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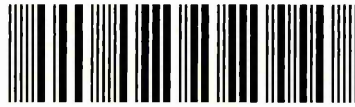
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A Framework for Enhancing the Success of Construction Projects
Undertaken in Libya

Mahdi Mohamed Abdulsamad Ali

A thesis submitted in partial fulfilment of the requirements of
Sheffield Hallam University for the degree of
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ABSTRACT

The construction industry is a key player in the development of the Libyan economy. It contributes for about 5.2 % of the Libyan Gross domestic Product (GDP) and employs around 3.2 % of the total workforce, which include Libyan and other nationalities. Construction projects successes are the public face of the construction industry. However, with the increasing number of project delays and/or failure facing the development of the construction sector, it is important to determine the factors affecting construction projects success and develop appropriate solutions to such problems. View studies have been carried out which concentrated on specific factors including projects' success, but these were very limited in the range of the study, and organisations are still struggling with how to complete projects successfully. Preliminary literature review and pilot study identified that the major cause of construction projects failure are management methodologies, selection of project team members, external factors and the procurement methods. Findings from the literature review, questionnaire survey and interviews were used to develop a framework to improve the success of construction projects, which was validated by experienced and professionals in the Libyan construction industry. The findings which are drawn from this research include establishment and evaluation of the factors that affects projects success including external factors (economic and political), contractual system and the selection of the project team members. The framework is considered to be a major contribution to knowledge and is recommended for use to ensure successful construction project implementation in both the public and private sectors. The framework provides very important criteria for the selection of the project team in order to ensure that appropriate persons are selected. The findings also provide solutions and methodologies for organisations to use to ensure that project will be successfully completed. The framework will contribute to construction projects' success and hence enhance and promote the development the construction sector in Libya.

LIBYAN GOVERNMENT SYSTEM

This research project was completed during a time of conflict, which led ultimately to change in Libyan political agenda. The process of data collection including the questionnaire survey and interviews, pilot studies and the validation of the framework were carried out in the period of previous government. However, it is anticipated with new government system the results of this research project will not be greatly affected, and this potentially makes the work even more important with the need for massive post war reconstruction. The aim of the research is to evaluate and explore factors that influence the success of construction projects, and develop a framework to enhance the success of construction projects in Libya. This was achieved and the framework was also developed for enhancing the success of construction projects in Libya, and it was validated by a number of experienced and professional people in the Libyan construction industry. The framework developed for improve the level of success of projects and the development of the construction sector in Libya is very relevant regardless of any change in the government system.

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ABBREVIATIONS

APMBOK:	Association for Project Body of Knowledge
APM:	Association of Project Management
ALE:	Association of Libyan Engineers
CSF:	Critical Success Factors
CIOB:	The Chartered Institute of Building
CDM:	Construction Design and Management Regulations 2007
CPMC:	Consultant, Project Manager and/or Contractors
GDP:	Gross Domestic Product
HSE:	A guide to Managing Health and Safety in Construction
LYD:	Libyan Dinar
MD:	Management Director
NB:	National Consulting Bureau
PMI:	Project Management Institute
PSF:	Project Success Factors
PM:	Project Manager
PMs:	Project Managers
PSF:	Project Success Factors
PD:	Planning Department
PMBOOK:	Project Management Body of Knowledge
SCP:	Successful Construction Project
CI:	Construction Industry

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Chapter 1

Introduction

1.1. AIMS OF THE CHAPTER

This chapter aims to familiarise the reader with the purpose and subject area of the research study. The chapter takes an overview of the Libyan Construction Industry, identifying the problems/factors that affect the success of the construction projects as well as the development of the construction sector in Libya. It then focuses on the research subject area and introduces its importance to the construction industry. The aims and objectives of this research are also outlined, together with the significance of the study. An overview of the research methodology is also presented in this chapter. It concludes with a chapter guide to the thesis.

1.2. BACKGROUND OF STUDY

The construction industry (CI) is one of the most important industries in the development of economy, and considered as the backbone to the growth of any country and its people. The Libyan economy is highly dependent on oil revenues; approximately 80% comes from the oil sector and 20% from non-oil and construction sectors. The construction sector in Libya is very important; however in spite of the large amount of money spent in this sector it is still not developed and large number of projects have failed and/or are suspended.

According to Mlinga and Wells (2001), the construction industry plays an important role in socio-economic development. In the view of Cridland (2009) the construction industry makes a tremendous contribution to the national economy.

With an increasing number of construction project failures in the Libyan construction industry, it is essential to understand why these projects have failed. Success and failure

in the construction industry depends upon many factors, such as the performance of the management system, project managers, communication, project management direction, planning and control, and policy. In the construction industry success means finishing the project within the time scales, achieving the estimated cost and acceptable level of quality as required by the client. Apart from the factors that are responsible for the success or failure of projects as identified above, the project success also depend on assigning and defining roles and responsibilities to each project team member.

PRINCE2 (2007) has emphasised that a successfully managed project has clearly assigned roles and responsibilities so that all members of the project management team and project team know what they should be doing, what other teams and team members are doing, and can act accordingly. If a project can be defined as a 'temporary organization' then clearly that organization must be well defined. Without assigning clear roles, the communications, interactions, accountabilities and responsibilities are confused.

Indication from both the pilot study and previous study by the author suggested that, the construction industry in Libya is suffering from late completion of projects, high levels of costs which affect the overall budget of the project and poor quality finish. To avoid the above problems and achieve projects goals these three elements should be taken into consideration from the inception to the completion stage of the project by all project members. Thus it is essential to recognise the factors that have an impact on the success and failure of any project. The Libyan construction industry suffers from a gross failure to complete projects to the scheduled time scale, causing increasing levels of cost. To rectify those problems, there should be in-depth study to ascertain the causes of these

problems and formulate a solution that could contribute to successful construction projects in the future.

1.3. INTRODUCTION TO THE RESEARCH

Success is very important to everyone in the organization and so everyone in an organization should contribute to delivering a successful project which can meet the client's expectations. Project success has been defined in various ways by different scholars.

According to Lock (2007) who stated that time, performance and cost are traditionally considered to be the basic parameters for measuring project success or failure. Also he stated that there are many things needed to be in place and many actions taken during the project execution period to help ensure success. For example: well-motivated staff, good project definition, availability of resources, good project communications, quick and fair resolution of conflict, appropriate choice of project strategy, appropriate regard for health and safety and strong support for the project and its manager from higher management were also recognised as fundamental.

In addition, Hughes (1996) and Chitkara (1998) recognised that the wrong choice of project team; unsupportive senior management; improper focus of the management system; rewarding the wrong actions; lack of communication; inadequate project formulation; and the improper management of the projects are attributes which diminish the success of the construction project.

With regarding to the selection of a project manager and his relation to the success of construction projects as a project manager is considered one of the keys to success of

projects. Burke (2007) stated that the right selection of project manager for the construction project is a key appointment which can influence the success or failure of the project.

Melton (2007) asserted that excellent project managers have the capability to bring projects in on time and within budget, whereas average or poor project managers may not. Melton also stated that construction project managers are those individuals who remain accountable for the achievement of the project objectives and who also ensure alignment of project objectives with the business objectives via use of an organizational project sponsor.

The general consensus among the above authors is that different elements have a contributing effect in achieving a successful construction project; this could be said to be true for most construction projects regardless of geographical location. Looking at the various published research material indicates that the relative success of the construction project is dependent on many of these factors. The importance of these factors is highlighted during the planning stage when they are carefully considered by all concerned in achieving a successful construction project framework.

The purpose and endeavour of the above definitions is to compare various insights from the published works and professionals in the industry in achieving a successful construction project. The information obtained from the published works will be used to gain a better understanding of these factors and this will be used along with the information collected from the primary research (quantitative and qualitative) to establish a new framework for enhancing the success of construction projects and improving the development of the construction sector in Libya.

From the above, it is clear that there are a lot of success factors that affect construction projects. These factors, if not properly managed, will lead to construction project failures. This research will establish the critical success factors affecting construction projects as well as developing a framework to enhance successful construction projects implementation in Libya. The framework is targeted at benefiting the construction industry by:

- Providing the opportunity for improved management and construction projects in Libya;
- Establishing a framework that contributes towards improving construction success.

1.4. RESEARCH AIMS AND OBJECTIVES

- **RESEARCH AIMS**

The aim of this research is to evaluate and explore factors that influence the success of a construction project, and develop a framework to enhance the success of construction projects in Libya.

- **RESEARCH OBJECTIVES**

In order to achieve the above stated aim, the objectives of the study are to:

- Identify and examine the problem areas associated with construction project management in Libya;
- Assess and define the roles and duties of the project manager at all stages of the project;

-
- Interpret and evaluate the existing barriers to the success of construction projects in Libya;
 - Identify and evaluate factors that contribute to the success of construction projects;
 - Develop and validate an operational framework to promote the success of construction projects based on best practice.

1.5. RESEARCH APPROACH METHODOLOGY

This study will adopt a mixed approach in its methodology, because it will facilitate the achievement of the research objectives, thus a mixed method research was used (quantitative and qualitative). Additionally a practical field survey was carried out to obtain primary information which was used to design the questionnaire. A number of interviews were conducted to aid the research gain more in-depth and detailed information, the aim of these interviews was to understand what factors affect construction projects success. A comprehensive investigation was carried out to identify the influential success factors that contribute to a successful construction projects, identify the research approach, and the research structure. A pilot study was used to test the samples for the research design and its suitability. The data analysis was based on the input from the questionnaires and from the interviews. The data were analysed using appropriate statistical tools (Statistical package for the Social Sciences SPSS and NVIVO respectively). The research culminated in the development of a new framework for integrating the most successful factors based on the extensive data collection and analysis, thereby contributing to the improved project management of construction projects in Libya.

Methodological Model

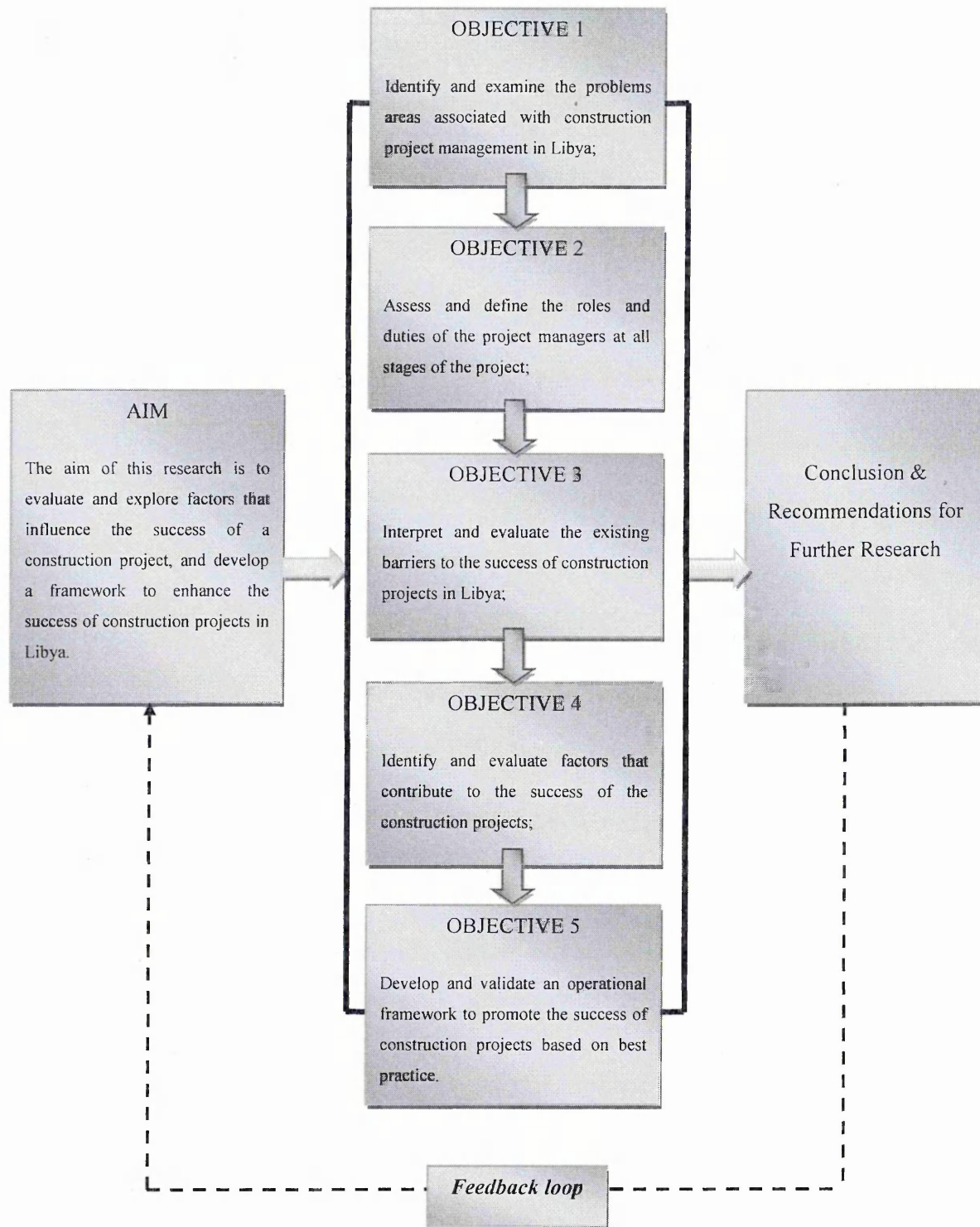


Figure 1.1: Methodological Model for the Research

1.6. GUIDE TO THE THESIS

This thesis is organised into ten chapters. A brief guide to each chapter is as follows:

Chapter 2 focusing on the main theme of the thesis, introduces the project management success and the means of success for construction projects. The Libyan construction sector and the management system in Libya are explained. The chapter covers the many factors that contribute to the success of a construction project.

Chapter 3 defines in detail the importance and the impact of a project manager to a project success, including a project manager role, duties, responsibilities, knowledge, selection, and his influence on the success of construction projects.

Chapter 4 identifies the most significant barrier factors that might affect the success of construction projects. The chapter concludes with the identification of the issues to be covered of the next chapter, and the chapter summary.

Chapter 5 explains and discusses in detail the research methodology of this study and the research process. It covers in detail different methodological concepts and approaches. The methods selected for this research are also outlined. Based on the comprehensive introduction, the chapter then explains the methodological framework of this project. The chapter also presents the structure of the data collection and analysis phase of this project.

Chapter 6 presents the data collection and analysis of the first phase of the primary research (the questionnaire survey). It starts with the introduction to the questionnaire. The average response rate and content of responses from different positions are outlined. The chapter also includes the methods employed for data analysis of the questionnaire.

Chapter 7 reports the data collection and analysis of the second phase of the primary research (the interviews). It begins with the selection criteria for the interviewees. The profiles of the organisations, methods used for the analysis and interviewees' positions for data collection in each organisation are outlined. Then the chapter presents the techniques and tools for the data analysis of the interviews.

Chapter 8 considers one of the main objectives in the thesis. Based on the analysis of the primary research (the questionnaire survey and the interviews) and the secondary research (the literature review) findings, the chapter presents a framework for enhancing the success of construction projects and improving the development of the construction sector in Libya. The concept, management and the structure of the framework are explained in detail.

Chapter 9 reports the validation of the framework for improving the success of construction projects in Libya. It starts with explaining the details and process used to validate the framework. Then the chapter presents the response received from the industry. The analysis of the feedback is also outlined. Finally, the summary of the chapter is presented, which covers the main suggestions received from the industry. Alternative routes discussed for the validation of the framework are also outlined in the summary of the chapter.

Chapter 10 is the final chapter of the thesis. It presents the conclusions drawn from the research work, covers all the phases including the literature review, questionnaire and interviews. Then the summary of the conclusions is given. The limitations of this research work are also outlined. Finally, the chapter identifies the area in the success of construction projects where future research is recommended.

1.7. SUMMARY OF THE CHAPTER

This chapter presented a brief introduction to the research project. The overview covered background about the research project, and an overview of the construction projects and the construction industry in Libya. Then the chapter presented the aims and objectives of the research project. The research methodology and methods that will be used for this research project are subsequently followed. The chapter concludes with a brief guide to the structure of the thesis. The next chapter identifies and evaluates factors that may have impact on the success of construction projects in Libya.

Chapter 2

Factors For Successful Construction Projects

2.1. AIMS OF THE CHAPTER

This chapter addresses the different factors that contribute to the success of a construction project and looks at the definitions of project success. This is achieved through a literature review and insights obtained from professionals in the industry, which will be used to gain a better understanding of how these factors contribute to developing a more effective framework for the Libyan construction industry. The chapter starts with an outline of the background to the construction industry in Libya. The construction industry and economy is also presented, followed by an explanation of the concept of project management and project management in developing countries. Communication in construction projects, risk management and health and safety management are presented in this chapter. The chapter also covers procurement methods. Criteria for selection of a project manager, contractor, consultant and subcontractors are also outlined. The chapter concludes with a chapter summary.

2.2. INTRODUCTION OF THE CHAPTER

There is a great need within the Libyan construction industry to identify for construction executives, construction managers, planners and project managers the key factors for success when planning the allocation of resources. For the purpose of this study project success is defined as the completion of a project within an acceptable time, within estimated cost, to an acceptable quality and to the client's satisfaction. The construction industry plays a very important role in the social and economic development of all countries as has been confirmed by several studies.

According to the World Bank (1988, p.6) the construction industry is "*a sector of the economy which transforms various resources into constructed economic and social infrastructure and facilities. The participants in the construction industry business include the planners, designer, employers, contractors, materials and equipment suppliers, construction workers, financiers, accountants, lawyers, insurers and operators*".

In the 1960s and 1970s, project success focused on the implementation stage, measuring time, cost, and functionality improvements. In the 1980s and 1990s, the quality of the planning and hand-over was identified as important. More recently, new Critical Success Factor frameworks have been developed on the basis that success is stakeholder-dependent and involves interaction between project supplier and recipient. Additional dimensions taken into account during this period have been: the project product and its utilization; staff growth and development; the customer; benefits to the delivery organization; senior management; and the environment (Turner and Muller, 2006).

The study of the factors which could contribute to a successful outcome are referred to as Critical Success Factors which will enable special attention to be paid to these critical areas, thus allowing the development of a schema for improving the performance of construction projects in Libya (Chua *et al.* 1999) and (Shen and Liu, 2003). In addition, the identification of the Critical Success Factors will enable the limited resources of time, workforce, and money to be allocated appropriately.

The aim of this chapter is to evaluate, identify and to gain a better understanding of those factors that may affect the success of the construction project. It will also examine

the underlying relationships between those factors, as well as comparing various insights obtained from published works and professionals in the industry.

