجهة استكمال كافة النواقص في المخططات قبل توقيع العقد لتحاشي أي تأخير جديد.
4. على الجهة تصفية حساب المقاول للمرحلة السابقة بحسب المخالصة النهائية الموقعة من قبل كل من الجهة والمقاول المنفذ، وخصم قيمتها من الدفعة المقدمة المصروفة بموجب العقد الأساسي، وتوقيع عقد جديد لهذه المرحلة الخاصة باستكمال المشروع وبحسب جداول الكميات والأسعار الموقعة من قبل كل من الجهة والمقاول المنفذ .
5. على الجهة تصفية حساب المبالغ المتبقية من الدفعة المقدمة بموجب العقد السابق واحتسابها كجزء من الدفعة المقدمة للعقد الجديد الخاص بمرحلة استكمال المشروع مقابل ضمانات بنكية جديدة.
6. لا يحق للمقاول المنفذ المطالبة بأي فوارق أسعار مهما كانت المبررات.
7. أن يتولى المقاول المنفذ إنجاز المشروع من قبله دون إسناده لأي مقاول آخر من الباطن.
8. على الجهة إلزام المقاول المنفذ لتقديم برنامج زمني لمدة ثلاثة أشهر للأعمال التي سيقوم بتنفيذها وإذا لم يتم الوفاء بهذا البرنامج يتم مصادرة جميع الضمانات وسحب المشروع وإنزاله في مناقصة عامة.
9. تتولى وزارة الأشغال العامة والطرق الإشراف على تنفيذ المشروع.
10. على الجهة أخذ الضمانات القانونية الكافية.

والله الموفق،،،

مدير إدارة المتابعة والمعلومات	مدير إدارة الإشراف	وكيل وزارة الأشغال العامة والطرق لقطاع الأشغال العامة
احمد علي الكبسي	م/ عبدالتقوي اسماعيل	م/ عبدالحميد احمد المتوكل

* Special Report addressing the stalled project of the Ministry of Youth and Sports (continued opinions of the Ministry of Public Works).

بسم الله الرحمن الرحيم

الجمهورية اليمنية
مجلس الوزراء
الامـــانة العـــامة

قرار مجلس الوزراء رقم (٤٥٤) لعام ٢٠٠٦م
بشأن
معالجة تعثر مشروع مبنى وزارة الشباب والرياضة

اطلع مجلس الوزراء على المذكرة المقدمة من نائب رئيس الوزراء وزير الداخلية رئيس اللجنة العليا للمناقصات ومشتريات الدولة برقم(ل.ع.م/٤٥٣) وتاريخ ٢٠٠٦/١٢/٢٤م بشأن معالجة تعثر مشروع مبنى وزارة الشباب والرياضة ، وأقر مايلي : -

١ - الموافقة على المعالجة الخاصة باستكمال تنفيذ مشروع مبنى وزارة الشباب والرياضة وفق الاسعار المتفق عليها بين وزارة الشباب والرياضة والمقاول مكتب البرج الهندسي لتنفيذ بقية الاعمال باجمالي مبلغ (١,١٧٨,٢٣٢,٧٥٠ ريال) مليار ومائة وثمانية وسبعون مليون ومائتين واثنين وثلاثون الف وسبعمائة وخمسون ريال - مع تصفية حساب الاعمال المنفذة والتي بلغت قيمتها الاجمالية بحسب المخالصة النهائية بمبلغ (٦٠,١٠٢,٠٠٠ ريال) ستون مليون ومائة واثنين الف ريال ، على ان تتحمل وزارتي الشباب والرياضة والاشغال العامة والطرق مسئولية صحة وسلامة الدراسة والمراجعة للاجراءات التي تم اتباعها لمعالجة تعثر هذا المشروع وكذا سلامة ودقة الاحتساب لاسعار الاعمال المتبقية والاعمال المنفذة (تصفية حساب الاعمال المنفذة) كما يعتبر التقرير الفني المرفوع من قبل وزارة الاشغال العامة والطرق وجداول الاسعار الموقعة بين وزارة الشباب والمقاول المنفذ للمشروع جزء لايتجزأ من هذا القرار.