2.3. THE LIBYAN CONSTRUCTION INDUSTRY

The construction industry in Libya plays a very important role in the country's economy, as it is one of the most important sectors in the country in terms of employees. The Libyan construction industry is governed by the Administrative Contracts Regulations (General People's Committee, 1999) which are based on English contractual arrangements such as the New Engineering Contract (Institution of Civil Engineers, 1995) and faces similar challenges. As the instigator or client of all large construction projects, the Libyan government has to carry the significant additional costs caused by project delays (Krima *et al.* 2007).

Construction projects in Libya are suffering from different problems. These can be attributed to; delays that cause money problems (inability to finish the projects within budget), time problems (finishing the projects on time), and in some projects there has been an unacceptable quality of work. The study of factors that affect the success of the construction projects is necessary in terms of resolving these three problems and enhancing the level of success.

Success factors are different from one project to another depending on the size and the environment of the project. For example, construction projects that are constructed in the north of Libya are affected greatly by such environmental factors as heavy rain (especially in winter) whereas in the south the weather is dry and very hot. There are also many other factors that affect the success of construction projects in Libya, these

factors if not properly managed will lead to construction project failure. This research will establish the critical success factors affecting construction projects as well as developing a framework in order to enhance the success of construction projects.

2.4. PROJECT MANAGEMENT SYSTEM IN LIBYA

The Libyan economy is traditionally based on oil production and oil exports are the main contributor to the GDP (Gross Domestic Product). The Government is using its oil trade surplus to broaden the country's industrial base and boost infrastructure activities and programmes (Al-Gathafi, 2005).

2.4.1. Government Departments and Functions

The Government consists of a number of General People's Committees (Ministries), Departments, Committees, and Organizations which manage Government projects:

1. General People's Committee

The General People's Committee is responsible for issuing laws, rules, regulations, resolutions and decisions for project management. The Committee approves consultant and contractor lists, awards consultancy services and contracts of work. It is also responsible for any joint project involving more than one region in the country such as joint motorways, hospitals and factories as well as strategic projects for the entire country.

The General People's Committee comprises two different sub-committees for advising and reviewing projects:

-
- I. The first committee was established to review plans and projects in the regions and reviewing each region's budget programmes for projects. Approval of the annual development programme will be carried out by this committee.
 - II. The second committee was established to advise and review strategic plans and projects for the whole country.

Feasibility Studies

Approval of new projects is based on feasibility studies which includes the scope of the project, capital and recurrent expenditure requirements, cost benefit analysis and implementation schedule with details of the work force and material requirements. The feasibility study is conducted and undertaken by technical experts of the project planning cell (department/division) of the ministry/institute concerned. Then, a feasibility report is submitted including an appraisal of social and economic benefits of the completed project. This report is the basis for a judgement on the necessity and possibility of constructing the project.

2. Ministry of Planning

The Ministry of Planning is responsible for the development and implementation of the overall plans and supervision of projects for the entire country, and reviewing new and current strategic projects managements. All strategic projects addressed to General People's Committee should be studied and analysed by the Ministry of Planning.

Planning Department

The Planning Department (PD) was established by the General People's Committee for the establishment of development plans for every region in the country as well as supervising projects. The PD has different divisions and each division has its specific role. The Department is also responsible for the preparation of the Annual Development Budget; providing technical and administrative services to the Regional General People's Committee and to other related departments (Al-Gathafi, 2005).

Table 2.1: Government Organizations and Functions

1.	Regional People's Committee RPC	The RPC is responsible for issuing resolutions and decisions for project management, rules and regulations for companies belonging or working in the region.
2.	General People's Committee	Advising and reviewing authority of all projects. All ministries and executive departments have to send all matters requiring RPC approval to GPC for review and recommendation for RPC approval.
3.	Ministry of Planning	Responsible for establishment of development plans and overall supervision of projects management for the region. All project matters addressed to RPC should be studied and analyzed by PD. Also PD is responsible for reviewing development budgets and programmes for new and current projects.
4.	Ministry of Finance	FD is the monetary and financial "controller" and reviews all the regional financial matters related to projects and provides the required financial approvals. Payment for the projects (consultancy fees & contractors dues) are also reviewed, approved and paid by the MF. All financial matters are undertaken only after approval by the PD.
5.	Municipality Department	M.D is responsible for executing, operating and maintaining municipal projects and facilities. Urban town planning and development is also carried out by the M.D. which is also responsible for giving all required approvals for local works. The boundary responsibility of such region in the country lies with the MD. Roads within cities are executed by the M.D.
6.	Ministry of Economics	ED is responsible for economic and commercial development and activities in the regions. The ED approves consultants list, contractors list, awarding consultancy services and awarding of contracting works after the approval of GPC.

The Planning Department structure

I. The Planning Department consists of the following sub-departments and divisions:

- Economic planning division,
- Social planning department, and
- Budget department.

II. Statistical Data and Information department consists of three departments:

- Information data & documentation department,
- Statistical department, and
- Follow up department.

III. Administration and Finance Division consists of three main departments:

- Administration department,
- Employment affairs and public relation department, and
- Finance department.

2.5. THE CONSTRUCTION INDUSTRY AND ECONOMY IN LIBYA

There is a consensus among researchers that the construction industry is important for economic growth and development (e.g. Drewer, 1980). Construction projects in Libya may be affected by national economic factors which directly affect project cost - one of the three main elements or success factors, which impinges on the client in terms of profitability. In Libya the fluctuation in the cost of materials affects project success. For example, in 2006 and 2007 the cost of cement (which accounted for more than 50% of

construction materials) increased by more than 100% compared with the years before. In 2008 the cost of cement stayed at the same level in the first three months and then decreased to 70% compared to the years of 2006/2007.

Labour cost is considered to be one of the economic factors that can significantly affect the success of construction projects, and plays an important role in project profitability. In Libya the labour cost increases from time to time resulting in lower profit which will not be to the client's satisfaction. To resolve such a problem the government should pay serious attention to this matter, and as well identify the rate of labour costs and the working hours.

Elinwa and Buba (1993) conducted a questionnaire study that involved architects, engineers, and quantity surveyors in Nigeria to identify the factors influencing time and cost in Nigerian construction projects. The top ranked factors that contributed to construction cost were: cost of materials, fraudulent practices, and fluctuations in material prices.

Al-Gathafi (2005) indicated that a number of variables can directly contribute to time overrun in construction projects which costs money, other factors may have little or no effect on construction duration but will have an effect on quality and cost. The author also stated that the principal factors contributing to project construction overruns (contractor's lack of project experience and non-familiarity with local regulations, inflationary material cost, inaccurate materials estimates, complexity of projects, and contractors' lack of geographical experience) are commonly seen.

What is more, in relation to the cash flow, it is considered a very important factor that really affects the success of construction projects. If there is inadequate cash flow the

project will fail, if the cash flow is not well tied to the milestone progress of the project this will cause problems for project success, inadequate management of time can also cause projects to fail.

In summary, economic factors which are stated above play a very important role in the success and/or failure of construction projects, and so it is considered vital that the clients, designers and project managers should take them into account before starting any project.

2.6. PROJECT MANAGEMENT

Project management has a strong tradition in the construction industry and is widely used on projects of all sizes and levels of complexity. Even so, many projects do not meet their required performance standards and/or budget and/or are not delivered on time. These issues can be directly addressed by raising the standards of project management within the construction industry and more specifically improving the skills of a project manager (CIOB, 2002).

Project management is no longer special-needs management. It is rapidly becoming a standard way of doing business. An increasing percentage of the typical firm's effort is being devoted to projects, and the future promises an increase in the importance and the role of projects in contributing to the strategic direction of organizations (Gray and Larson, 2000).

2.6.1. Definition of Project Management

There are many definitions of the project management, these are as follows:

Walker (2007, p. 20) defines construction project management as: The planning, coordination and control of a project from conception to completion (including commissioning) on behalf of a client requiring the identification of the client's objectives in terms of utility, function, quality, time and cost, and the establishment of relationships between resources, integrating, monitoring and controlling the contributors to the project and their output, and evaluating and selecting alternatives in pursuit of the client's satisfaction with the project outcome.

BMBOK (2008, p. 1) and Leste (2007, p. 5) defined a project management as: The planning, organization, monitoring and control of all aspects of a project and the motivation of all involved to achieve project objectives safely and within agreed time, cost and performance criteria.

The British Standards Institution (BS 6079, p. 2-3 section 1.3) defines project management as: *"The planning, monitoring and control of all aspects of a project and the motivation of all those involved to achieve the project objectives on time and to cost, quality and performance"*

The Project Management Institute (1996, in PMBOK p. 167) defines project management as: *"Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project"*

Synthesising these definitions, it is clear that for successful project management there is need to plan, organize, monitor and control all aspects of a project and then motivate all involved to achieve the triangle of project objectives (Time, Cost and Quality).

2.7. PROJECT MANAGEMENT IN DEVELOPING COUNTRIES

According to Smith (2008) construction projects and construction industries in developing countries are significantly different from those in the developed industrialised world. The main differences are related to climate, population and human resources, material resources, finance and economics, and socio-cultural factors. Due recognition of these differences is a prerequisite for the successful management of projects in developing countries.

1. Climate

Many poor developing countries experience climatic conditions quite different from those in the temperate north. The type of project that is required, the most appropriate technology to be applied and the way in which the project is managed can be influenced by climatic conditions. For example, communities living in hot climates have quite different requirements for power and water, giving rise to alternative approaches to the planning and design of the requisite infrastructure facilities.

Climate will also affect the design and type of technology used: solar power may be a realistic alternative to thermal power generation; high temperatures and long hours of sunlight may indicate alternative forms of sewage treatment such as waste stabilisation ponds; and the design of building must be aimed at reducing glare from sunlight and ensuring heat is kept out (rather than in).

During construction, it may be necessary to take precautions not required in cooler climates, such as chilling or adding crushed ice to the water used in mixing concrete, and paying particular attention to the curing of concrete. Planning and scheduling of

construction work can also be affected by the climate - particularly when roads, bridges and hydraulic structures in areas may be affected by heavy seasonal monsoons. The PM therefore needs to be fully aware of the climate implications from the very earliest stages of the project.

2. Population and Human Resources

Population and human resources affect not only the need for projects but also the way projects are implemented, the large pool of available and relatively inexpensive labour, much of which is unemployed and relatively unskilled, points to a less mechanised approach to construction and a greater use of human labour. Labour-intensive construction requires a different approach from the planning, design and management of projects in more developed countries, and these issues must be addressed at the earliest stages of the project. Questions of training and technology transfer therefore need to be taken into consideration throughout the planning and implementation of the project.

3. Materials, Equipment and Plant

Many of the materials commonly used in construction projects are often not readily available in developing countries. Cement and steel may have to be imported. Delays in importation and difficulties in gaining passage for imported goods through customs are not uncommon and need to be allowed for. Even when materials are manufactured in the country of the project, supplies cannot always be guaranteed and the quality may be inferior to that normally expected in industrialised countries. Production capacity and quality should therefore be assessed before detailed design is done. Imported mechanical equipment, whether for construction or for incorporation within the completed project, is expensive and requires maintenance.

4. Finance and Economics

Although there is a great need for new projects in developing countries, there is often a lack of funds from the normal sources expected in developed countries. Many projects are funded externally from national aid agencies, international development banks or non-governmental organisation such as international charities. PMs involved in the identification, preparation and appraisal stages of a funded project need to be fully aware of the requirements of the grant-or loan-awarding agency to which they are making application for funding, as each has its own specific requirements.

5. Socio-cultural factors

The successful management of a project in a developing country requires an understanding of the ways local society is organised and the indigenous cultural and religious traditions. In Muslim countries, time must be allowed for workers to participate in daily prayers and during the month of Ramadan fasting is mandatory during daylight hours; thus affecting productivity and the way work is organised. The roles of men, women, religious and community leaders, and landowners must be understood, particularly when managing projects in which the community is actively participating.

If socio-cultural factors are not taken into consideration, a project may not be successful even if it is successfully constructed. A new water supply may not be used if the community members feel they do not own it, or if existing traditional sources of water have a strong culture significant; sanitation facilities might be underused or neglected if their orientation offends religious beliefs or if men's and women's toilet blocks are sited too close together. As with other factors already mentioned, knowledge of socio-cultural

influences is necessary at the earliest stages of a project because they may have a significant effect on project identification, appraisal and design, as well on construction and operation.

It is clear that the understanding of the employee's culture and religion are important elements that should be taken into consideration to ensure a project is finished successfully. The management team and a project manager should be fully aware of the employee's culture and religion, and as well understanding their holidays (e.g. religious, international and national) in terms of motivating them to do proper job and finishing the projects without any delays.

2.8. PROJECT SUCCESS

The reasons for success or failure of projects and project management are many and different. Nguyen, et al. (2004), Kerzner (1992), Greenwood and Aggiag, (2004) and Aggiag, (2004) consider that a construction project is commonly acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and to the stakeholders' satisfaction. They also considered successful project management can be defined as achieving the project objectives: within time; within cost; at the prescribed level of performance/technology; and utilizing the assigned resources effectively and efficiently.

Cost, time and quality are considered to be the main elements for the success of any project. By finishing the project to time, within the estimated budget and to an acceptable quality client satisfaction will be achieved. For the purpose of this study,

project success is defined as completion of a project within acceptable time, cost and quality and this is taken to achieve client satisfaction.

The key dimensions of project success for the majority of the scholars are illustrated in Figure 2.1.

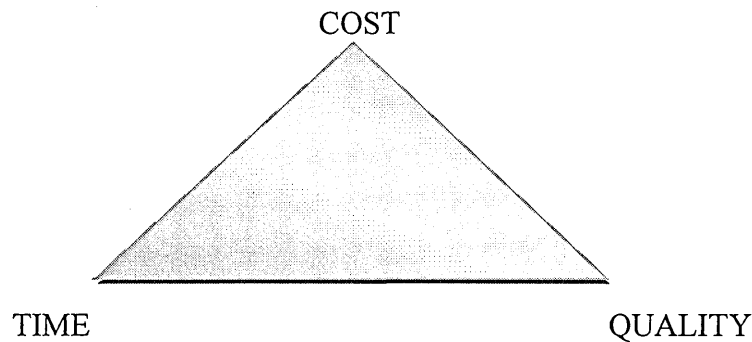


Figure 2.1: Time, Cost and Quality impact on the project success

However, some scholars have claimed that the success of the projects can be dependent on other factors. Baccarini (1999) stated that there is no consistent interpretation of the term project success, that there is no standardised definition of the term nor is there an accepted methodology for measuring it.

Other scholars argue that the contribution of employees is one of the most important elements for the success of construction projects. According to Kliem and Ludin (1992) the contribution of people cannot be ignored. They also argue that the term "specification level" should replace "quality" on the grounds that "quality" should be considered an absolute that is non-negotiable against time and cost. Figure, 2.2 illustrates the impact of cost, time and specification level on project success (Lock, 2000).

When a project is finished on time, within budget, to an acceptable quality and the client is satisfied it is considered a successful project. This is achieved by the efforts of the entire workforce on the project who must have been well managed with good communication links and an understanding their individual responsibilities so that the triangular success project management will be achieved (time, cost, quality).

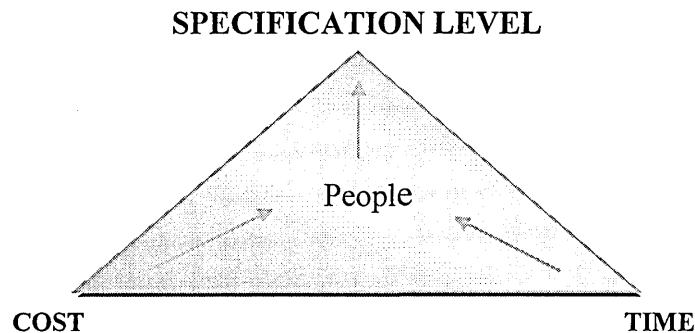


Figure 2.2: Time, Cost and Specification Level impact on the project success

Source: Adapted from Lock, (2000)

The following are some definitions of "Project Success" in general and in construction.

Sanvido, *et al.* (1992) defined success for a given project participant as the degree to which project goals and expectations are met. He added that these goals and expectations may include technical, financial, educational, social, and professional aspects.

Freeman and Beale (1992) concluded that success means different things to each individual. An architect may consider success in terms of aesthetic appearance, an engineer in terms of technical competence, an accountant in terms of dollars spent under budget, a human resource manager in terms of employee satisfaction, and client and project manager in terms of finishing the project within budget, cost and quality. So it is

clear that the success of any project depends on the entire project team members; everybody in the organization is responsible for driving the project towards success. This will be achieved by working as one person to complete the work as planned.

Nguyen *et al.* (2004) claim it is necessary to distinguish between project success and project management success and between project success and project performance. In regard to this, de Wit (1988), Munns and Bjeirmi (1996) and Cook-Davies (2002) argue that project success is measured against the overall objectives of the project while project management success is measured against cost, time and quality/performance.

According to Eisner (2008) construction time, cost and performance are the "big three" of project management and system engineering management. Projects are originally planned to meet the performance requirements within the prescribed time and budget constraints. There are numerous reasons why project do not satisfy these three key aspects of a system development, several of the most common are:

- Inadequate articulation of requirements,
- Poor planning,
- Inadequate technical skills and continuity,
- Lack of teamwork,
- Poor communications and coordination,
- Insufficient monitoring of progress, and
- Inferior corporate support.

Chan, *et al.* (2004) believed that project success and the Critical Success Factors can be considered to be a means to improve the effectiveness of the project. However the

concept of project success has remained ambiguously defined in the mind of construction professionals. The following are some definitions of the success factors that can affect the success of a construction projects.

2.9. FACTORS AFFECTING THE SUCCESS OF A CONSTRUCTION PROJECTS

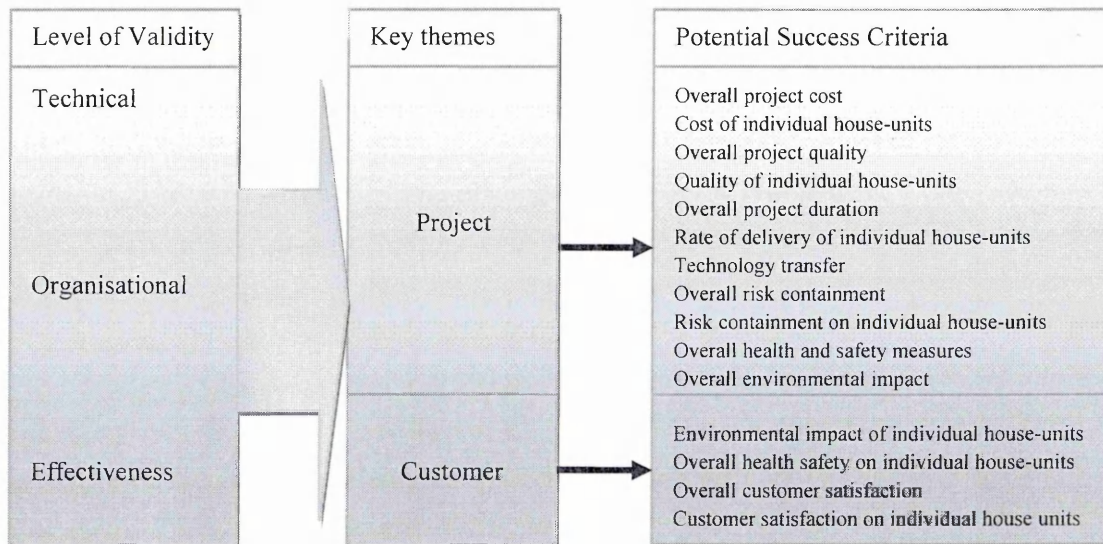
There are many factors that can affect the success of construction projects; the factors are different from one project to another and from one country to another. The purpose of this study is to assess and evaluate those factors in terms of enhancing the rate of success in the Libyan construction industry.