بشريطة أن يتضمن العقد الشروط والالتزامات التالية :-

أولا : على الجهة صاحبة المشروع الزام المقاول اعلاه بالتنفيذ طبقاً للمخططات والمواصفات الفنية والشروط العامة والخاصة المحددة في العقد.

ثانيا : على الجهة صاحبة المشروع الزام المقاول المنفذ للمشروع بتقديم برنامج زمني مفصل للتنفيذ في المدة المحددة وهي (٢٤شهرا).

ثالثا : على الجهة استكمال كافة النواقص في المخططات قبل توقيع العقد لتحاشي أي تأخير جديد.

رابعا : على الجهة تصفية حساب المقاول المنفذ للمشروع للمرحلة السابقة بحسب المخالصة النهائية الموقعة من قبل كل من الجهة والمقاول وتوقيع عقد جديد لهذه المرحلة الخاصة باستكمال المشروع وبحسب جداول الكميات والاسعار الموقعة من قبل كل من الجهة والمقاول المنفذ للمشروع.

خامسا : على الجهة تصفية حساب المبالغ المتبقية من الدفعة المقدمة بموجب العقد السابق اضافة الى مبالغ العهد المنصرفة على هيئة مستخلصات لاعمال غير منجزة واحتسابها كجزء من الدفعة المقدمة للعقد الجديد الخاص بمرحلة استكمال المشروع مقابل ضمانات بنكية جديدة.

سادسا : على الجهة صاحبة المشروع الزام المقاول المنفذ للمشروع بعدم المطالبة بأي فوارق اسعار مهما كانت المبررات.

سابعا : على الجهة صاحبة المشروع الزام المقاول المنفذ للمشروع انجاز المشروع بنفسه دون اسناده لأي مقاول آخر من الباطن.

* Cabinet ordinance on the project error handling for the building of the Ministry of Youth and Sports.

بسم الله الرحمن الرحيم

الجمهورية اليمنية
مجلس الوزراء
الامـــانة العـــامة

ثامناً : على الجهة الزام المقاول المنفذ للمشروع بتقديم برنامج زمني لمدة ثلاثة أشهر للاعمال التي سيقوم بتنفيذها واذا لم يتم الوفاء بهذا البرنامج يتم مصادرة جميع الضمانات وسحب المشروع منه وانزاله في مناقصة عامة جديدة.

تاسعاً : تتولى وزارة الاشغال العامة والطرق الاشراف على تنفيذ المشروع بالتنسيق مع الجهة صاحبة المشروع.

عاشراً : على الجهة صاحبة المشروع أخذ الضمانات القانونية الكافية للتنفيذ قبل توقيع العقد.

٢- يعمل بهذا القرار من تاريخ ٢٦/ ١٢ /٢٠٠٦م وينتهي بتنفيذ الاحكام الواردة بالقرار .

٣- ينفذ القرار بالوسائل الإدارية المناسبة .

المتحفظون	الممتنعون	المنفـــذون	
		رئيسي	مشـــارك
لايوجـد	لايوجـد	وزير الشباب والرياضة وزير الاشغال العامة والطرق	

مدة القرار : مؤقت

مضمون القرار : خدمي/ شباب ورياضة-- معالجة تعثر مشروع مبنى وزارة الشباب والرياضة

شكل القرار : مناقصة

جهة التنفيذ : مشترك.

* Cabinet ordinance on the project error handling for the building of the Ministry of Youth and Sports, continued.

APPENDIX 4: PROJECT DOCUMENTATION FOR CASE STUDY IN MALAYSIA

CADANGAN MEMBINA DAN MENYIAPKAN 1 BLOK 8 TINGKAT KOMPLEKS IPPP DAN MAKMAL KEMUDAHAN PENYELIDIKAN BERPUSAT DI UNIVERSITI MALAYA KUALA LUMPUR

No. Kontrak.: JKR/IP/CKUB/103/2009

JURU UKUR BAHAN	JURUUKUR BAHAN H & A SUITE 2-4-32B, WISMA RAMPAI, JALAN 34/26, RAMPAI TOWN CENTRE, SETAPAK 52200 KUALA LUMPUR TEL: 03 4142 7355 FAX: 03 4143 5355
JUMLAH KONTRAK ASAL	RM 64,000,000.00
NO. KONTRAK	JKR/IP/CKUB/103/2009
TARIKH MILIK TAPAK BINA	20 APRIL 2009
TARIKH SIAP KERJA	17 APRIL 2011
TEMPOH KONTRAK	24 BULAN
TEMPOH LIABILITI KECACATAN	12 BULAN

MAKLUMAT KONTRAKTOR

NAMA KONTRAKTOR	OISB CONSTRUCTION SDN. BHD. NO 270 JALAN TENGKU KELANA 41000 KELANG SELANGOR DARUL EHSAN TEL: 03 3371 4602 FAX: 03 3372 4075
NO. PENDAFTARAN SYARIKAT	45104-T
NO. PENDAFTARAN PKK	1002A950113
KELAS	'A'
NO. PENDAFTARAN CIDB	1961120-SL016017
GRED CIDB	G7
TARAF	BUMIPUTERA

* Details of the project.

CADANGAN MEMBINA DAN MENYIAPKAN 1 BLOK 8 TINGKAT KOMPLEKS IPPP DAN MAKMAL KEMUDAHAN PENYELIDIKAN BERPUSAT DI UNIVERSITI MALAYA KUALA LUMPUR

No. Kontrak.: JKR/IP/CKUB/103/2009

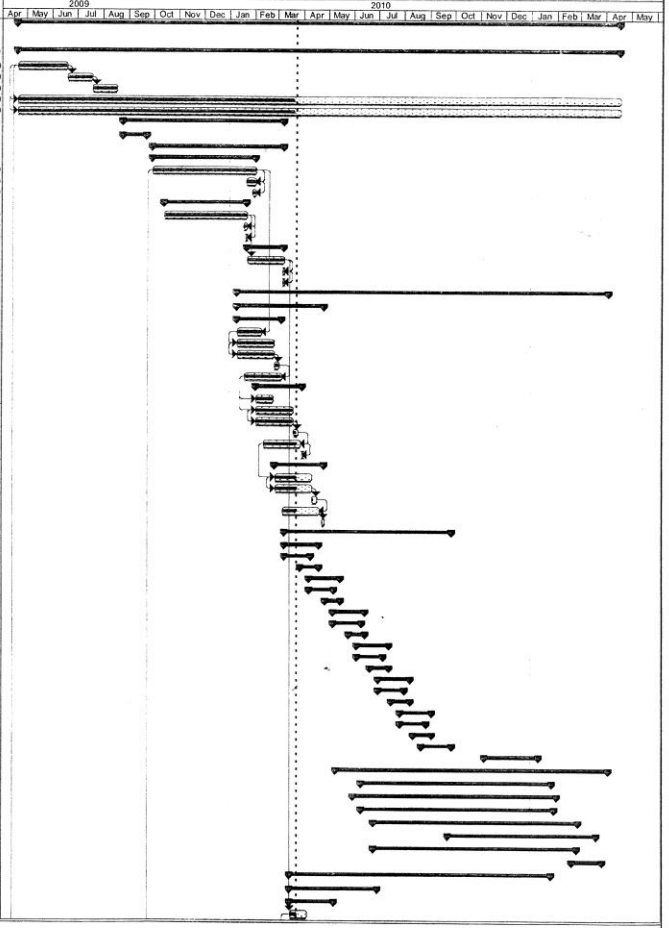
Bil	Skop Kerja	Jumlah Kontrak (RM)
1	Preliminaries and General Conditions	3,601,000
2	Piling works	9,957,988.00
3	Building works - Kompleks IPPP - Auditorium	 17,428,765.30 3,898,020.90
4	External works - Site Preparation & Demolition Works - Earthworks & Retaining Wall - Roadwork & Carpark - Surface water drainage - Sewerage - Water reticulation - Rumah sampah	2,439,508.60
5	Landscaping works	371,556.70
6	Laboratory furniture & equipment - Built In Furniture - Laboratory Furniture	 744,300.00 657,377.50
7	Provisional sum	200,000.00
8	Electrical works	9,321,000.00
9	Mechanical works	12,735,170.00
10	Information & Communication Technology	2,645,313.00
	Total	**64,000,000.00**

* Cost details of the project.