Different authors have defined factors that impact on the success of construction projects, those factors include on the size of the project; the project's environment; the management team; project planning and the project workforce. The success factors have been the object of several studies, and the following scholars propose their own assessments of the different success factors that affect project success.

Slevin and Pinto (1986), Pinto and Slevin (1988), Freeman and Beale (1992), Shenhar, *et al.* (1997) and Lim and Mohamed (1999) found that, as would be expected, project success is linked to both exogenous and endogenous factors. These factors include the control level (especially schedule and cost), the impact on the client, the support of the general management of the organization, communication, the competence of a project manager, but also on less controllable factors such as the environment and the political context.

Pinto and Slevin (1988, p.70) broadened their field of research and created a framework that can be used to enhance the success of the projects, as shown in Table 2.2. The quantitative study was conducted in 409 projects as a sample size in various industries.

Table 2.2, Project Success Framework Based on the Idea of Pinto and Slevin, (1988)



Source: Adapted from Ahadzie, Proverbs and Olomolaiye, (2008).

Chan, *et al.* (2004) conducted a questionnaire survey to identify the factors influencing project success. The study was based on literature review related to critical success factors in seven major management journals. The study showed the following five factors can affect project success:

1. Project-Related Factors

The type of project; nature of project; complexity of project and the size of project are considered most important project-related factors affecting the success of construction projects. This has been confirmed by (Akinsola, *et al.* 1997), (Songer and Molenaar, 1997), (Belout, 1998), (Chua, *et al.* 1999) and (Dissanayaka and Kumaraswamy, 1999).

2. Procurement-Related Factors

Walker and Vines (2000) and Pocock, *et al.* (1997) agree that procurement-related factors are of very highest importance relating to the success of a project. These factors consist of the procurement methods (selection of the organization for the design and construction of the project) and tendering methods (procedures adopted for the selection of the project team and in particular the main contractor). A full explanation of procurement methods is given later in this chapter.

3. Project Management Factors

The project management include adequate communication; control mechanisms, feedback capabilities; troubleshooting; coordination effectiveness; decision making effectiveness; monitoring; project organizational structure; the plan and schedule followed and related previous management experience. Jaselskis and Ashley (1991) have suggested that by using management tools, project managers should be able to plan and execute their construction projects to maximize the project's chances of success.

4. Project Participant-Related Factors

These factors can be divided into two main categories: One is related to the client, including the client's experience and ability, the nature of the client, the size of the client organization, the client's emphasis on cost, time and quality and the client's contribution to the project.

The second category is the project team, which includes the project team leaders' experience and skills, the project team leaders' commitment on time, cost and quality,

the project team leaders' involvement, the project team leaders' adaptability and working relationships, and the support of the project team leaders get from his/her parent company.

5. External factors

These factors are predominantly the economic environment, the social environment, the political environment, the physical environment, the industrial relations environment and level of advanced technology available.

In Libya, political and economic factors are considered to be two of the most influential factors affecting the success of construction projects. The fluctuations in equipment and material prices that occur from time to time cause many problems relating to project duration and increased costs. The rise in these prices can affect the project's profitability and cause an increase in labour costs. These problems, if not properly managed, will lead to construction project failures. From the very first stages the project plan should include contingency arrangements to be implemented if any unforeseen circumstances arise.

Figure 2.3 illustrates the factors that can affect project success identified in the research study conducted by (Chan, *et al.* 2004).

Belassi and Tukel (1996) conducted a questionnaire survey over a wide geographical area in industrialised countries. 91 project managers were conducted to answer the questionnaire, and the questionnaire was analysed using SAS. It was found that success depended on four main groups of factors: factors relating to the PMs, factors relating to

the project, factors relating to the organization, and factors relating to the external environment.

As mentioned earlier, success factors can vary from one project to another and from one environment to another. These factors depend upon the project's situation, the project's environment and the performance of the project members. Supporting this, Muller and Turner (2007) conducted a worldwide study of 300,000 people as a sample size, and the analysis was based on 959 respondents. It found that there is a growing recognition that different types of projects require different approaches to their management, requiring management procedures tailored to the needs of the project.

Andersen *et al.* (1987) carried out a research study through a questionnaire survey to investigate the factors that can affect the project success at four of the project stages. It was found that what project managers did or did not do, increased the chance of failure, and pitfalls in the way the project is established, planned, organized, and controlled were identified. The corresponding success factors are presented in Table 2.3.

Morris (1988) investigated and identified both success and failure factors that affect identified at successive stages of the construction project life cycle, see Table 2.4.

Baker *et al.* (1988) added that, to run project management successfully, the factors shown in Table 2.5 should be taken into consideration both before starting the project and during the project's life cycle.

Factors Affecting the Success of a Construction Project

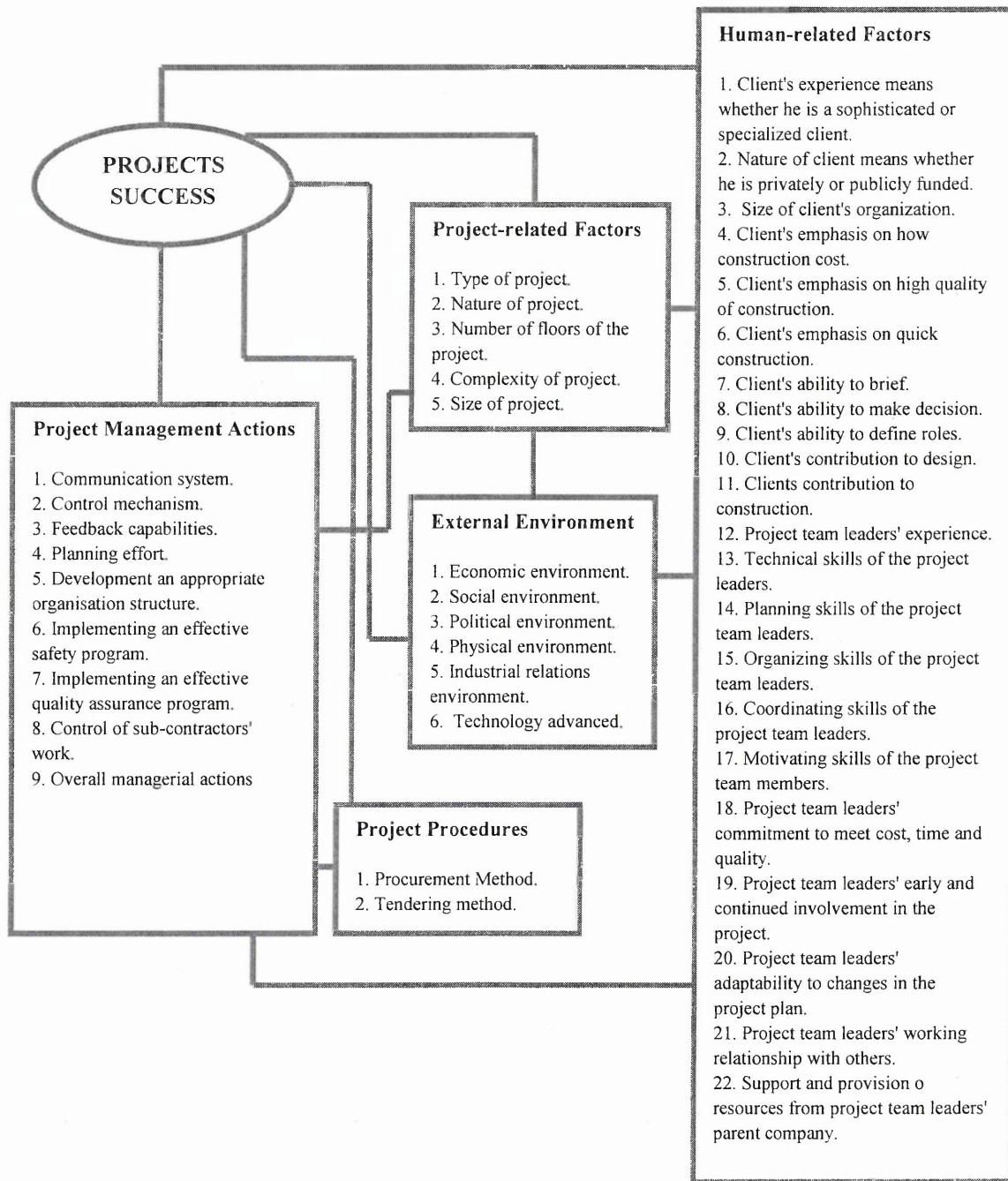


Figure 2.3: New Conceptual Frameworks for Factors Affecting Project Success

Source: Adapted from Chan, *et al.* (2004)

Table 2.3: Project Success Factors (after Andersen *et al.* 1987)

Project Stage	Rank	Success Factors
1. Foundation	1	F1. Align the project with the business
	2	F2. Gain commitment of involved managers
	3	F3. Create a shared vision
2. Planning	1	F1. Use multiple levels
	2	F2. Use simple friendly tools
	3	F3. Encourage creativity
	4	F5. Estimate realistically
3. Implementation	1	F1. Negotiate resource availability
	2	F2. Agree cooperation
	3	F3. Define management responsibility
	4	F4. Gain commitment of resource providers
	5	F5. Define channels of communication
	6	F6. Project manager as manager not chief technologist
4. Control	1	F1. Integrate plans and progress reports
	2	F2. Formalize the review process through <ul style="list-style-type: none"> ▪ defined intervals ▪ defined criteria
	3	▪ controlled attendance
		F3. Use sources of authority

Table 2.4: Project Success and Failure Factors Identified by Morris, (1988)

Stage	Rank	Success Factors	Barriers
1. Formation	1	F1. Personal ambition	B1. Unmotivated team B2. Poor leadership B3. Technical limitations B4. Money problems
	2	F2. Top management support	
	3	F3. Team motivation	
	4	F4. Clear objectives	
	5	F5. Technological advantage	
2. Build-up	1	F1. Team motivation	B1. Unmotivated team B2. Conflict in objectives B3. Poor leadership B4. Poor top management support B5. Technical problems
	2	F2. Personal motivation	
3. Execution	1	F1. Team motivation	B1. Unmotivated team B2. Poor top management support B3. Deficient procedures
	2	F2. Personal motivation	
	3	F3. Top management support	
	4	F4. Technological expertise	
4. Close-out	1	F1. Personal motivation	B1. Poor control B2. Poor financial support B3. Ill-defined objectives B4. Poor leadership
	2	F2. Team motivation	
	3	F3. Top management support	
	4	F4. Financial support	

Table 2.5: Project Success Factors after Baker, *et al.* (1988)

Success Factors	Rank
F1. Coordination and team-client relations	1
F2. Adequacy of team structure and control	2
F3. System uniqueness, importance, and public exposure	3
F4. Success criteria salience and consensus	4
F5. Competitive and budgetary pressure	5
F6. Initial over-optimism and conceptual difficulty	6
F7. Internal capabilities build-up	7

Lists of 9 common factors were identified from Pinto and Slevin (1988) who conducted a questionnaire survey to rank the most important factors affecting project success. The questionnaires were mailed to project managers and members of project management institute with 400 respondents obtained. The results showed project mission and top management support was considered the most important factors to the success of a construction project. Table 2.6 lists the most significant factors that could affect project success.

Table 2.6: Project Success Factors after Pinto and Slevin, (1988)

Success Factors	Rank	Description
F1. Project mission	1	Clearly defined goals and direction
F2. Top management support	2	Resources, authority and power for implementation
F3. Schedule and plans	3	Detailed specification for implementation process
F4. Client consultation	4	Communication with and consultation of all stakeholders
F5. Personnel	5	Recruitment, selection, and training of competent personnel
F6. Technical tasks	6	Availability of the final product to the end users
F7. Client acceptance	7	Timely and comprehensive control
F8. Monitoring and feedback	8	Provision of timely data to key players
F9. Trouble-shooting	9	Ability to handle unexpected problems

In Tables 2.4, 2.5 and 2.6 the factors are presented in order of decreasing impact. Unlike others, Andersen *et al.* (1987) and Morris (1988) identified that different factors are appropriate at different stages of the project life cycle, suggesting different

competencies are appropriate at different stages. Morris mentioned leadership as a factor, and Andersen *et al.* mentioned PM competence.

Morris and Hough (1987) identified success factors from a study of seven major projects in the UK from the 1960s, 1970s and 1980s, of which some were successful and others unsuccessful. Morris (1997) developed this list into a project strategy model, which Turner (1999) recast as the seven forces model for project success; see Figure 2.4, with five success factors in each of seven areas: context, attitude, sponsorship, definition, people, systems, and organization.

Cooke-Davies (2001) conducted a questionnaire survey with more than 70 large multinational and national organisations which showed that successful project management included six factors to help ensure a project is completed on time, two factors to help ensure it is completed within budget, and four factors to help ensure the project is successful, see Table 2.7.

Mahdi (2007) carried out a research study through a questionnaire survey, involving project managers, construction managers, site managers and quantity surveyors within the UK construction companies to investigate the most significant factors that can affect the success of a construction project. The questionnaires were conducted in seven construction organisations in Sheffield, and the analysis was based on 29 respondents. Fifteen factors as shown in Table 2.8 that could affect the success of a construction project.

Table 2.7: Successful project management and factors leading to successful projects Cooke-Davies, (2001)

<p>1. Project management success factors contributing to time completion:</p> <p>F1. Adequacy of company-wide education on risk management F2. Maturity of organization's processes for assigning ownership of risks F3. Adequacy with which a visible risk register is maintained F4. Adequacy of an up-to-date risk management plan F5. Adequacy of documentation of organizational responsibilities on the project F6. Project or stage duration as far below three years as possible, preferably below one year</p>
<p>2. Project management success factors contributing to budget completion:</p> <p>F7. Changes to scope only made through a mature scope change control process F8. Integrity of the performance measurement baseline</p>
<p>3. Additional project success factors contributing to successful benefits realization:</p> <p>F9. Existence of an effective benefits delivery and management process that involves the mutual cooperation of project management and line management functions</p> <p>F10. Portfolio and program management practices that allow the enterprise to resource fully a suite of projects that are thoughtfully and dynamically matched to the corporate strategy and business objectives</p> <p>F11. A site of project, program, and portfolio management metrics that provide "direct line of sight" feedback on current project performance and anticipated future success, so that project, program, portfolio and corporate decisions can be aligned</p> <p>F12. An effective means of learning from experience on projects that combine explicit knowledge with tacit knowledge in a way that encourages people to learn and to embed that learning into continuous improvement of project management processes and practices.</p>

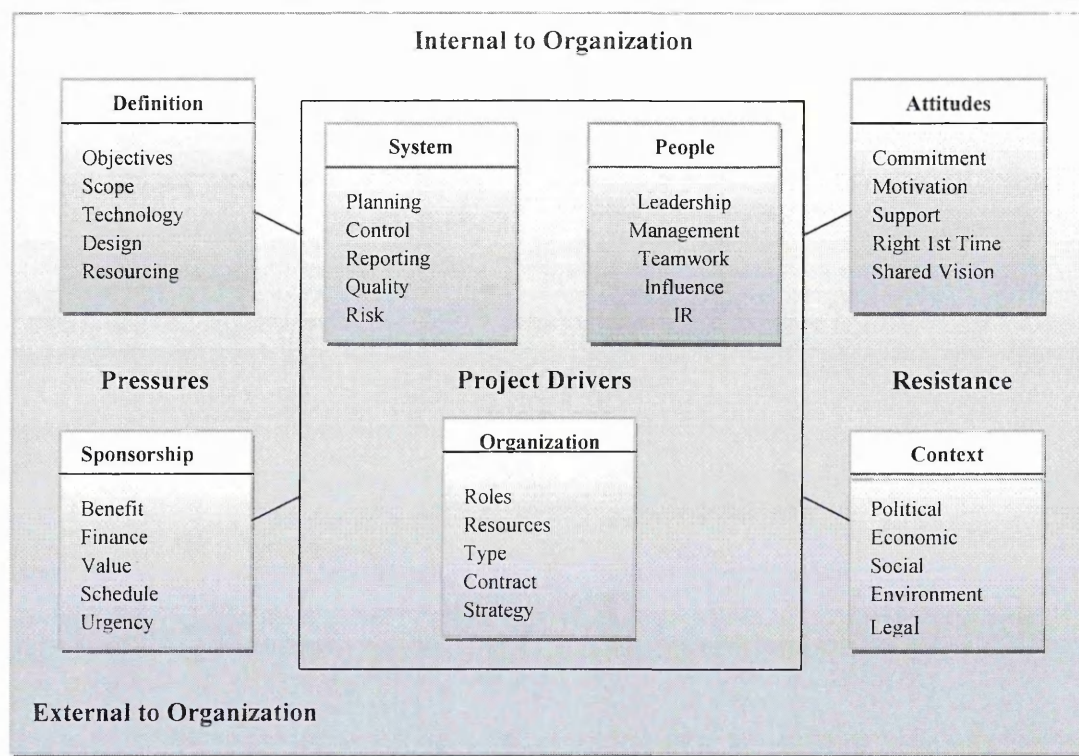


Figure 2.4: The Seven Forces Model for Project Success, developed by Turner, (1999)

Table 2.8: Ranking of Factors that could affect Construction Project Success

Rank	Factors which can affect the success of the project
1	F1. Poor definition of objectives at the outset
2	F2. Inability to build a truly cross-functional team
3	F3. Weak leadership
4	F4. Lack of senior management commitment
5	F5. Minimizing complexity with consequent technical problems not resolved
6	F6. Inability to anticipate problems
7	F7. Poor planning and control, the feeling that planning is an unnatural act
8	F8. Too many uncontrolled changes with consequent scope creep
9	F9. Resistance to change
10	F10. Inadequate resources
11	F11. No effective communication process
12	F12. Assumed knowledge, skills and experience of team members
13	F13. Scope not clear or controlled as project progresses
14	F14. Confused roles and responsibilities
15	F15. Over-optimism about time due to our innate ability to understate everything

Source: Adapted from Mahdi, (2007)

The task is to critically compare the various insights from the published works and professionals in the industry on how to achieve a successful construction project, and to be fully aware of the factors that have greatest impact on the success of construction projects. It is clear that the success/failure of projects is dependent upon many factors which can be endogenous or exogenous. The internal factors are: lack of communication; poor planning and control; misunderstandings; lack of motivation; having a weak a project manager; lack of relevant experience; choosing the wrong person for the job; weak management and control; and an inability to anticipate and manage such problems if they occur. The external factors include: economic factors (changes in domestic economic conditions; increased competition; regulatory changes); political factors (uncertainty on return on investment); environment factors; (weather, water, unsustainable use of natural resources). The different impact between the internal and external factors is that the internal factors could be controlled during the project life cycle, whereas the external factors sometimes cannot be easily controlled and might lead to construction project failure.