* Flow of work Bar char 1st page.

UNIVERSITI MALAYA - KOMPLEKS IPPP DAN MAKMAL KEMUDAHAN BERPUSAT

ID	Task Name	Duration	Start	Finish	Predecessors	% Tracking Schedule	% Physical Schedule	% Physical Actual	Variance
1	**UNIVERSITI MALAYA - KOMPLEKS IPPP DAN MAKMAL KEMUDAHAN BERPUSAT**	728 days	Mon 4/20/09	Sun 4/17/11		18%	18	17	-1
2	**BILL. A - PRELIMINARIES**	728 days	Mon 4/20/09	Sun 4/17/11		51%	51	51	0
3	Mobilisation	60 days	Mon 4/20/09	Thu 6/18/09		100%	100	100	0
4	Site Office & Hoarding	30 days	Fri 6/19/09	Sat 7/18/09	3	100%	100	100	0
5	Site Demarcation & survey	30 days	Sun 7/19/09	Mon 8/17/09	4	100%	100	100	0
6	Site logistic	728 days	Mon 4/20/09	Sun 4/17/11	3SS	46%	46	46	0
7	Preliminaries Requirement	728 days	Mon 4/20/09	Sun 4/17/11	3SS	46%	46	46	0
8	**BILL. B - PILING WORKS**	195 days	Tue 8/25/09	Sun 3/7/10		100%	100	100	0
9	**Piling - Test pile**	29 days	Tue 8/25/09	Tue 9/22/09		100%	100	100	0
17	**Working Pile - 368 pts**	159 days	Wed 9/30/09	Sun 3/7/10		100%	100	100	0
18	**Zone 1 - 172 pts**	125 days	Wed 9/30/09	Mon 2/1/10		100%	100	100	0
19	Boring + Concreting - 1 no pile rig	125 days	Wed 9/30/09	Mon 2/1/10	16FS+7 days	100%	100	100	0
20	Test Pile (PDA + MLT) - 3 pts	12 days	Thu 1/21/10	Mon 2/1/10	19FF	100%	100	100	0
21	Test Pile - PDA only	5 days	Thu 1/28/10	Mon 2/1/10	20FF	100%	100	100	0
22	**Zone 2 - 137 pts**	100 days	Wed 10/14/09	Thu 1/21/10		100%	100	100	0
23	Boring + Concreting - 1 no pile rig	100 days	Wed 10/14/09	Thu 1/21/10		100%	100	100	0
24	Test Pile (PDA + MLT) - 2 pts	4 days	Mon 1/18/10	Thu 1/21/10	23FF	100%	100	100	0
25	Test Pile - PDA only	2 days	Wed 1/20/10	Thu 1/21/10	24FF	100%	100	100	0
26	**Zone 3 - 59 pts**	45 days	Fri 1/22/10	Sun 3/7/10		100%	100	100	0
27	Boring + Concreting - 1 no pile rig	45 days	Fri 1/22/10	Sun 3/7/10	23	100%	100	100	0
28	Test Pile (PDA + MLT) - 1 pts	2 days	Sat 3/6/10	Sun 3/7/10	27FF	100%	100	100	0
29	Test Pile - PDA only	2 days	Sat 3/6/10	Sun 3/7/10	28FF	100%	100	100	0
30	**BILL. C - MAIN BUILDING**	450 days	Sun 1/10/10	Mon 4/4/11		9%	9	5	-4
31	**1. WBFFL**	106 days	Sun 1/10/10	Sun 4/25/10		84%	84	55	-29
32	**Pilecap**	54 days	Sun 1/10/10	Thu 3/4/10		100%	100	92	-8
33	Excavation works	30 days	Sun 1/10/10	Mon 2/8/10	19FF+7 days	100%	100	92	-8
34	Formwork fabrication & installation	45 days	Sun 1/10/10	Tue 2/23/10	33SS	100%	100	92	-8
35	Reinforcement bending,cutting & installation	45 days	Sun 1/10/10	Tue 2/23/10	34SS	100%	100	92	-8
36	Inspection & approval by Resident engineer	6 days	Wed 2/24/10	Mon 3/1/10	35	100%	100	92	-8
37	Concreting work	45 days	Tue 1/19/10	Thu 3/4/10	36FF+3 days	100%	100	92	-8
38	**Groundbeam**	57 days	Tue 2/2/10	Tue 3/30/10		97%	97	35	-62
39	Excavation works	21 days	Tue 2/2/10	Mon 2/22/10	37SS+14 days	100%	100	35	-65
40	Formwork fabrication & installation	45 days	Tue 2/2/10	Thu 3/18/10	37SS+14 days	100%	100	35	-65
41	Reinforcement bending,cutting & installation	45 days	Tue 2/2/10	Thu 3/18/10	40SS	100%	100	35	-65
42	Inspection & approval by Resident engineer	6 days	Fri 3/19/10	Wed 3/24/10	41	83%	83	35	-48
43	Concreting work	45 days	Thu 2/11/10	Sat 3/27/10	42FF+3 days	91%	91	35	-56
44	Removal of formwork	1 day	Tue 3/30/10	Tue 3/30/10	43FF+3 days	35%	35	35	0
45	**Groundfloor slab**	60 days	Thu 2/25/10	Sun 4/25/10		52%	82	35	-17
46	Formwork fabrication & installation	45 days	Thu 2/25/10	Sat 4/10/10	43SS+14 days	60%	60	35	-25
47	Reinforcement bending, cutting & installation	45 days	Thu 2/25/10	Sat 4/10/10	46SS	60%	60	35	-25
48	Inspection & approval by Resident engineer	6 days	Sun 4/11/10	Fri 4/16/10	47	35%	35	35	0
49	Concreting work	45 days	Sat 3/6/10	Mon 4/19/10	48FF+3 days	40%	40	35	-5
50	Removal of formwork	3 days	Fri 4/23/10	Sun 4/25/10	49FS+3 days	35%	35	35	0
51	**2. FRAME**	203 days	Tue 3/9/10	Mon 9/27/10		5%	5	0	-5
52	**1st Floor**	42 days	Tue 3/9/10	Mon 4/19/10		35%	35	0	-35
53	**Beam and Slab**	32 days	Tue 3/9/10	Fri 4/9/10		85%	85	0	-85
59	**Column**	23 days	Sun 3/28/10	Mon 4/19/10		0%	0	0	0
67	**2nd Floor**	38 days	Thu 4/8/10	Sat 5/15/10		0%	0	0	0
68	**Beam and Slab**	30 days	Thu 4/8/10	Fri 5/7/10		0%	0	0	0
76	**Column**	19 days	Tue 4/27/10	Sat 5/15/10		0%	0	0	0
84	**3rd Floor**	39 days	Fri 5/7/10	Mon 6/14/10		0%	0	0	0
85	**Beam and Slab**	35 days	Fri 5/7/10	Thu 6/10/10		0%	0	0	0
93	**Column**	20 days	Wed 5/26/10	Mon 6/14/10		0%	0	0	0
101	**4th Floor**	39 days	Sat 6/5/10	Tue 7/13/10		0%	0	0	0
102	**Beam and Slab**	32 days	Sat 6/5/10	Tue 7/6/10		0%	0	0	0
108	**Column**	23 days	Mon 6/21/10	Tue 7/13/10		0%	0	0	0
116	**5th Floor**	39 days	Thu 7/1/10	Sun 8/8/10		0%	0	0	0
117	**Beam and Slab**	32 days	Thu 7/1/10	Sun 8/1/10		0%	0	0	0
123	**Column**	23 days	Sat 7/17/10	Sun 8/8/10		0%	0	0	0
131	**6th Floor**	39 days	Tue 7/27/10	Fri 9/3/10		0%	0	0	0
132	**Beam and Slab**	32 days	Tue 7/27/10	Fri 8/27/10		0%	0	0	0
138	**Column**	23 days	Thu 8/12/10	Fri 9/3/10		0%	0	0	0
146	**7th Floor**	37 days	Sun 8/22/10	Mon 9/27/10		0%	0	0	0
161	**4. ROOF**	66 days	Sat 11/6/10	Mon 1/10/11		0%	0	0	0
170	**5. STAIRCASE**	330 days	Mon 5/10/10	Mon 4/4/11		0%	0	0	0
183	**6. WALL & PANEL**	231 days	Thu 6/10/10	Wed 1/26/11		0%	0	0	0
248	**7. DOORS & IRONMONGERIES**	247 days	Mon 5/31/10	Tue 2/1/11		0%	0	0	0
253	**8. WINDOWS**	234 days	Thu 6/10/10	Sat 1/29/11		0%	0	0	0
258	**9. WALL FINISHES**	248 days	Fri 6/25/10	Sun 2/27/11		0%	0	0	0
267	**10. FLOOR FINISHES**	180 days	Thu 9/23/10	Mon 3/21/11		0%	0	0	0
278	**11. CEILING FINISHES**	246 days	Fri 6/25/10	Fri 2/25/11		0%	0	0	0
287	**12. SANITARY APPLIANCES**	37 days	Sun 2/20/11	Mon 3/28/11		0%	0	0	0
290	**BILL. D - AUDITORIUM**	317 days	Mon 3/15/10	Tue 1/25/11		3%	3	6	3
291	**1. WBFFL**	107 days	Mon 3/15/10	Tue 6/29/10		19%	19	38	19
292	**Pilecap**	54 days	Mon 3/15/10	Fri 5/7/10		43%	43	85	42
293	Excavation works	21 days	Mon 3/15/10	Sun 4/4/10	27FS+7 days	43%	43	85	42