2.10. CRITICAL SUCCESS FACTORS

Success has always been the ultimate goal of every activity within a project, and construction project briefings are no exception. In this study, a successful briefing is where the needs and requirements of the client and stakeholders are identified, understood, defined and represented accurately, and communicated effectively to the project team. The factors critical to the success of the briefing include the following (CIOB 1997):

Clear and agreed upon objectives; carefully thought-out requirements; the provision of the essential information at each stage of the project; a flexible approach that balances the requirements for quality against the concern to 'freeze' requirements to control costs and meet deadlines; and a trusting relationship.

Blyth and Worthington (2001) identified clear and comprehensive communication as a key area that is important to the briefing process. Successful briefing demands attention to communication and how information is structured and passed through the system. Designers speak different languages to users, yet they must understand the business language of their clients to allow for a meaningful communication of needs.

Blyth and Worthington (2001) provide eight factors for successful briefing, which can be identified as:

- The most vital factor for success is a template for consistently well integrated projects,
- A transparent framework, which sets out expectations, procedures, and performance measures against which evaluation and improvements can be made,
- Clarity of roles - the clarification of roles goes hand-in-hand with empowered clients who are able to articulate needs clearly within the long-term strategic framework,
- Manageable buildings that absorb change,
- Monitoring and feedback by introducing quality improvement loops and greater customer orientation,
- Continuous review that tests assumptions and revisits hypotheses.
- Provide a robust and transparent framework to test projects as they progress, and

-
- Concentrating innovation on items with greatest return. Organizations with a continuous building program have the opportunity to reflect on poor performance, repeat those items that have been successful, and find new solutions for those areas where they can achieve the greatest return.

Bryde (2008) conducted a questionnaire survey amongst 238 UK-based practitioners, he identify two broad issues associated with project success: the criteria used to define and measure success project success, and the critical factors influencing project success.

Atkinson (1999) reported that project success criteria focused on the 'iron triangle' of meeting cost, time and quality-related objectives. White and Fortune (2002) who carried out a research study through a questionnaire survey amongst 236 project managers found that the iron triangle criteria were the most commonly cited measures of project success.

Boynton and Zmud (1984) asserted that the critical success factors (CSFs) are those few things that must go well to ensure the success of an undertaking and must be given special and continual attention to bring about high performance. Belassi and Tukel (1996) in a questionnaire survey involving 91 project managers intended to rank CSFs found that the technical background of project team members was particularly important for construction and information system projects. Top management support was important regardless of context.

Young and Jordan (2008) confirmed that top management support is the most important CSF for project success. This study also showed that hard working project staff was the most important condition for project success.

Pinto and Mantel (1990) identified three distinct aspects of project outcome: the implementation process itself (internal criteria such as budget, schedule), the perceived value of the project, and client satisfaction with the delivered project.

Wateridge (1995) has concluded that there does not appear to be a consensus of opinion on the criteria for judging project success and the factors that influence that success. Definitions of the success of construction projects have traditionally followed the dimensions of time/cost/quality. Brown (1994) agrees that if a project is delivered on time, within budget with agreed functionality, then it would be classed as a success.

Pinto and Slevin (1987) undertook a comparative analysis of various studies on factors considered critical to the success of a project, and identified nine common factors: clearly defined goals; a competent project manager; top management support; competent project team members; sufficient resource allocation; adequate communication channels; control mechanisms; feedback capabilities; and responsiveness to clients.

2.10.1. Project Success Factors and the Project Success Criteria

Turner and Muller (2006), Jugdev and Muller (2005), Cooke-Davies (2002), Turner (1999), Lim and Mohamed (1999), Morris and Wateridge (1998) and Hough (1987) have all distinguished between project success factors and project success criteria:

- Project Success Factors are those elements of the project and its management that can be influenced to increase the chance of a successful outcome; these are independent variables that make success more likely.

-
- Project Success Criteria are the measures (both quantitative and qualitative) against which a project is judged to be successful; these are dependent variables which measure project success.

Whilst all measures are important in terms of evaluating the overall success of a project, the focus of this study is on defining the factors affecting construction projects success in the Libyan construction industry.

2.10.2. Project Implementation Profile

According to Slevin and Pinto (1986) who empirically developed a framework for the project implementation process and a diagnostic instrument called the Project Implementation Profile which identifies ten critical success factors:

- Project mission - initial clarity of goals and general direction,
- Top management support - willingness of top management to provide the necessary resource and authority/power for project success,
- Project schedule/plan - a detailed specification of the individual action steps required for project implementation,
- Client consultation - communication, consultation, and active listening to all impacted parties,
- Personnel - recruitment, selection, and training of the necessary personnel for the project team,
- Technical Tasks - availability of the required technology and expertise to accomplish the specific technical action steps,

-
- Client acceptance - the act of "selling" the final project to its ultimate intended users,
 - Monitoring and feedback - timely provision of comprehensive control information at each stage in the implementation process,
 - Communication – the provision of an appropriate network and necessary data to all key actors in the project implementation, and
 - Trouble shooting - ability to handle unexpected crises and deviations from the plan.

In addition to the above ten factors, Pinto and Slevin (1989) considered four additional exogenous factors, which are often beyond the control of the project team but had a powerful impact on the project outcome: the characteristics of the project team leader (competence and authority available); power and politics; environmental events; and urgency (perception of the importance of the project).

However, Pinto and Prescott (1988) concluded, in a separate study, that the relative importance of various critical success factors changes significantly, based on the stage of the project life cycle, namely, conceptualisation, planning, execution, and termination. For instance, during the execution stage of the project life cycle, five factors (project mission, trouble shooting, project schedule/plan, technical tasks, and client consultation) emerged as the most important factors for success.

2.11. DETERMINANTS OF SUCCESSFUL CONSTRUCTION PROJECTS

The project is considered an overall success if the project meets the technical performance specification; and if there is a high level of satisfaction among key people

in the parent organisation, key people in the project team, and key users of the project outcomes (Al-Gathafi, 2005).

Pinto (1988) conducted a questionnaire survey to investigate and validate a number of project CSFs. This research showed that the various factors for success are not equal, nor does their priority order remain the same over the life of the project. The theoretical basis of the research was to study and evaluate eight pairs of projects, each pair included a project that was considered successful by the sponsor and another that was considered less successful. The gathered information was evaluated by cross-referencing answers from various participants on the same project as well as examining the completeness of the answers relative to items in the Integrated Building Process Model where a set of project CSFs were derived, these were:

- The facility team: This includes taking adequate steps to assemble facility team members have common goals, understand the owner's plans and expectations, and are able to clearly communicate the construction project objectives.
- Contracts, obligations, and changes: This includes the assignment of project liabilities, the establishment of appropriate financial and duration contingency plans, and the implementation of the construction project's control mechanism.
- Facility experience: This includes ensuring that all team members, subcontractors, and all other involved members of the project construction have the verified adequate qualifications and experience for the type and complexity of project.

-
- Optimisation experience: This includes the use of expertise to optimise the project design and constructability, ensuring that the optimisation information was adequately communicated to the entire project team.

Bamesa and Wearne (1993), and Baker *et al.* (1983) believed that the success of projects (now and in the future) will depend upon the following “causes of success”: Definition of Project Objectives; Risk policy; Anticipation of Problems; Early Decisions; Proper representation in decisions; Leader; Committed Project Team; Contract Strategy; Adapting to External Changes; and Induction, Team Building and Counselling.

2.12. DOMINATING TACTICAL FACTORS THROUGHOUT THE PROJECT LIFE CYCLE

Chua *et al.* (1999) in their study gave primary importance to budgetary considerations. Using a neural network method, the authors identified eight important project management attributes associated with achieving successful budget performance which claim can also be used to forecast the budget performance of a construction project:

Number of organisational levels between a project manager and craft workers; Amount of detailed design completed at the start of construction; Number of control meetings during the construction phase; Amount of money expended on controlling the project; Implementation of a constructability program; The project manager's technical experience; Number of budget updates; and Team turnover.

Chan *et al.* (2001) identified a set of project success factors for Design and Build (D&B) projects and examined their relative importance on project outcome. Using factor

analysis on the responses of 53 participants with 31 variables they extracted six project success factors: project team commitment, contractor's competencies, risk and liability assessment, client's competencies, end-users' needs, and constraints imposed by end-users. Using multiple regression analysis, project team commitment, client's competencies, and contractor's competencies were also found to be important in achieving a successful project outcome.

2.13. MEASURES OF PROJECT SUCCESS

The objective measurement of project success can be difficult and ambiguous as when common and agreed criteria are not used. In such circumstances success for one may be the failure of another. According to Shenhar, *et al.* (1997), this happens when project management success disregards product success, for example, a project has been managed efficiently (time, cost and quality targets are met) but the outcome does not meet customer or organizational expectations.

Sidwell (1983) listed several criteria which were generally used to evaluate a project. These include time, cost, aesthetics, function, quality, client's satisfaction and team members' relation. Pinto and Slevin (1988) also argued that the triple constraints approach toward project evaluation is too simplistic. They highlighted customer satisfaction as an important criterion for project evaluation, in line with Sidwell's (1983) findings.

Freeman and Beale (1992) identified seven main criteria used to measure project success. Five frequently used criteria were technical performance, efficiency of

execution, managerial and organizational implications, personal growth and manufacturer's ability and business performance.

Shenhar, *et al.* (1997) mentioned that it is necessary to understand the two components of project success (project management success, or product success or both) in order to measure success. Project management success measured in terms of cost, time and quality can be viewed as internal measures of efficiency while product success is concerned with the project's external effectiveness. Thus, the measure of project success can be restricted to the traditional criteria of time, cost and quality.

Based on the above, it is important to decide whether all the above criteria of project success are to be included in this study. As with Pheng and Chuan (2006) this study will adopt the four criteria of time, cost, and quality and client satisfaction for the purpose of assessing project success.

2.14. COMMUNICATION IN CONSTRUCTION PROJECTS

Communication in construction is considered a very important factor for construction projects to be successful. Dainty, *et al.* (2006), Cheng *et al.* (2001) and Hargie (1986) have all identified communication as a vital factor for the success of construction projects, where:

- Communication usually involves the transfer of information, a generic term that embraces meaning such as knowledge, processed data, skills and technology.
- Successful communication (at an interpersonal level in any case) is a social skill involving effective interaction between people.

According to Baguley (1994) communications not only occur between individuals, but also between groups or organizations. Construction is inherently a team activity involving the concurrent involvement of many specialists in order to successfully deliver project objectives.

Dawood *et al.* (2002) Kornelius and Wamelink (1998), and Pietroforte (1997) confirm that communication is of vital importance in construction projects. Mohamed and Stewart (2003), Dawood *et al.* (2002), and Thorpe and Mead (2001) argue that the construction industry is confronted with great communication difficulties and there is a consequential need for improved communications between participating organizations in construction projects.

According to Egbu *et al.* (2001) the rapid evolution of information and communication technologies offers opportunities to enhance communication between participants in construction projects and to enable more effective and efficient communication. Anumba and Ruikar (2002) said that the use of such systems in construction projects, however, is relatively limited and ineffective when compared to other sectors such as the automotive and aerospace industries

Hassan and McCaffer (2002), and Mohamed and Stewart (2003) allege that the effectiveness of information and communication technologies in construction projects may be hindered by the technical inability to share electronic data between organizations.

Effective communication inside and outside the project is required to achieve success and attain the project goals. It can be concluded that communication is considered to be one of the most importance elements that can affect the success of a construction project,

and plays an essential role in the success of construction projects. Provided that the team members communicated with each other and work as one group, they should find no difficulty in managing the project successfully and meeting the client's expectations.

In addition, good communication links between the workforces will enable them to manage their work properly, and avoid any misunderstanding that might affect the success of the projects. The communication process should be well planned before starting any project and it should be taken into consideration that each stage of the project should have a suitable communication process.

2.15. RISK MANAGEMENT

Risk management is another important factor that should be taken into account for any project to be successful. The hierarchical risk breakdown structure shown in Figure 3.5 provides a basis for classifying risks within a project. It allows the separation of risks into those that are related to the management of internal resources and those that are present in the external environment (Tah and Carr, 2000):

- External risks are those which are relatively uncontrollable, including inflation, currency exchange rate fluctuations, legislative changes, and 'Acts of God'. Because of their uncontrollable nature, there is a need for continual scanning and forecasting of these risks and for the development of a company strategy for managing and controlling the effects of external forces.
- Internal risks are relatively more controllable and will vary between projects. Examples of internal risks include resource availability, experience in the type of work, the location of the project and the conditions of contract. Internal risks

have been separated into two subgroups: global risks, which affect the project itself and cannot be associated with individual tasks or work packages; and local risks, which affect individual work packages within a project. Each work package is treated separately, as no two work packages have the same level of risk, even if they are superficially similar.

The Hierarchical Risk Breakdown Structure

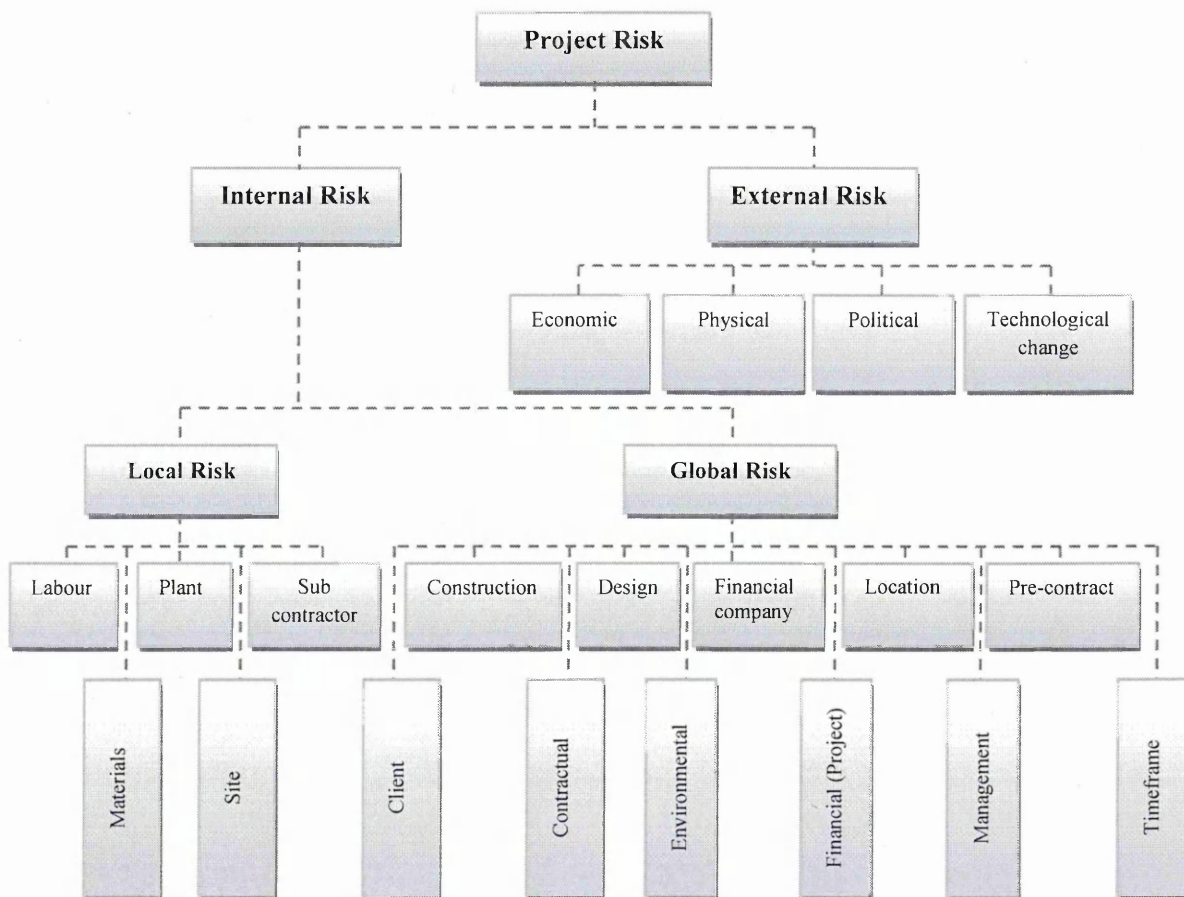


Figure 2.5: The Hierarchical Risk Breakdown Structure

Source: Adapted from Tah and Carr (2000).

Bing (1999) has stated that construction projects are generally subject to a high level of uncertainty with many assumptions often made at the early design stage. Risk

management helps in quantifying such uncertainties. In the absence of certainty, confidence can only be increased by identifying sources of uncertainties, and their potential consequences. Systematic risk management can have the following advantages (Mill, 2001):

- Questioning the assumptions that affect the project success,
- Concentrating attention on actions to best control the risks,
- Assessing the cost benefit of such actions,
- Clarifying the project objectives and refining the project brief, and
- Helping in recognising the importance of any constraints and their potential impact.

Williams (1995) indicated that the risk management will not remove all risks from a project. Its principal aim is to ensure that identified risks are managed in the most efficient way. Once a project starts, the risk management needs to be an on-going process.

Al-Gathafi (2005) believes that today it is widely recognised and accepted that successful management of uncertainties is associated with project overall success. This has led to the current popularity of risk management. He also indicated that the application of risk management at an early stage of construction is more likely to give high cost savings and therefore should be recommended from inception, through the various construction phases to completion and beyond. It is concluded that risk management should be an important and integral part of the decision-making process of all construction companies.

2.15.1. The Risk Management Process

Risk management is defined as a procedure to control the level of risk and to mitigate its effects Uher and Toakley (1999), Baker *et al.* (1999), British Standard BS 8444 (1996) and Eloff *et al.* (1993) have divided the risk management process into five steps: risk identification; risk estimation; risk evaluation; risk response; and risk monitoring. These five stages fit into a simple circular model as illustrated in Figure. 2.6.

Jaafari (2001), Buchan (1994), and Uher and Toakley (1999) have proposed a strategy-based management methodology, which integrates planning, decision-making and risk management to enable real time optimisation of a project's objectives versus variables. Three phases are generally identified in the process of managing risks namely: risk identification, analysis and response.

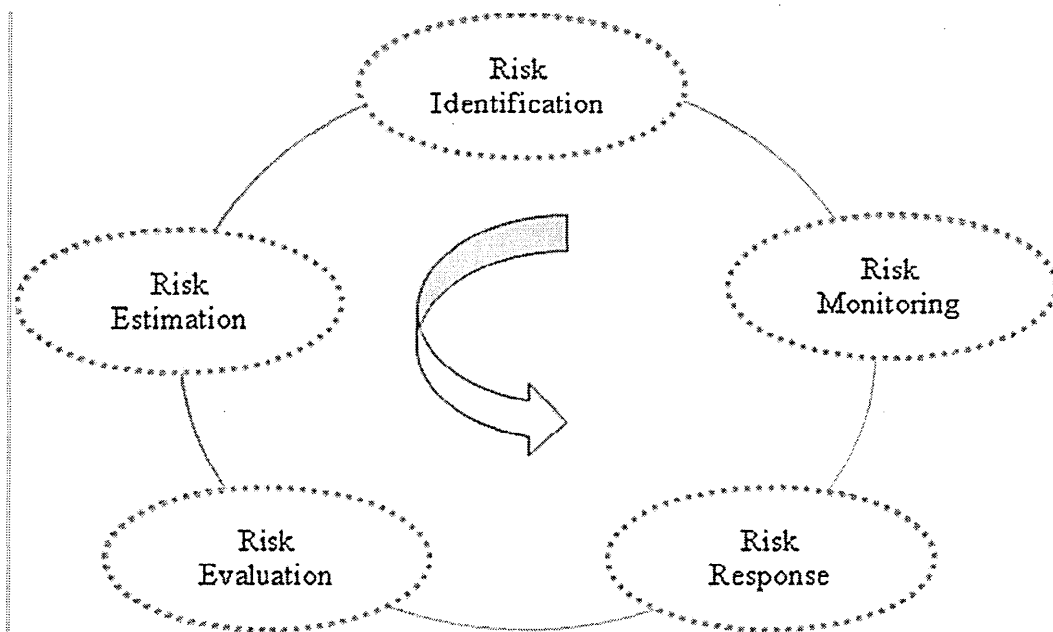


Figure 2.6: Risk Management Life-Cycle based on Baker et al, (1999)

1. Risk Identification

According to Griffith and Howarth (2000) risk is something which has the potential to cause harm. Risk identification is system recognition of any aspects of a project which have a potential to be a danger to those persons working on or being around that project.

The Project Management Institute (1996) explained that risk identification should address both internal and external risks. Internal risks are things that the project team can control or influence, such as staff assignments and cost estimates. External risks are things beyond the control or influence of the project team, such as market shifts or government action.

Dallas (2006) and Williams (1995) claim that risk identification is the first necessary step without which risks cannot be analysed nor appropriate responses determined. The risk identification phase is probably the most difficult one and, given its importance, should not be rushed. Mill (2001) has identified that there are two main reasons why risks should be identified as early as possible: (i) A realistic estimate of the total project cost is required early in the project life cycle, and (ii) To focus management attention on the control and allocation of risk through the choice of a suitable contract strategy. Risk identification is also useful to highlight where further design, development and clarification are most needed.

Turner (1999) suggested that, using expert judgment, plan decomposition, assumption analysis, decision drives and brainstorming as possible effective methods for risk identification, whereas, Dey (1999) suggests the Delphi technique for the identification of risk sources.

Project Risk Management Overview

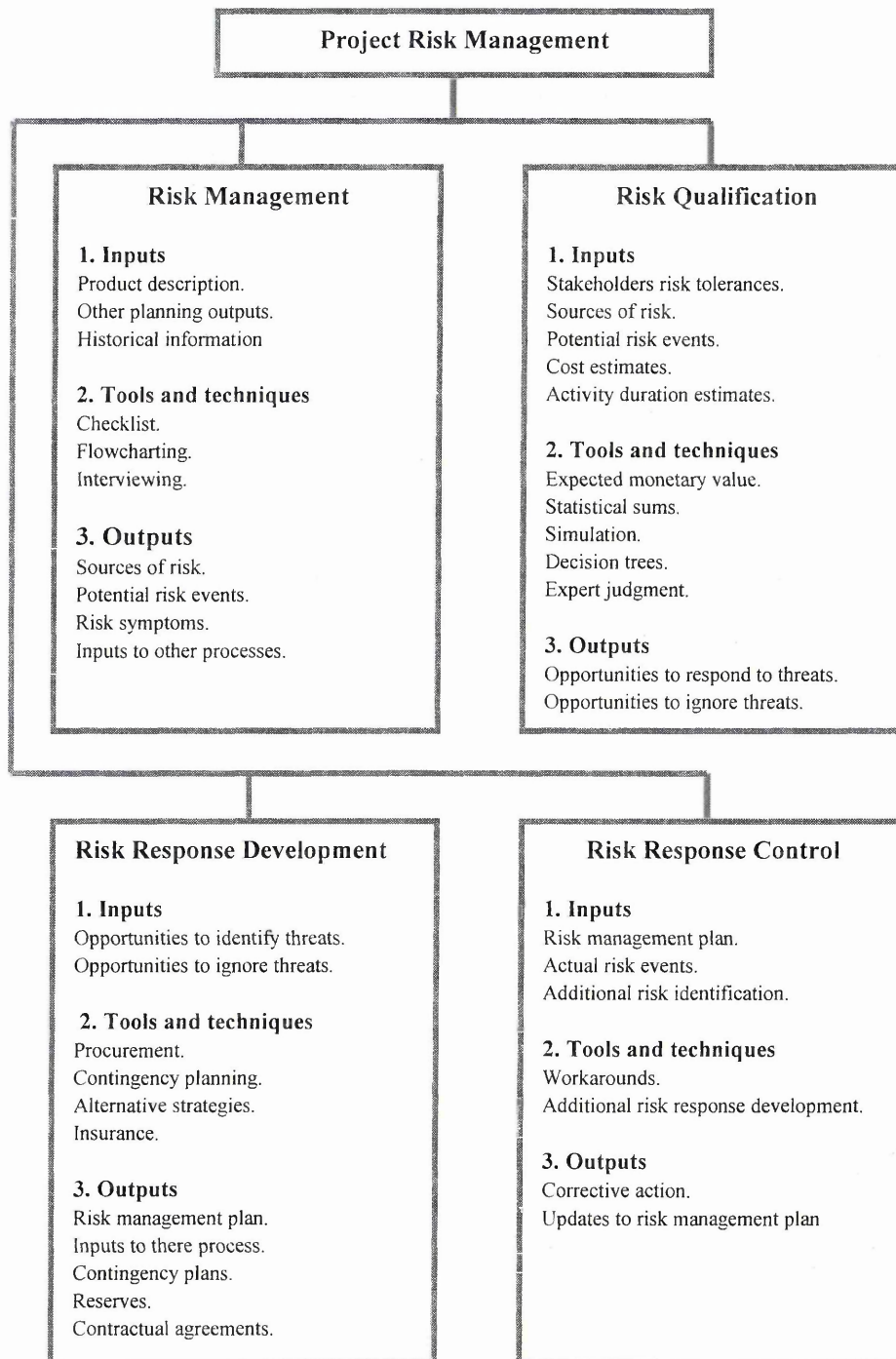


Figure 2.7: Project Risk Management Overview

Source: Adapted from Project Management Institute (1996)

Jaafari and Anderson (1995) identified possible risks in a real life case study of an office building in Sydney, Australia and classified these risks into four groups: Planning risks including development approval and building approval; Design and construction risks including quality of brief, design changes, consultants' fees, contractor's performance, subcontractors' performance, inclement weather, industrial disputes, materials shortages and poor quality control; Site-related risks including accessibility, flooding and soil conditions; Market risks such as rental income, occupancy rate, sale of building and interest rate.

2. Risk Estimation

Williams (1995) and Isaac (1995) suggested that risk estimation and quantification can be defined by the magnitude and frequency of the risk event being considered. Usually the probability of occurrence and likely impact of events are assessed at this stage. Impact is usually measured in terms of time or cost and occasionally, performance.

According to Ward *et al.* (1991), the slow adaptation of risk analysis techniques in the construction industry can be blamed on cultural issues such as lack of knowledge, negative attitudes and a mistrust of risk analysis techniques.

3. Risk Response

Issac (1995) explained the risk response as: *"... is any action or activity that is implemented to deal with a specific risk or combination of risks"*. Responses are usually classified into four different types: (i) Avoidance; (ii) Transfer; (iii) Retention; and (iv) Reduction.

Baker, *et al.* (1999) looked at the choice and use of the most common risk response techniques within the oil and gas industry and compared them with the use of those chosen by the construction industry. The findings show that the risk reduction response is most commonly used by both sectors and that the construction industry puts greater emphasis on reduction of financial risk than technical risks, and useful lessons can be learnt from the oil and gas industry. On the other hand, Issac (1995) argued that it is usually more important to consider the timing of the response rather than worrying too much about the type of response. Raftery (1994) offers the following explanations of methods used when responding to risk:

I. Risk Avoidance

This is also referred to as risk elimination and might occur in a number of ways. Risks can be avoided in two major ways; using alternative construction methods and techniques or not bidding for high-risk projects Hillson (2002). The former reduces the risk by using another, inherently safer, construction method. The latter reduces the probability of occurrence to zero e.g. making it impossible for the risk to occur.

II. Risk Transfer

Thompson and Parry (1992) explain two basic forms of risk transfer. First, the construction activity causing the risk is transferred, for example by hiring a subcontractor for the most risky activities. Second, the actual activity is retained and the financial risk is transferred by getting insurance.

The principal rule in determining whether a risk should be transferred is whether the receiving part has both the competence to fairly assess the risk and the expertise necessary to control it (Kartam and Kartam, 2001). However, much of the current

difficulty with risk allocation may arise because contractual parties are usually occupied with transferring risk to other parties. Williams (1995) thought that managing risks should mean minimising, controlling and sharing of risks, and not merely passing them off onto another party.

III. Risk Reduction

Companies can reduce their risks by improving their physical, procedural, educational and training Flanagan and Norman (1993). For example, simple measures like maintenance, first aid and security can improve not only labour relations and increase productivity, but can reduce risk by either (or both) reduce its probability of occurrence and/or impact.

4. Risk Evaluation

Risk is "Likelihood that a specified undesired event will occur due to the realization of a hazard" (Croner, 1994). Also they concluded that once a hazard was identified the degree of risk must be determined. Two factors are influential in this determination:

- I. The severity of harm - the level of harm that a circumstance would create, and
- II. The likelihood of occurrence - the frequency of a hazardous circumstance

They proposed that the evaluation of risk is done using a simple calculation:

$$(\text{Severity of harm}) * (\text{likelihood of occurrence}) = \text{degree of risk}$$

Discovering the risk at an early stage is considered to be one of the most important responsibilities of the project team (engineers, contractor, sub-contractors, employees, construction manager and a project manager). A successful construction project needs a

good project manager with a high level of experience that enables him/her to resolve and control the risk if such occur. By controlling and resolving the risk the level of success may not be very high but may meet with the success criteria.

2.16. HEALTH AND SAFETY MANAGEMENT

Health and safety is very crucial and should be given more attention in order to complete a project successfully. It is really important factor especially in the construction works; this is because construction works is dangers (e.g. High-rise projects). Griffith and Howarth (2000) defined the management of health and safety as being one of the most important functions within and throughout the construction process. Construction work is considered intrinsically dangerous. Injury to persons on and around construction sites occurs regularly and frequently. It is fortunate that many injuries are minor, but, others are serious and some are fatal.

The Construction (Design and Management) Regulations 1994 (HSE, 1994), introduced welcome and much needed legislation into UK construction health and safety. The regulations focus purposefully on the management of health and safety throughout the total construction process.

The health and safety service at any construction project is a very important service in terms of maintaining the well-being of the workers. The CDM Construction (Design and Management) Regulation 2007 was designed to help and ensure that the construction project is safe to build, safe to use, and safe to maintain and delivers good value (CDM Regulation, 2007).

The CDM Regulations 2007 place a duty upon clients, coordinators, designers, principal contractors and contractors to plan and ensure adequate health and safety for all phases of the construction project. Health and safety at work is the responsibility of all project members in terms of avoiding any problems that might affect the success of the construction project. Health and safety at work should be addressed by clients, coordinators, designers, principal contractors and contractors, PMs and construction managers before starting the projects and during the entire construction process to make sure the construction project will finish successfully without any problems.

The designing of health and safety management at an early stage will enable all parties to know and understand their duties and responsibilities and avoid any misunderstanding later during the construction process. So it is clear that health and safety management is considered an essential part of the construction project plan as well as a vital element that can affect the success of construction projects.

2.17. PROCUREMENT METHODS

The selection of the procurement method is one of the most critical factors contributing to finishing projects successfully. Selecting an appropriate procurement route for any given ‘Scenario’ and highlighting a practical role for a project manager within it is a sensible approach. The project will have a partnering arrangement, so the role of a project manager amongst other things will be that of the partnering facilitator. The wrong selection of the procurement methods for a construction project is considered to be a factor that may affect the success of a project. In Libya such problem is always happened and this may be related to the unqualified people who managing contracts and to the old contracting system that are used in the country.

2.17.1. The Procurement Route

There are essentially four main procurement systems; Traditional; Management Contracting; Construction Management and Design and Build. Although some of them have variances, the explanation is focus on the four systems. (CIOB, 2010) and (Hughes, *et al.* 2006)

1. Traditional

The traditional procurement approach detaches the design and construction processes. Separate consultants are used to design the project and an independent contractor is employed to complete the construction process. The contractor is normally selected through a competitive tendering process and has little to no input in the design of the project. Both the design and the management of the project are managed by an architect. Additional consultants, for example quantity surveyors and structural engineers, will join the project throughout its lifecycle, as and when required.

This total separation of the design and construction processes is advantageous in that the cost of the project is determined at its commencement through the competitive tendering process. Through the demarcation of functions there are clear lines of responsibility and accountability within the project. However, there are a number of problems associated with separating the design and construction processes. Most significantly, the project durations are normally lengthier than other procurement systems. This is because tendering for the construction phase can only commence after completion of the design process. The tendering process itself is time restrictive. Additionally, the separation of the design and construction process can slow down the

decision making process. Having separate teams reduces communication making it difficult to resolve issues in the construction process in a timely manner.

2. Management Contracting (divided contract approach)

Similarly to the traditional procurement system, management contracting, or divided contract approach, separates the design and construction processes. However, these processes are overseen by a management organisation, for example a project or construction manager. The management organisation is appointed at the commencement of the project and acts as the client's representative. The project or construction manager has authority to make decisions on behalf of the client.

3. Construction Management

Construction management method allows specialists to be contracted by the client directly and the client involved a construction manager as member of project team acting as an agent and not principle, to concentrate on the organisation and management of the construction operation. Such method is at its best with a hands-on responsive client who can make decisions quickly. On the other hand, it has been found to relatively unsuccessful when the client needs to refer issues to one or more committees before decision (CIOB, 2010).

4. Design and Build

The design and build procurement route has many names, for example, Design & Build, Design-Managed-Construct, Build-Own-Operate, Build-Own-Operate-Transfer and Turnkey. The design and build system enables a single point of responsibility which is offered to the client by the contractor. As with the traditional approach there are many

variants on the theme to the design and build route, many of which are project finance. The structure of the design and build project is more complex than that of the traditional route during the tender stage. This is because, more often than not, different priced bids along with different design solutions are competing for the same project.

The code of practice for Project Management for construction and development 2010 (CIOB) understands the procurement route for design and build to be as follows: The client appoints a contractor (normally on a standard building contract, i.e. JCT); to provide a finished project that is within budget and completed within the agreed programme. The contractor is then responsible for the design and construction of the project. This agreement transfers all the risks to the contractor. The design and build contractor may be appointed when part of the design is completed, and in many cases the design team may be passed on to the contractor.

According to The Code of Practice of Project Management for construction and development 2010 (CIOB, p35), procurement should be considered to be the process of identification, selection and commissioning of the contributions required for the construction phase of the project.

Procurement of the design and construction work is about integrating the client's objectives for the project with the particular characteristics of the procurement system chosen. Each of the procurement options has implications.

The main procurement types are matched with the priorities of the client. These features may be met in more than one of the standardised procurement types of contract. The principals governing procurement type are: Degree of client involvement: priorities and client objectives; Risk allocation: client side versus supply side; Balance of competition

and negotiation; Tendering processes: e.g. single or two stages, open versus selective, closed or negotiated; Whether framework agreements or repeat projects required; Degree of integration required; Degree of collaborative practice and partnering; and Controlling life cycle costs facilities in or out.

Alternatively, tailor-made procurement could be developed amending contract conditions to suit. This is not recommended because of the difficulty of introducing working conditions which have not been tested.

The choice of procurement system then becomes a major issue in meeting the client's requirements and it is important to make sure that they understand the implications of the different approaches. A table to help proper selection of procurement systems can be found in HM Treasury Procurement Guidance No.5 (1999), Procurement Strategies, which provides a matrix for scoring evaluation criteria for a given project against different types of procurement. This theme is developed in the achieving excellence guidelines.

2.18. A PROJECT MANAGER

A project manager is the first main factor that can affect the success of construction projects. The success of the construction project can depend upon the experience, knowledge, authority, skills and relationship of a project manager. Full information about this factor has been explained in the previous chapter. Thite (1997) identified a project manager as the person who is charged with managing the resources to complete project implementation on time, within budget and with agreed functionality.

Moreover, Hauschildt *et al.* (2000) accepted that effective project managers are essential to project success and many organizations have wisely spent large sums to improve the selection of managers.

Turner and Muller (2006) have shown that a project manager's success at managing his/her project is dependent on his/her competence, particularly in terms of leadership style comprising emotional intelligence, management focus and intellect.

From the above definitions, it is clear that a project manager has overall responsibilities for the execution of a project taking into account the necessity to complete the project on time, within budget with the agreed functionality, as well as being considered the key contributor to the success of the construction project.

2.18.1. Selection of a Project Manager (PM)

Mian (1999) offers a model for the selection of a project manager where three main criteria are identified. Firstly, there are administrative and supervisory skills, which include leadership ability, communication skills and problem-solving skills. Secondly, technical knowledge, which includes project knowledge and experience in the field and education level. Thirdly, a project manager needs personal abilities which include self-confidence, decisiveness, personal integrity, entrepreneurship and aggressiveness.