OISB CONSTRUCTION SDN. BHD.

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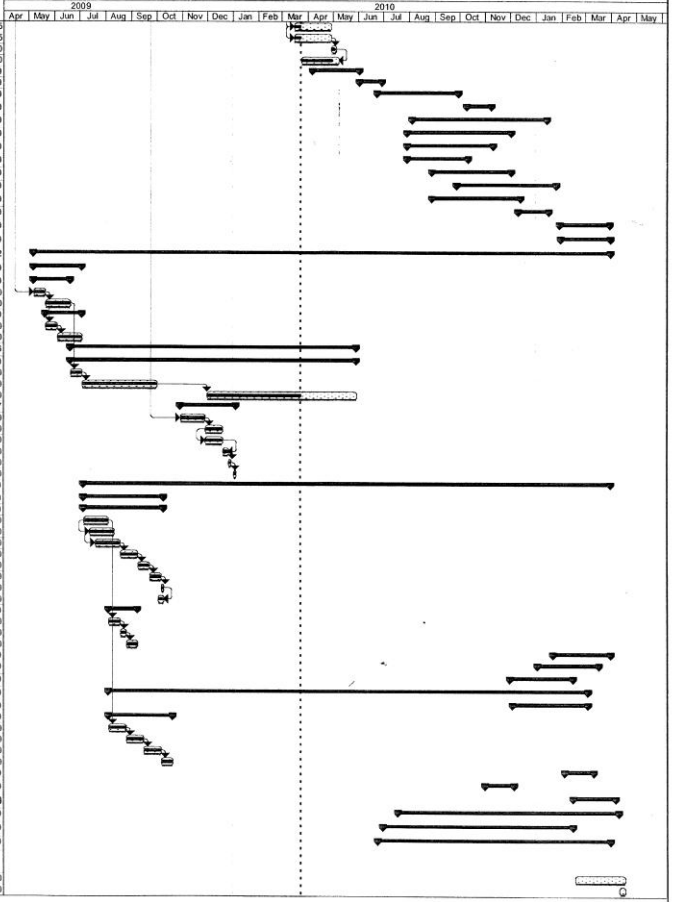
UNIVERSITI MALAYA - KOMPLEKS IPPP DAN MAKMAL KEMUDAHAN BERPUSAT