Hauschildt *et al.* (2000) also propose seven factors and 25 variables which affect project manager efficacy. The seven factors are: organization under conflict, experience, decision making, and productive creativity, organizing with cooperation, cooperative leadership and integrative thinking. The variables are: critical ability, time management, ability to delegate, conflict tolerance, years of employment, knowledge procedures,

leadership experience, experience in the field, holistic thinking, judgment, decision making, showing creativity, ideas and initiatives, carrying through ideas, cost management, willingness to learn, planning and organization, team management, sensibility, ability to cooperate, ability to motivate, expressing oneself clearly, attending to others, systematic thinking and explanation of variance.

Goodwin (1993) concluded that a project manager's effectiveness is dependent on conceptual, human and negotiating skills as well as, to lesser extent, technical skills and the ability to communicate. Mead (2001) and Thomas *et al.* (1999) agreed that effective communication is one of the key factors in determining the success or failure of a project, and considered to be the major challenge to project success.

Selection of the right person for the right project is very important to any project in terms of driving the project to success without any problems and to meet the most important aspect (the client's satisfaction). Full information has been explained in the previous section. Table 2.9 shows the main project managers' selection criteria in current use.

Table 2.9: A Set of the Main Project Manager Selection Criteria

Author(s) (Year) (Nationality)	Sum of Criteria (in no particular order)
UK criteria for selecting a project manager; Selection criteria by federal Government of Nigeria, Awe 2007; Sykes. (1986), (New York); Collins. (1998), (California); Hauschildt. et al. (2000), (Germany & Canada); Lorda and Brown. (2001), (Canada); Ogunlana et al. (2002), (Thailand & UK); Lievens et al. (2003), (Belgium); Haynes and Love. (2004), (Australia); Figueira et al. (2005), (Portugal, Italy & New Zealand); Meredith and Mantel. (2006, 2010), (UK); Turner and Muller, (2006), (France & Sweden); Kerzner. (2006), (UK); Zavadskas, et al. (2008), (Lithuania).	Education level (academic qualification); Age; Gender; Availability; Experience in similar projects; Dependability; Work experience in project management; Ability and knowledge of using project management software; Interest in the project; Previous projects successfully managed; Personal skills (mobilizing, political sensitivity, verbal communications, high self-esteem, enthusiasm, delegating authority, Conflict resolution diplomacy, Hard-nosed manager, Ability to keep project's team happy); Technical skills; Technical engineering background; Management and managerial skills; Knowledge of national building code; Dispute resolution management ability and knowledge; Health and safety training; Risk management assessment ability; Design making ability; Project management skills (Team leadership, Knowledge of project management implementation process, Developing recourse plans); Business skills; Control; Quality; Conceptual and organisational skills (planning, organizing, and strong goals orientation).

2.19. SECTION OF CONTRACTORS

There is no doubt that the contractor who will be directly involved in the project can have a significant impact on the successful outcome of a project. According to Mabachu (2008) optimal selection of contractors should be on the basis of overall ability to perform, rather than on tender price alone. A contractor for a project must be carefully selected taking into account the availability of knowledge, experiences and capability. This should be considered before the tendering stage in order to ensure that an appropriate contractor will be selected. In Libya, a large number of projects have failed and/or been delayed because of a lack of efficiency and capability of the contractors. This may have been due to the absence of appropriate selection criteria which allowed selection of “the wrong” contractor. This is considered as a fundamental issue in

relation to the success of construction projects and should be strongly taken into consideration. Table 2.10 shows the selection criteria for selecting contractors for construction projects.

2.20. SELECTION OF SUBCONTRACTORS

The success of any construction project is considered a complementary process, if any participating body is wrongly selected that will definitely affect the success of the entire project. The selection of subcontractors is important, especially for large projects when there will be a number of subcontractors. Neglecting the key criteria underpinning performance, causes main contractors to select subcontractors who lack the necessary competencies and disposition to perform adequately. Mabachu (2008) has identified that the ability of the main contractor, a project manager and consultants to deliver the project within time, quality and cost depends largely on the performance of the subcontractors. It is considered the main contractors' and project manager's responsibility to select the right subcontractors, and this should depend upon an agreed set of selection criteria and a transparent process, see Table 2.11 which shows current criteria for selection of subcontractors.

2.21. SELECTION OF CONSULTANTS

Selection of consultants with a minimum of relevant experience is a very important step in the selection process, neglecting this criterion will usually adversely affect the success of a construction project. To ensure that the project will be completed successfully (on time, within cost, of adequate quality and to client satisfaction), the right consultant or consultancy firm should be selected. The simplest way of achieving

this is by using a suitable set of selection criteria. Table 2.12 provides selection criteria in use in different countries.

Table 2.10: Current Selection Criteria for Contractors

Author(s) Year (Nationality)	Sum of Criteria
Australian code of practice for the building and construction industry	Organisational capacity; Technical and professional expertise and qualifications; Previous experience; Innovation ability; Resource availability; Health and safety management.
UK Code of Practice for the Selection of Main Contractors	Quality of work; Performance record; Overall competence; Health and safety record and competence; Financial stability; Appropriate insurance cover; Size and resources; Technical and organisational ability; Ability to innovate.
Federal Government of Nigerian Code of Practice for the Selection of Contractors, Awe 2007.	Financial capability and suitability; Capability as per experience to handle project of given magnitude; Commendable business track record; Good reputation for good quality workmanship and efficient organisation; Good record of industrial relations.
Waara. (2004), Sweden; Singh and Tiong (2006), Singapore; Sonmez et al. (2002), UK and France; Holt. (1997), UK; Palaneeswaran & Kumaraswamy. (2000), Hong Kong; Hatush and Skitmore. (1998), UK; Wong et al. (2001), UK; Waara & Brochner. (2006), Sweden; Standards Australia Ltd (1994); Hatush & Skimore. (1997), UK; Salama et al. (2006), UK & Egypt; and El-Sawalhi et al. (2007), UK & Palestine; Zavadskas & Vilutiene. (2006), Lithuania; Topcu. (2004), Turkey; Singh & Tiong. (2005), Singapore.	Financial stability; Relevant experience; Appreciation of the task; Past performance; Sustainability; Resources; Management and technical ability; Experience in similar project; Historical non-performance; Firm's structure and organisation; Firm's capacity and history of claims; Methodology; Quality assurance; Reputation; Health and safety concerns.

Table 2.12: Current Selection Criteria for Consultants

Author(s) Year (Nationality)	Sum of Criteria
Australian Code of Practice for the building and construction industry	Organisational capacity; Technical and professional expertise and qualifications; Previous experience; Innovative ability; Resource availability, Health and safety management.
South-Western Region of the United States (Arizona)	Consultant technical capability, Registration and license, Financial capacity; and Organisation structure documents.
Pakistan Engineering Council	Registration and license; Experience of the firm (level of responsibility and extent of experience, experience with similar projects authorities/size of the project, experience in the kind of service); Quality of personal experience.
Indian Consultants Prequalification Manual	General information (insurance, registration and license, capacity); Financial information; Technical information (quality of personal experience).

Table 2.11: Current Criteria for Selection of Subcontractors

Author(s)	Criteria
UK Code of Practice for the Selection of Sub-Contractors	Quality of work; Performance record; Overall competence; Health and safety record; Financial stability; Appropriate insurance cover; Size and resources; Technical and organisational ability; and Ability to innovate.
Singapore Subcontractors' Selection Criteria	Price; Technical (working methods, materials, machines, and tools and based on reference past projects); Quality (meeting project's requirement, past experience and reputation); Cooperation (in terms of extent to which agreements are fulfilled and problems are proactively solved and prevented and based on past experience/reputation).
New Zealand Subcontractors' Selection Criteria	Quality of work; Productivity records (leadership qualities and ability to manage own workforce); Technical and managerial competence and experience (size/annual turnover, strength of workforce); Reputation and attitude (past records of working relationship with current contractor and/or reference from previous employers and financiers); Health and safety records; Financial capacity; Current workload and commitment, and ability to mobilize on site when needed; and Location of the subcontractor and knowledge of the project environment (local labour laws, site conditions, and material supplies).
Cooke & Williams. (1998), UK; Okoroh & Torrance. (1999), UK & Malaysia; and Gruneberg et al. (2007), UK.	Previous experience; Ability to manage resources and liaise with the main contractor's staff (including relationship); Financial capacity; Reputation; Expertise; Current commitment workload; Quality of work; Trade and bank references; Acceptability of the subcontractors to the building owner; Competitiveness of the subcontractor's tender price and item rates; management capability; Quality of workmanship; Transport/project location, reliability and trustworthiness; Performance based contracting; and Subcontractors quality records.

2.22. SUMMARY OF THE CHAPTER

The chapter has presented a detailed account of factors that may affect the success of construction projects. The literature review showed strong support among researchers for project management, CSFs (see Section 2.10 - e.g. the technical background of project team members and top management support) and such other factors (e.g. as the selection of project team, top management support) were very important for the success of construction projects. Different researchers' perspectives on what makes a successful

construction project clearly shows that the factors for success of such a project (in terms of time, cost, and quality) can differ from one project to another and from one environment to another. The chapter reviews internal and external factors in relation to projects success including the necessity of anticipating problems that may endanger the success of the project. The chapter included a brief examination of factors affecting the success of projects within the construction industry in Libya, including project management systems in Libya and developing countries. Also the chapter emphasising the importance of using the suitable selection criteria for selecting a project team. Chapter three plans to discuss the importance of a project manager to the success of construction projects including a project manager's role, duties, responsibilities and relationships.

Chapter 3

The Project Manager

3.1. AIMS OF THE CHAPTER

This chapter reviews problems with construction projects due to the project manager. There will be a specific emphasis on the Libyan project manager. A project manager in this context refers only to a project manager appointed by the client. The introduction outlines the importance of a project manager to projects success. Definition of a project manager and relationship between a project manager and success are subsequently described. A project manager's roles, responsibilities, duties, with desirable knowledge, skills and attributes are also presented in this chapter. Information about the influence of a project manager and project success is given in this chapter. The process for selection of an appropriate project manager is provided in this chapter. Finally, the chapter concludes with a summary of the chapter.

3.2. INTRODUCTION OF A PROJECT MANAGER

Effective project management in construction must vigorously pursue the efficient utilization of labour, material and equipment to improve labour productivity. In addition, good project management in the field of construction needs an excellent project manager, expert site manager, a good site engineer and a very good contractor having extensive experience in construction, professional subcontractors. However, the project manager is the most important person to lead a project to success, guide the team members and achieve client satisfaction. Today the Libyan construction industry is suffering from severe problems that affect the success of construction projects. One of those problems concerns the project manager, regarding his ability to finish the projects within time, cost and quality, experience, knowledge and his choice of the right projects.

To resolve such problems within the Libyan construction industry the roles, duties and responsibilities of the project managers have to be well defined and explained, in terms of enhancing the level of success and the commitment of a project manager.

3.3. DEFINITIONS OF A PROJECT MANAGER

Roles and typical responsibilities for project managers as applied to a construction project have been defined:

"The overall planning, co-ordination and control of a project from inception to completion aimed at meeting a client's requirements in order to produce a functionally and financially viable project that will be completed on time within authorized cost and to the required quality standards" (Parsloe and Wild, 1998, p. 21).

The person who is charged with managing the resources to get the complete project implementation on time, within budget with the agreed functionality (Thite, 1997).

A project manager is the person who has the overall responsibility for the successful planning and execution of a project” Project Smart: The role of the project manager (2007).

Synthesising these definitions, it is clear a project manager has overall responsibilities for the execution of a project to complete the project on time, within budget with the agreed functionality.

3.4. THE IMPORTANCE OF PROJECT MANAGERS

Organizations have recognized that project managers (PMs) play a critical role in the success of service engagements. To succeed, PMs are required to deliver products and

services that meet the needs of the organization and that deliver value to their clients. They must master the difficult skills, such as understanding processes, tools and techniques, as well as people skills. The latter allows PMs to provide vision and direction, resolve issues, evaluate and mitigate risk, and build and sustain client relationships (Webber and Torti, 2004).

Furthermore, a project manager is considered to be responsible to manage and resolve all the problems that arise during the construction project life cycle, and to ensure that projects follow the planned time scale that has been prepared and agreed. In Libya a project manager plays a very important role in construction projects and is considered one of the important keys in the project: he is one of the persons who are responsible to manage and resolve problems as they occur.

3.5. THE RELATIONSHIP BETWEEN A PROJECT MANAGER AND PROJECT SUCCESS

In construction projects a project managers can play a most important role regarding the improvement of the organization's performance, the organization's profitability and client satisfaction. Hauschildt, et al. (2000) have claimed that it is generally accepted that effective project managers are essential to project success and many organizations have spent large sums to improve the selection of managers.

According to Turner and Muller (2006) a project manager's success at managing his project is dependent on his competence, particularly in regard to leadership style, comprising emotional intelligence, management focus and intellect. PRINCE2 (2007) states the project manager has the authority to run the project on a day-to-day basis on behalf of the Project Board within the constraints laid down by the Board. The project

manager's prime responsibility is to ensure that the project produces the required products to the required standard of quality, within the specified constraints of time and cost. So it could be concluded that a project manager is considered to be the main person responsible for delivering the project successfully and achieving the project's goals.

Successful construction projects need competent a project manager with high levels of experience, good quality of knowledge, skills, and the ability of communicate with others, co-operative techniques, motivation and capability of driving the project to success and managing any occurring problems. Where Crawford (2001, 2003 and 2005) has defined competence as the knowledge, skills and personal characteristics required to achieve job performance as defined by appropriate standards. Thus, to manage the project effectively, a project manager needs knowledge about the application of project management tools and techniques and not only the skill to apply them in routine situations but also the competence to apply them in unfamiliar situations, so to be able to respond to the unexpected. The project may also need technical knowledge and the skill to apply it.

Moreover, Turner and Muller (2006) concluded that the project manager's leadership style influences success, and that different leadership styles are appropriate on different types of projects.

3.6. A PROJECT MANAGER AS A SUCCESS FACTOR

In stark contrast, a notable absence from many of the lists of success factors presented is any mention of a project manager. The manager, their competence, personality, or

leadership style is hardly ever mentioned as a success factor of projects, Turner and Muller (2006).

Kendra and Taplin (2004) suggest a project manager's leadership style and competence as a potential success factor for projects. However, a project manager literature is generally reticent about a project manager and his or her competence and leadership style as a factor for success of projects. This silence has not been quite deafening, there has been some work has been done over the years and some authors (Pinto and Slevin, 1988), (Melymuka, 2000) and (Zimmerer and Yasin, 1998) have suggested:

- A project manager's competence is related to their success as a project manager.
- Different project leadership styles are appropriate at each stage of the project life cycle.
- Specific leadership styles are appropriate for multicultural projects.
- Project managers have a leadership role in creating an effective working environment for the project team.
- Project managers prefer a task-oriented to people-oriented leadership style.
- A project manager's leadership style influences his or her perception of success.

3.6.1. Competence and Success

The most significant work on correlating a project manager's competence to his success was done by Crawford (2001) whose measure of success was not project performance but assessment by the supervisor. It was a subjective assessment by a line manager. Further, it was an assessment of overall performance, not that on a specific project. Crawford found that once a project manager achieved an entry level of knowledge, more knowledge does not make them more competent. However, improvement in the

other dimensions of competence, such as skills, and personal characteristics, can make them more competent. This has been confirmed by Hobbs, (Petteren and Guerette, 2001) and (Besner and Hobbs, 2004).

The most important point is that the project manager should have at least knowledge and skills related to the kind of project. In Libya a project manager sometimes is appointed for a project without any related skills and knowledge of the project, which will have negative impact on the success of the project.

3.6.2. A Project Manager's Competencies

A project manager's competence has four aspects associated with it, these are as following:

- The first is the inherent traits that a project manager has such as technical capability, leadership quality and positive attitude.
- The second is the empowerment of a project team through delegation of authority to take day-to-day decisions, making the team understand their responsibilities and generating a sense of commitment in them, developing and maintaining a short and informal line of communication amongst the team, and training the human resources in the skills demanded by the project.
- The third is to get empowered him/herself though demanding authority e.g. to take financial decisions, selecting key team members, and making sure the required resources (funds, machinery, material) are delivered as planned throughout the project duration.

-
- Fourthly it is not enough to possess the skills mentioned above unless the construction project manager is involved in the project through regular budget updates and taking an active part in construction control meetings.

These four characteristics: inherent or personal traits; empowering team; getting empowered; and getting involved with the project are typical characteristics of a competent project manager (Iyer and Jha, 2005).

3.7. THE ROLES OF A PROJECT MANAGER

The role of a project manager in the construction process can be different from company to company, and depends upon such factors as the size of the company and the size of the construction project. A project manager is accountable to the sponsor for the day to day management of the project work from the outset through to closure (Young, 2000).

The key role of a project manager is to motivate, manage, co-ordinate and maintain the moral of the whole project team (The Chartered Institute of Building (CIOB), 2010). To manage the project management processes, a person should be well organized, have great follow-up skills, be process oriented, be able to multi-task, have a logical thought process, be able to determine root causes, have good analytical ability, be a good estimator and budget manager, and have good self-discipline. A project manager normally is responsible for defining and planning the project. This results in the completion of a project definition and a project work plan. Once the project starts, a manager must successfully manage and control the work, including (Mochal, 2003):

- Identifying, tracking, managing and resolving project issues.
- Pro-actively disseminating project information to all stakeholders.

-
- Identifying, managing and mitigating project risk.
 - Ensuring that the solution is of acceptable quality.
 - Pro-actively managing scope to ensure that only what was agreed to is delivered, unless changes are approved through scope management.
 - Defining and collecting metrics to give a sense for how the project is progressing and whether the deliverables produced are acceptable.
 - Managing the overall work plan to ensure work is assigned and completed on time and within budget.

3.7.1. People Responsibilities

In addition to process skills, a project manager must have good people management skills. This includes (Mochal, 2003):

- Having the discipline and general management skills to make sure personnel follow standard processes and procedures
- Establishing leadership skills to get the team to follow direction willingly. Leadership is about communicating a vision and getting the team to accept it and strive to get there.
- Setting reasonable, challenging and clear expectations for people, and holding them accountable for meeting those expectations. This includes providing good performance feedback to team members
- Team building skills so that the people work together well, and feel motivated to work hard for the sake of the project and their other team members. The larger

your team and the longer the project, the more important it is to have good team-building skills.

- Pro-active verbal and written communicator skills, including good, active listening skills.

Mintzberg (1980), Lavender (1996), Walker (2002) and Newcombe, *et al.* (1990) all agree that job a project manager performs can be divided into three roles: Interpersonal, Informational and Decisional which can be defined as follows:

The Interpersonal Role:

- *The Manager as Figurehead.* This is a senior role and involves being the public face of the organization, representing the organization at functions and acting as the high level talking head to the media. The manager should be the key link between the management and the other workfaces within the organization.
- *The Manager as Leader.* In this, the organization looks to its formal head for guidance and motivation. One of the most important points for the PM in this section is to give motivation and activation. Also the manager should be responsible for allocating staff, at all levels within the organization.
- *The Manager as Liaison.* Here, the manager should use all forms of communication, written or verbal, with other persons or organizations, whether inside or outside the organization including the client's customers, suppliers, contractors, engineers and sub-contractors.