ID	Task Name	Duration	Start	Finish	Predecessors	% Tracking Schedule	% Physical Schedule	% Physical Actual	Variance
294	Formwork fabrication & installation	45 days	Mon 3/15/10	Wed 4/28/10	293SS	20%	20	85	65
295	Reinforcement bending,cutting & installation	45 days	Mon 3/15/10	Wed 4/28/10	294SS	20%	20	85	65
296	Inspection & approval by Resident engineer	6 days	Thu 4/29/10	Tue 5/4/10	295	85%	85	85	0
297	Concreting work	45 days	Wed 3/24/10	Fri 5/7/10	296FF+3 days	85%	85	85	0
298	Groundbeam	57 days	Wed 4/7/10	Wed 6/2/10		0%	0	0	0
305	Groundfloor slab	27 days	Thu 6/3/10	Tue 6/29/10		0%	0	0	0
311	2. FRAME	98 days	Thu 6/24/10	Wed 9/29/10		0%	0	0	0
361	4. ROOF	30 days	Sun 10/10/10	Mon 11/8/10		0%	0	0	0
370	5. STAIRCASE	163 days	Thu 8/5/10	Fri 1/14/11		0%	0	0	0
383	6. WALL & PANEL	126 days	Fri 7/30/10	Thu 12/2/10		0%	0	0	0
416	7. DOORS & IRONMONGERIES	104 days	Fri 7/30/10	Wed 11/10/10		0%	0	0	0
421	8. WINDOWS	74 days	Fri 7/30/10	Mon 10/11/10		0%	0	0	0
426	9. WALL FINISHES	96 days	Sun 8/29/10	Thu 12/2/10		0%	0	0	0
435	10. FLOOR FINISHES	120 days	Tue 9/28/10	Tue 1/25/11		0%	0	0	0
446	11. CEILING FINISHES	107 days	Sun 8/29/10	Mon 12/13/10		0%	0	0	0
455	12. SANITARY APPLIANCES	37 days	Sat 12/11/10	Sun 1/16/11		0%	0	0	0
458	BUILT IN FURNITURE	60 days	Sun 1/30/11	Wed 3/30/11		0%	0	0	0
462	LABORATORY FURNITURE	60 days	Mon 1/31/11	Thu 3/31/11		0%	0	0	0
467	BILL. F - INFRASTRUCTURE WORKS	694 days	Thu 5/7/09	Thu 3/31/11		53%	53	51	-2
468	1. SITE PREPARATION AND DEMOLITION WORKS	58 days	Thu 5/7/09	Fri 7/3/09		100%	100	100	0
469	OPEN CARPARK	44 days	Thu 5/7/09	Fri 6/19/09		100%	100	100	0
470	Site Clearance	14 days	Thu 5/7/09	Wed 5/20/09	3SS+2 days	100%	100	100	0
471	Demolition Works	30 days	Thu 5/21/09	Fri 6/19/09	470	100%	100	100	0
472	MAIN BUILDING	44 days	Thu 5/21/09	Fri 7/3/09		100%	100	100	0
473	Site Clearance	14 days	Thu 5/21/09	Wed 6/3/09	470	100%	100	100	0
474	Demolition Works	30 days	Thu 6/4/09	Fri 7/3/09	473	100%	100	100	0
475	2. EARTHWORK & RETAINING WALL	344 days	Sat 6/20/09	Sat 5/29/10		82%	82	76	-6
476	Earthworks	344 days	Sat 6/20/09	Sat 5/29/10		76%	76	76	0
477	Strip off top soil	14 days	Sat 6/20/09	Fri 7/3/09	471	100%	100	100	0
478	Cutlexcavation works	90 days	Sat 7/4/09	Thu 10/1/09	477	100%	100	100	0
479	Anti-termite treatment	180 days	Tue 12/1/09	Sat 5/29/10	478FS+60 days	63%	63	63	0
480	Retaining Wall	67 days	Fri 10/30/09	Mon 1/4/10		100%	100	73	-27
481	Excavation works	30 days	Fri 10/30/09	Sat 11/28/09	19SS+30 days	100%	100	100	0
482	Formworks fabrication and installation	21 days	Sun 11/29/09	Sat 12/19/09	481	100%	100	60	-40
483	Reinforcement cutting,bending,installation	21 days	Sun 11/29/09	Sat 12/19/09	482SS	100%	100	60	-40