The Informational Role:

- *The Manager as Monitor.* In this regard, the manager should have the control function in the organization, collecting information on matters such as whether company budgets of planned project costs, time and quality targets are being met. Moreover, the manager should be responsible and monitor the entire workforce and the project's processes within the organization.
- *The Manager as Disseminator.* The manager should make sure that everybody in the organization is provided with the appropriate information and data required for them to carry out their job properly.
- *The Manager as Spokesperson.* Here, the project manager is the external public relations head, representing his organization effectively.

The Decisional Role:

- *The Manager as Entrepreneur.* In the entrepreneur role, the manager acts as initiator and designer of much of the controlled change in his/her organization. What is more, the manager should actively seek to improve the performance and position of the organization.
- *The Manager as Disturbance Handler.* This involves dealing with both external disturbances such as changes in government policy and internal disturbances such as personality clashes and industrial disputes.
- *The Manager as Resource Allocator.* This requires deciding how the organization's resources including capital will be used.
- *The Manager as Negotiator.* This involves discussions inside and outside the organization on matters such as contracts payments.

The role of a project manager encompasses many activities including: Planning and Defining Scope; Activity Planning and Sequencing; Resource Planning; Developing Schedules; Time Estimating; Cost Estimating; Developing a Budget Controlling Quality; Managing Risks and Issues; Creating Charts and Schedules; Risk Analysis; Benefits Realisation; Scalability, Inter-operability and Portability Analysis Documentation; Team Leadership; Strategic Influencing and Customer Liaison.

It is important to distinguish project management responsibilities such as:

- The planning, monitoring and control of all aspects of a project and the motivation of all those involved to achieve the project objectives on time and to cost, quality and performance (BS6079, Guide for Project Management, 2010).
- The art of directing and co-ordinating human and material resources through the life of a project using modern management techniques to achieve predetermined goals of scope, cost, time, quality, and participant satisfaction (The Project Management Institute, 2008).
- Project management is about balancing the needs of all the participants in the project. Forcing the pace of design for the sake of construction or vice versa may mean inefficiencies later. Integrating the business needs of the contractors and the consultants with the requirements of the client (BS6079, Guide for Project Management, 2010).

However, a project manager's prime concern is to try and get value for the client and on occasions conflict may arise within the project team. On these occasions conflict needs

to be fairly managed so as not to de-motivate the project team which would be counter-productive.

It is acknowledged that the leadership of the construction project may change during the project life cycle. For example, traditional procurement in the UK is most likely to involve the architect or the engineer taking the lead in inception and design stages and acting on behalf of the client. During construction the main contractor will have a leading role. For large or complex jobs the client will appoint a project manager with direct leadership of the project team and through whom the client communicates.

Young (1996) suggested that, a project manager's role can include the following:

Responsibility for achieving a successful outcome; Being expected to have proven skills in the use of project tools and techniques; Being expected to have team leadership skills; Being responsible for the availability of resources; Working with the unknown and unpredictable; Operating in a position subject to risk; Being regarded with distrust by many of those not involved; and Being forced to cut through hierarchical boundaries to get things done.

A project manager should be responsible for allocating staff at all levels within the organization, and should be responsible for connecting with all parties inside and outside the workplace, being able to receive and send information easily, and establishing good relationships with the whole workforce, all of which enhance the chances of project success.

A project manager should ensure that the work is progressing day-by-day, keeping control and finishing the construction process on time without any problems in the

budget. Also he/she should make sure that everybody in the organization is provided with appropriate information and data required for them to carry out their job properly.

A project manager is responsible for resolving the problems inside the organization if they occur, such as problems between the contractor and employees, sub-contractor and contractor, engineers and sub-contractors, or problems in the construction process should they occur. What is more, he/she can be a negotiator which involves discussions inside and outside the organization on matters such as contracts payments.

3.7.2. A Project Manager at the Feasibility stage

In the feasibility stage there are many responsibilities which a project manager should take them into account, including (CIOB, 2010):

- A project manager should be provided with or assist in preparing a clear report of the client's objectives and any known constraints.
- A project manager will be responsible for establishing a route which will best meet the client's objectives, and which will be prepared under the client's direction.
- In liaison with the client a project manager will discuss the available options and initiate a feasibility study to determine the one to be adopted.
- The client might ask a project manager to engage with and brief different specialists, to co-ordinate information or make recommendation useful to the client.
- Through this stage a project manager will convene and minute meetings of the feasibility team, report progress to the client, and he/she should give advice if the agreed budget is likely to be exceeded.

-
- A project manager should help the client to take decisions and should provide any important information to the client during this stage.

3.7.2.1. Detailed Design Brief

A project manager will be responsible for monitoring the assembly of the detailed design brief to ensure compliance with the outline project brief, the project budget, the master plan and the time-table for all the project's processes. Moreover, a project manager will be responsible for giving advice to the client of the implications of cost, time and risk in the deferment of any elements of the detailed design brief.

A project manager should monitor the progress of the assembly of the detailed design brief and he/she should inform the client if there any consequences on cost, time, quality, function and financial viability of any changes from the outline design brief. A project manager, with the approval of the client, will instruct the design team to complete the scheme design. A project manager will monitor the completion of the scheme design, arrange for cost checks to be carried out, obtain confirmation that the design meets the detailed design brief and all external constraints (CIOB, 2010).

3.7.3. A Project Manager at the Strategy Stage

According to the CIOB (2010-2002): PMs can come from a variety of backgrounds but will need the necessary skills and competencies to manage all aspects of the project from inception to completion, those skills, competencies, roles and responsibilities are:

3.7.3.1. A Project Team Structure

A project manager is responsible for defining the organizational structure of the project and for interfacing with the functional organizations. The construction project manager will be the link between the management and workforce, and between the client and the engineers, contractors and subcontractors. Projects are usually carried out by a project team under the overall direction and supervision of a project manager. The structure of the construction project team can be described by the following diagram:

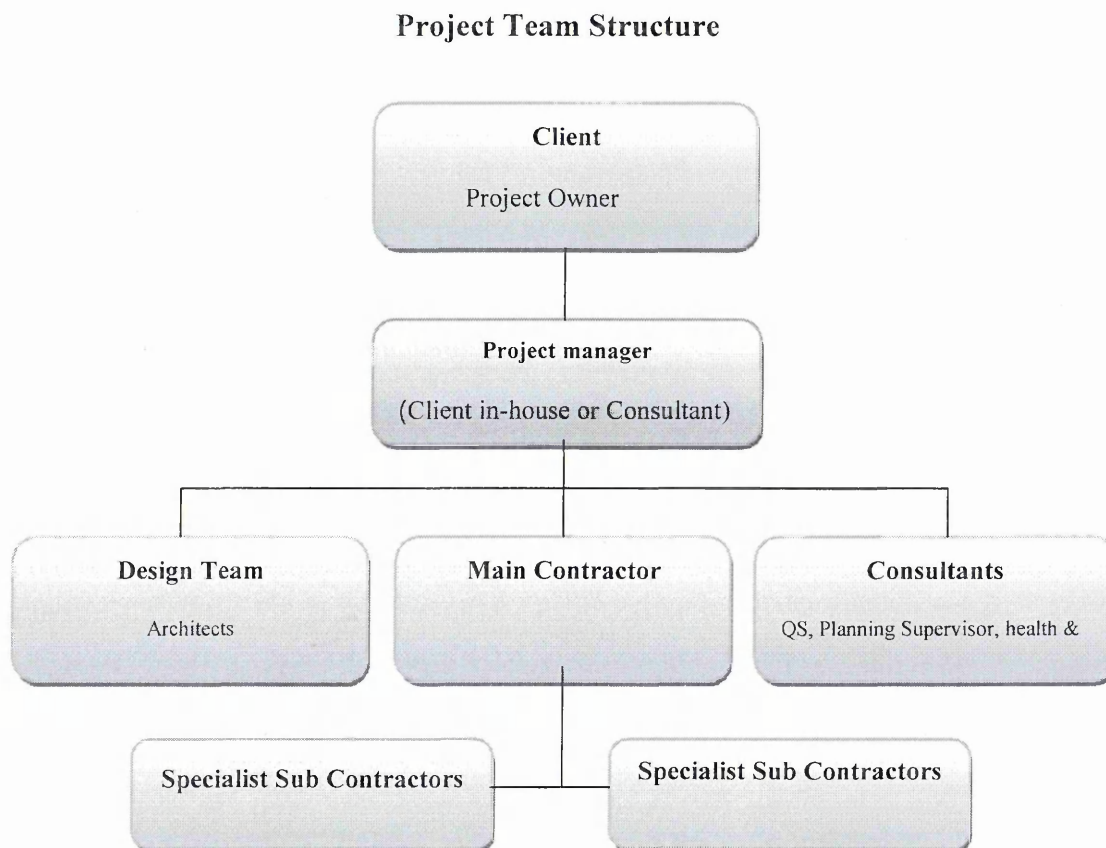


Figure 3.1: Project Team Structure

Source: Adapted from the Chartered Institute of Building, (2002, page 25)

3.7.3.2. The Project Plan

It is important that a project manager should insure the project plan can be carried out and he/she should inform the client if there any likely problems in the project plan. What is more a project manager will be responsible in front of the client to finish the construction processes within time and to timetable. Also it is project managers' responsibility to monitor the progress of the project against the master and stage schedule, identify risks to progress and to initiate necessary action to rectify potential or actual non-compliance.

The project master schedule should be developed and agreed with the client and the consultants concerned. The duties of a project manager in this stage should ensure that all detailed schedules for each stage are prepared and managed as soon as possible.

The use of computer software in this stage will be very helpful for both client and project manager to ensure that the dates for all the construction processes are known and what exactly are the start and finish dates of each stage. There are several kinds of software which can be use in construction projects, such as Pert Master and Microsoft Project.

3.7.4. A Project Manager at the Pre-construction Stage

The pre-construction stage is considered to be a very important stage for a project manager, at this point the design team and construction team has been appointed and a draft version of the project execution plan would have been issued to all relevant parties for comments. A project manager for the client would be tasked to ensure that all comments have been received and progression to the final plan can be executed.

With the project execution plan in its draft formation, the CIOB Code of Practice for Project Management considers this to be a "Live Document" which governs the strategy, organisation, control procedures, respective responsibilities for the project. The execution plan will also include:

Client brief; Risk assessment; Cost controls; Master programme (milestones, critical path analysis); and Project strategy.

A project manager would also schedule meetings with the design and construction teams respectively to firstly introduce him/herself and confirm his/her responsibilities within the project; secondly as a partnering facilitator, he/she would set objectives for the respective teams to achieve, thus allowing the project manager to build the team (CIOB, 2010).

If required, another role for a project manager at this stage is to ensure that any specialist consultants required are brought into the design team at an early stage to enable any risks that have been identified to be easily mitigated.

A project manager has several other responsibilities, which are including:

- Monitoring progress within the design team, along with its inter-relationship.
- Advising the design team leader of any details required along with design team activities.
- Incorporating the project schedule, dates for submission and periods for their consideration and approval.
- Drawing the attention of the design team to their respective duties under CDM 2007.
- Obtaining regular/cost reports and monitoring against budget/cost plans.

It is very important for the project manager at this stage to know of his roles and responsibilities before starting of the construction stage. A project manager should be sure of the ability of the project team members in relating to completing the project; and ensure that the project plan and drawings are clear and available. Also, he should have a number of meetings with people involved in the project to ensure that every thing is in the right place.

3.7.5. A Project Manager at the Construction Stage

"The change from pre-construction to the construction stage signifies the culmination of all the pre-construction effort that allows the actual work to start on site." (The Chartered Institute of Building CIOB, Code of Practice for Project Management for Construction and Development, 2010)

Additional duties for a project manager will also have to be established. As the construction stage takes effect, major decisions will have to be taken by a project manager i.e. planning conditions, client's main objectives, and whole life cycle constraints. A project manager has to be proactive and able to drive the team to completion or handover.

The additional duties that will be required by a project manager are: Ensuring signed contract documents are prepared and issued to the contractor; Arranging the site handover from client to contractor; Review the contractors' method statements and construction schedules; Regular site meetings - well documented; Ensure the Health and Safety file is properly maintained; Regular reports to the client (New CDM 2007); Managing project cost; Ensuring client meets contractual obligations (payments); and Anticipating and resolving potential problems (risk register).

Again, as a partnering facilitator, a project manager is to ensure that the project team is governed by a strong leader and is able to direct the team through measurement of performance against time, quality and cost and to carry out all necessary actions to ensure the team's successful delivery of the project that not only satisfies the client's needs, but also exceeds personnel expectations.

This stage is considered as a very crucial stage in the project. A project manager should be well organised and should be able to direct the project successfully through to the handover stage, he should aim at completing the project within time scale, estimated budget and to acceptable quality. As a result, many construction projects in Libya failed in this stage (the construction stage), and the main reason for this is due to incompetence of the project manager. So, it is clear that the project manager at this stage should be well qualified to achieve the success.

3.7.5.1. The Responsibilities for a Project Manager in the Construction Stage

A project manager has many responsibilities on the construction site during the construction process when he/she must ensure that the construction processes are progressing as planned and that the construction processes completed are within quality, time and cost.

A project manager also needs to be demonstrating his/her soft skills as well as hard skills (CIOB, 2010). The hard skills generally include construction planning, scheduling for the construction process to ensure that the construction process is completed on time, organizational ability on site, report writing, cost controlling, which enable the project to finish within budget, innovation, decision making and prioritisation.

The soft skills include leadership of the construction team, where a project manager should provide good leadership on the construction site to enable the construction team to achieve the project's goals and objectives, provide motivation for employees to encourage the workers to do better work and achieve project success, provide communication with the contractor, workers and the client, demonstrate interpersonal skills (a project manager needs a flexible personality to avoid and/or resolve the problems should they occur), show a team building ability, be honest with all parties, and possess integrity and a sense of humour (CIOB, 2010).

3.7.5.2. A Project Manager Objectives in the Construction Site

A project manager should achieve and develop the project objectives, the individuals' objectives and the team's objectives. Moreover a project manager needs to continuously ensure that all the clients' objectives are being achieved. The client expects that a project manager should lead the project to success that a project manager should ensure all clients' and the project objectives have been achieved. A project manager needs to ensure that all site personnel and the contractor are working in a successful way which leads the project to achieve its objectives (CIOB, 2010-2002).

3.7.6. A Project Manager at the Completion / Handover Stage

The completion and the handover stage are considered the last stage of work executed by the contractors and consultants prior to acceptance of the facility by the client. A project manager maintains the required link, whilst acting on behalf of the parties concerned (the client/user). Work organized by the client's occupation coordinator is usually preceded by accommodation schedules of works which can consume up to 3% of the construction budget (CIOB, 2010).

There are a number of activities for a project manager to ensure the construction contract ends successfully (CIOB, Code of Practice for Project Management):

- Ensure the contract administration has inspected the works, if appropriate, and has issued the Certificate of Practical Completion. With this certificate should be attached the timetable statement for the project. In this stage, the PM needs to ensure their completion.
- A project manager needs to ensure the client is prepared for the insurance and security implications of the change of responsibilities.
- A project manager needs to write a certificate marking each completion of all parts of the work.
- It is important for a project manager should ensure the final account process for the completed works is concluded with the contractor as rapidly as possible.
- A manager has a duty to monitor the legal liability of the client throughout the construction work.
- A project manager should ensure the contract administrator carries out a final inspection and, if appropriate, issues the final Certificate.
- On the behalf of the client, a project manager needs to ensure that the following documents are available and that they are of the necessary quality:

The project health and safety file; 'As built' drawings together with all relevant specifications; Operating and maintenance manual, consisting of details of maintenance schedules operation instruction, manufacturer's details; Warranties and guarantees from suppliers; and Test and commissioning documents.

3.8. A PROJECT MANAGER'S DUTIES

In order to complete projects successfully, the duties of the project team should be well defined and understood by all team members. It is very important for a project manager to be aware of his duties that enabling him to manage a project's tasks without any problem. Parsloe and Wild (1998) and Sears (2000) defined the duties of project managers as: Ensuring that the design management plan is being complied with; It is important to ensure that the requirements of the consolidated brief are being met; To produce, together with the design team, an integrated programme for the activities of all design team members; Develop the design programme to include dates for the submission and consideration of outstanding reports affecting design issues; Commission any additional reports required; Draw attention to the design team's duties under the CDM Regulations; To obtain, on behalf of the design team, information and decisions relevant to the design from the client; To submit, with the design team, preliminary design proposals to the client for approval; Obtain regular cost reports, monitor the cost plan and secure client approvals at agreed stages; Clarify responsibilities between the design team and specialist contractors or manufacturers who may contribute to the design; Review project control procedures and amend the project handbook as required; To review and, if necessary, amplify the consolidated brief for each design unit; To co-ordinate client and design team activities; Prepare with the design team a detailed design and production information programme defining tasks and allocating responsibilities; Establish key dates for delivery of information for cost checking, client approval, and tender preparation purposes; To liaise between client, design team and statutory bodies; Prepare and collate design progress reports; and To obtain client approval for detailed design.

3.9. THE RESPONSIBILITIES OF A PROJECT MANAGER

A project manager has many responsibilities that should be fully understood by him in order to achieve the objectives of a construction project. According to Lester (2007) a project manager is an individual who has the responsibilities, authority and accountability assigned to him to achieve safely the project objectives within an agreed time, cost, and quality criteria. Young (2000) stated that a project manager has a substantial number of responsibilities during the work including:

- Selection of the core team with the project sponsors.
- Identifying and managing risk.
- Monitoring and tracking project progress.
- Solving problems that interfere with that progress.
- Leading the project team, and being responsible for the team.
- Delivering the project deliverables and benefits.
- Managing performance of everyone involved with the project.

A successful project manager should have a good understanding of these responsibilities and duties in order to ensure that the project will be successfully completed.

3.10. SITE ACTIVITIES

There are many factors affecting job-site productivity which can be characterized as well in the project. These characteristics are (Young, 2000):

- Age, experience and skill of workforce: The workforce on the project should possess good experience and skills and can manage and complete their work

without problems; also the age of the employees should be suitable for sustained hard work.

- Leadership and motivation of workforce: The workforce should have good internal relationships to work successfully and finish on time, also good relationships will give the employees the motivation to enjoy their work and organise it well.

Also there are other factors in the project which can affect the quality of project completion: the job size and complication, including:

- Accessible to the project site.
- Labour availability.
- Use of equipment.
- Contractual agreements.
- The local climate.
- The culture of workforce (project management construction; labour, material and equipment).