484	Inspection and approval by Resident Engineer	7 days	Sun 12/20/09	Sat 12/26/09	483FF+7 days	100%	100	60	-40
485	Concreting works	3 days	Sun 12/27/09	Tue 12/29/09	484	100%	100	50	-50
486	Removal of formworks	3 days	Sat 1/2/10	Mon 1/4/10	485FS+3 days	100%	100	50	-50
487	3. ROADWORKS & CARPARKS	634 days	Mon 7/6/09	Thu 3/31/11		60%	60	60	0
488	Open Carpark	96 days	Mon 7/6/09	Fri 10/9/09		100%	100	100	0
489	Roadworks	96 days	Mon 7/6/09	Fri 10/9/09		100%	100	100	0
490	Excavation	30 days	Mon 7/6/09	Tue 8/4/09		100%	100	100	0
491	Preparation of sub-base	30 days	Mon 7/13/09	Tue 8/11/09	490SS+7 days	100%	100	100	0
492	Preparation of base-course	30 days	Mon 7/20/09	Tue 8/18/09	491SS+7 days	100%	100	100	0
493	Road kerb	21 days	Wed 8/19/09	Tue 9/8/09	492	100%	100	100	0
494	Premix works - binder course	14 days	Wed 9/9/09	Tue 9/22/09	493	100%	100	100	0
495	Premix works - wearing course	14 days	Wed 9/23/09	Tue 10/6/09	494	100%	100	100	0
496	Road marking	3 days	Wed 10/7/09	Fri 10/9/09	495	100%	100	100	0
497	Road Signage	7 days	Sat 10/3/09	Fri 10/9/09	496FF	100%	100	100	0
498	Foot path	35 days	Wed 8/5/09	Tue 9/8/09		100%	100	100	0
499	Excavation	14 days	Wed 8/5/09	Tue 8/18/09	490	100%	100	100	0
500	Preparation of base	7 days	Wed 8/19/09	Tue 8/25/09	499	100%	100	100	0
501	Installation of concrete paver	14 days	Wed 8/26/09	Tue 9/8/09	500	100%	100	100	0
502	Building Lot	69 days	Sat 1/22/11	Thu 3/31/11		0%	0	0	0
515	4. EXTERNAL WATER RECTICULATION	74 days	Mon 1/3/11	Thu 3/17/11		0%	0	0	0
522	5. SEWERAGE	76 days	Wed 12/1/10	Mon 2/14/11		0%	0	0	0
527	6. SURFACE WATER DRAINAGE	577 days	Wed 8/5/09	Fri 3/4/11		42%	42	42	0
528	Building Lot	91 days	Sat 12/4/10	Fri 3/4/11		0%	0	0	0
534	Open Carpark	77 days	Wed 8/5/09	Tue 10/20/09		100%	100	100	0
535	Installation of Underground Pipe	21 days	Wed 8/5/09	Tue 8/25/09	490	100%	100	100	0
536	Installation of Block Drain	21 days	Wed 8/26/09	Tue 9/15/09	535	100%	100	100	0
537	Construction of Sumps	21 days	Wed 9/16/09	Tue 10/6/09	536	100%	100	100	0
538	MS Grating & Trash Screen	14 days	Wed 10/7/09	Tue 10/20/09	537	100%	100	100	0
539	7. EXTERNAL STEP	35 days	Sat 2/5/11	Fri 3/11/11		0%	0	0	0
546	8. RUMAH SAMPAH	35 days	Mon 11/1/10	Sun 12/5/10		0%	0	0	0
550	BILL. G - LANSCAPE WORKS	51 days	Tue 2/15/11	Wed 4/6/11		0%	0	0	0
554	BILL. H - MECHANICAL WORKS	266 days	Mon 7/19/10	Sun 4/10/11		0%	0	0	0
623	BILL. J - ELECTRICAL WORKS	229 days	Thu 7/1/10	Mon 2/14/11		0%	0	0	0
749	BILL. K - INFORMATION & TECH. COMM	280 days	Fri 6/25/10	Thu 3/31/11		0%	0	0	0
753									
754									
755	Cleaning Works	60 days	Thu 2/17/11	Sun 4/17/11		0%	0	0	0
756	Handing Over	7 days	Mon 4/11/11	Sun 4/17/11		0%	0	0	0



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