3.11. PRELIMINARY PROJECT ARRANGEMENT - A PROJECT MANAGER

There is a set of primary considerations for a project manager before starting any project; these elements are (CIOB 2010):

- Meetings with clients, architects, consultants and all the engineers in the project,
- Meeting with contractors and subcontractors and with all employees,
- Meetings with local authorities,

-
- All contract documents should be given to the contractor and ensure the contracts are signed,
 - Ensuring the health and safety regulations are available in the project,
 - Arranging the handover of the site from the client to the contractor,
 - Reviewing the contractor's construction schedule, method statements and project drawings, and
 - Ensuring design information required by contractor is supplied by consultants, and ensuring that the site inspections happen.

A project manager should arrange meeting with the suppliers, this is to ensure that the availability of materials will be in place before starting any task in the project.

3.12. THE SELECTION OF A PROJECT MANAGER

Choosing the right project manager is important to the project and will be the responsibility of the client with guidance from advisors. In certain circumstances a professional/expert in other disciplines may be required to act as an advisor at an early stage.

Mian (1999) offers a model to select a project manager where three main criteria are identified.

- Firstly, administrative and supervisory skills, which include leadership ability, communication skills and problem-solving skills.
- Secondly, technical knowledge, which includes project knowledge, experience in the field and educational level.

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- Thirdly, personal abilities which includes self-confidence, decisiveness, personal integrity, entrepreneurship and aggressiveness.

Hauschildt *et al.* (2000) propose seven factors with 25 variables which affect a project manager efficacy. The seven factors are: organization under conflict, experience, decision making, and productive creativity, organizing with cooperation, cooperative leadership and integrative thinking. The 25 variables are: critical ability, time management, ability to delegate, conflict tolerance, years of employment, knowledge procedures, leadership experience, experience in the field, holistic thinking, judgment, decision making, showing creativity, ideas and initiatives, carries through ideas, cost management, willingness to learn, planning and organization, team management, sensibility, ability to cooperate, ability to motivate, expresses oneself clearly, attends to others, systematic thinking, variance explained.

Goodwin, (1993) concluded that a project manager's effectiveness depends on conceptual, human and negotiating skills as well as, to a lesser extent, technical skills and the ability to communicate.

Mead (2001) and Thomas *et al.* (1999) agreed that effective communication is one of the key factors in determining the success or failure of a project, and considered to be the major challenge to project success.

The project management institute (1996) describes the essential “characteristics” of a project manager as having, a positive, ‘can do’ attitude, common sense, open mindedness, adaptability, inventiveness, fairness and commitment, and being a prudent risk taker (weighing up the risk). A competent construction project manager, with these qualities will make the communication process with the client a lot easier and allow the

project to run smoothly. Having said that, a competent/well established client will include with these skills ‘a willingness to see those things which are important to their business’. A project manager role will be related to the procurement route chosen by the client. In the case of the executive structure, a project manager manages all aspects of the project from inception to completion. With traditional procurement a project manager changes with the different stages of the project life cycle. Either way, there are four key tasks for a project manager acting on behalf of the client. They are to:

- Guide and advise the client.
- Manage the resources to carry out project activities.
- Build the project team.
- Ensure customer requirements are met.

The appointment of a dedicated a project manager should help provide customer focus and to draw the client into the team, allowing the client’s approval process to be clarified. Meeting customer requirements means gaining knowledge of the customer’s business, sharing problems at an early stage, so that trust is built up and reviewing project goals at regular intervals to make sure that the developing brief meets expectations.

Indication from both the pilot study and previous study by the author suggested that the selection of the project manager should be based on his experience, knowledge and skills. This is one of the problems that always happened in the Libya construction sector. A project manager is appointed without experience, skills and knowledge and even sometimes with different background, which affects the success of construction projects in Libya. For the success of project it is very important to select a project manager

based on relevant selection criteria. The selection of the project manager should be done by both the client and specialists.

3.13. THE PROJECT MANAGER'S RELATIONSHIPS

For the success of a construction project, it is very important for a project manager to have good relationships with all a project team. If there any problems between a project manager and the contractor or between the contractor and the employees, the project will not proceed smoothly and may not finish it on time. This relationship is one of the most important for finishing projects successfully. Without good on-site relations, it will be difficult to organise and complete the project and achieve its goals.

3.13.1. Relationship with the Contractor

The contractor is responsible for working according to the terms and condition set out in the contract. To achieve this, he/she needs to have to have good communication lines and interaction with a project manager. What is more a project manager needs to communicate realistic project objectives to the contractor and make him/her aware of the major risks in the project. A project manager's responsibilities are to follow the contractor, the construction process, provide all necessary assistance to the contractor, provide continual feedback to the contractor, asking for day-to-day progress of the project and ensure that the contractor is working within the project plan.

A project manager needs to arrange meetings with the contractor from time to time to discuss problems at work and, and exchange any information from the client at any time during the project. The relationship between a project manager and the client should be good and the contractor needs to take a project manager's advice into consideration.

This will lead to finishing the project on time, within budget, with good work quality and finishing the project without any problems.

3.13.2. The Relationship with the Client

A project manager manages the project on behalf of the client, which means a project manager will be responsible for the project and he/she will be responsible to achieve the project's goals and objectives for the client. Most project managers want to deliver to the client's requirements because they are interested in maintaining a good ongoing relationship. Thus a project manager also needs to know that they are making the right choices on behalf of the client. Moreover a project manager is responsible for writing reports and handing them to the client from time to time (weekly, monthly or at agreed set times), which should provide complete information about the project.

Maclachlan (1996) stated that a project manager usually presents a formal report to the client. The report should be short, clear and focused on the key issues of the project.

The client is likely to require the following:

- Activity since the last report, a project manager needs to explain what he/she has done and what has been completed.
- Planned activities, in which a project manager includes plans about the next stage of work, and needs to explain if there any problems that have been found in the last stage and how to resolve the problems which have been found.
- Issues where a project manager tells the client what problems have arisen or are likely to arise.
- A project manager demonstrates he/she is the important person in the project and crucial to the success of the project.

A project manager should have good relationship with all team members not just with the contractor and the client. Such relationship should be with the workers, subcontractors, engineers and specialists to encourage them to work as a team and complete tasks successfully.

3.14. LEADERSHIP EFFECTIVENESS/SUCCESS

The effectiveness/success of the leader is measured by the leaders themselves (self perception) and the team members of the project (subordinate perception) based on the following parameters (Pinto and Stevin, 2000):

- Ability of the construction project manager (leader) in representing his/her group to higher authority,
- Ability of the leadership in meeting the job-related needs of his or her subordinates,
- Ability of the leader in meeting the requirements of the organization, and
- The overall effectiveness of the group.

3.15. THE PROJECT MANAGER'S KNOWLEDGE

Knowledge of construction project management is needed to manage successful construction projects and avoid misunderstandings that could adversely affect success and get in the way of achieving the project's goals. Gretton (1993) outlined the generic areas of knowledge that various accrediting bodies expect project managers to acquire for certification. The lists of necessary knowledge in Figure 3.2 has been acquired from two main sources: the Project Management Institute and the Association of Project

Managers; and a review of instructional material from several other organisations that provide training in project management to corporate establishments. The following figure shows the most important areas of knowledge that a project manager needs to be a successful manager and good leader.

The Project Manager's Knowledge

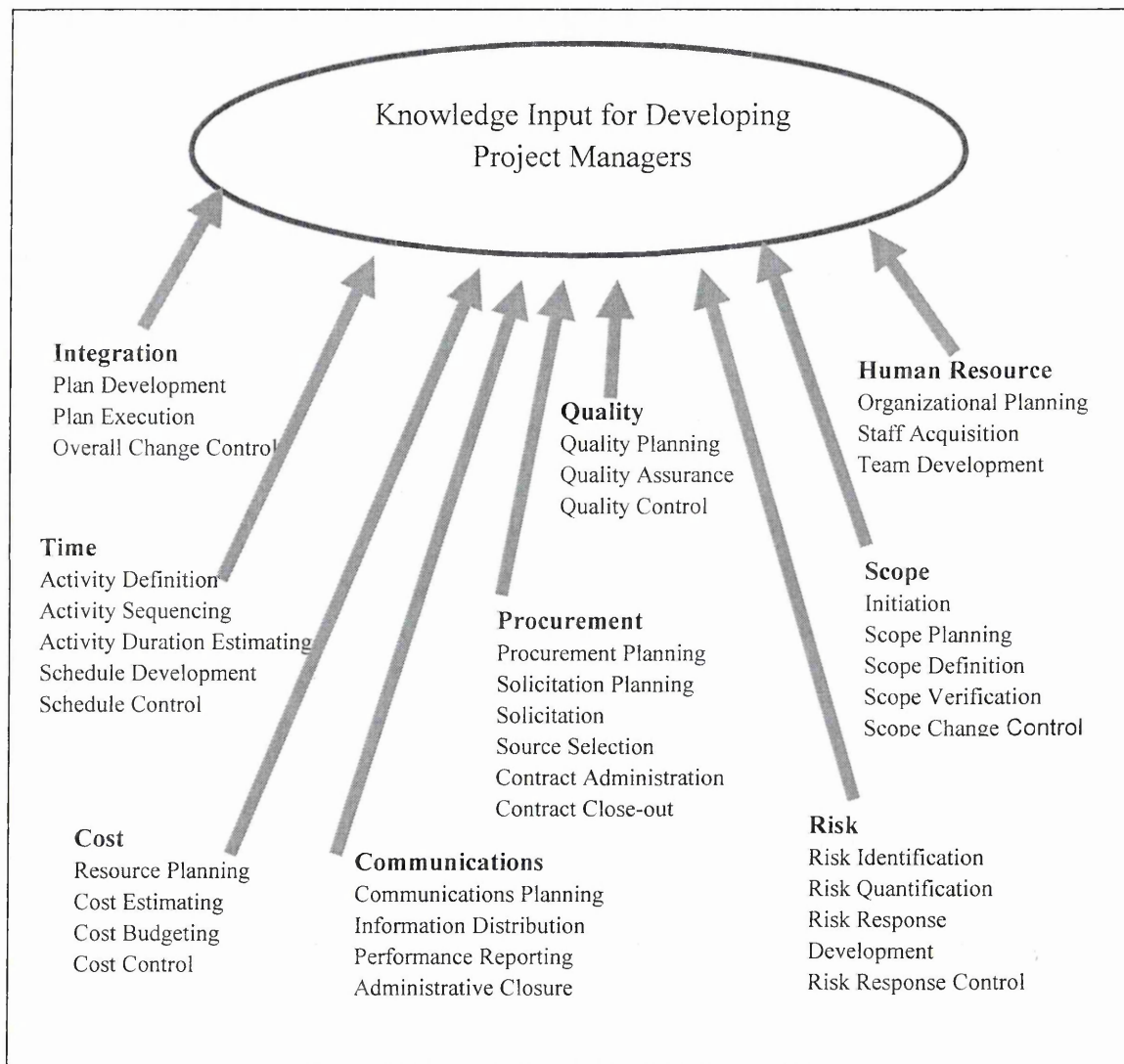


Figure 3.2: A Project Manager's Knowledge

Source: Adapted from: Edum-Fotwe and McCaffer (2000).

It is important for the project manager to have wider knowledge that can help him to complete project successfully without any problems. But in Libya, a number of project managers do not possess enough knowledge that can enable them to complete project successfully, which affect the overall the level of success. Knowledge is very important for managers; such knowledge includes the understanding of the employees' culture and religion.

3.16. THE PROJECT MANAGER'S SKILLS

There are different essential skills that a project manager should acquire to be able to lead the project successfully and to meet the client's requirements. Different researchers suggest a project manager needs different skills to achieve success.

Table 3.1: Essential Qualities and Skills of Project Managers

Rahn. (1987)	Willingness to take risks, willingness to commit time, ability to handle stress well, disposition to people management, right emotional disposition, communication skills, ability to handle politics.
Bander. (1986)	Problem solving, managerial identity, achievement orientation strongly influential.
Geaney. (1995)	Visible leadership, flexibility, sound business judgement, trust-worthiness, active listening skills.
Bloom. (1996)	Technical competence, political and people skills, ability to cope with obstacles, maturity to accept full project responsibility, stamina and sense of humour.
Lowry <i>et al.</i> (1996)	(With specific reference to IT staff) a coach, one who managers by walking around, diplomat, stands up for staff, open door policy, promoter of the best in people, juggler, maintains momentum, a large ear and superman.

Edum-Fotwe and McCaffer (2000) provided four factors which they considered the most essential skills that a construction project manager should have: Leadership, Communication, Negotiation and Problem Solving.

3.16.1. Leadership

This entails providing leadership at the three main levels of the project, both technical leadership and team leadership and will include (Edum-Fotwe and McCaffer, 2000).

1. Establishing direction by developing a vision of the future, and strategies for producing the changes needed to achieve that vision.
2. Aligning people through communication with the vision by words and deeds to all whose co-operation may be needed to achieve the vision.
3. Motivating and inspiring subordinates by helping people energise themselves to overcome political, bureaucratic, and resource barriers to change.

3.16.2. Communication

Communicating involves the exchange of information. Effective communication is a broad skill and involves a substantial body of knowledge that is not unique to the project context. Among the many skills required by a project manager for effective communications are writing, speaking and listening.

3.16.3. Negotiation

Negotiations occur around many issues, during the life of a project may will involve a project manager. The following situations are often encountered during the course of a construction project, and for which negotiation skills are called for.

- Scope, cost, and schedule objectives.
- Changes to scope, cost or schedule.
- Contract terms and conditions.
- Resource availability and utilisation.

3.16.4. Problem Solving

Problem solving skills involve a combination of problem definition and decision making skills usually concerned with problems that have already occurred. The problem definition aspect requires distinguishing between causes and symptoms. Equally the problems may be technical (differences of opinion about the best way to design a product), managerial (a functional group is not producing according to plan), or interpersonal (personality or style clashes). A project manager's decision regarding the defined problems may call for a quick response.

These skills combine with the traditional engineering knowledge of a project manager to produce what Chen (1997) described as the new perspective for project management. Figure 3.3 shows this new perspective and identifies some key areas in which the modern a construction project manager needs to develop competency in order to perform effectively. As a strategist/entrepreneur a project manager is required to provide innovative solutions both for the product as well as the business processes involved in the delivery of the project outcomes. This requires both long-term and short-term perspective for the project and its wider business/industry context. As a manager, a project manager has to oversee to the general functions associated with the project. These include managing human systems, logistics, information flows and organisational relationships.

The use of technology has become more important now to the effective delivery of projects. This operates both at the production level and the use of IT resources. A project manager is required to be astute regarding options that can be deployed for effective technological innovation to optimise the project's performance. The production

process in construction combines specific activity phases including planning and scheduling, estimating and cost control, contract management and purchasing. As production engineer a project manager is required to manage the effective implementation of each of these phases to achieve reasonable levels of efficiency.

Supporting the above definitions of project manager skills, Jha and Iyer (2006) synthesised different opinions from different scholars to produce the following table (table 3.2):

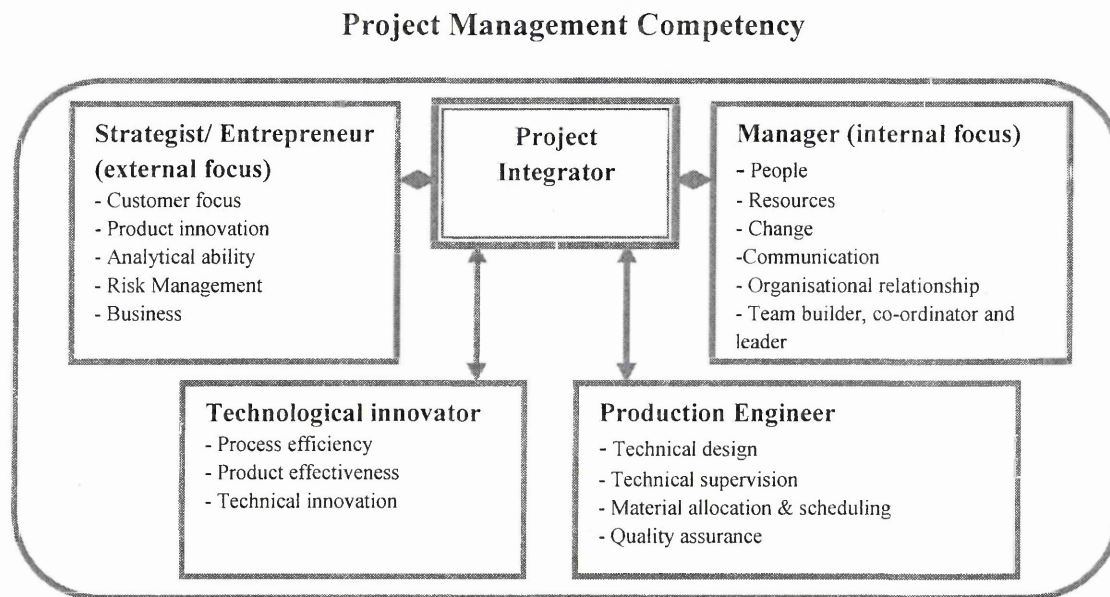


Figure 3.3: Project Management Competency
Source: Adapted from Edum-Fotwe and McCaffer, (2000)

Table 3.2: Summary of Project Manager's Skills Identified in Different Studies

Authors	Skill Description
Gaddis (1959)	Project manager needs solid basic experience in the relevant field and should be a leader able to carry out planning and follow-up activities.
Katz & Kahn (1978)	Project manager should have technical skills, human skills and conceptual skills.
Stuckenbruck (1976)	A proficient manager must be: multidisciplinary oriented; global problem oriented; an effective problem solver and decision maker; a good manager and administrator; possessing good analytical abilities; creative in dealing with information and problems; an effective communicator; able to motivate his team members to achieve fixed goals; flexible, and able to adapt to change; of the right temperament, and should be able to keep calm.
Adams & Barndt (1978) Fryer (1979)	Project manager must have planning, coordination and budgeting skills in addition to team management skills.
Petterson (1991) Goodwin (1993)	Project manager should have: interpersonal skills; synchronizing skills for different technologies; technical expertise, and information processing skills.
Meredith et al. (1995) cited in El-Sabaa (2001)	Project manager's effectiveness depends on conceptual, human, and negotiating skills as well as, to a lesser extent, on technical skills, besides verbal and written communication skills. The skills needed for a project manager are categorised into six skills areas: communication, organizational, team building, leadership, coping, and technological skills.
El-Sabaa (2001)	Found three major skills groups: human skills such as communication, coping with situations, delegation of authority, high self-esteem and enthusiasm; conceptual skills such as planning and organizing skills, strong goal orientation, ability to see the project as a whole; and technical skills such as specialized knowledge of project, the technology required, and skill in the use of computer.
Project Management Institute (2000)	The project manager should have the following characteristics: an open positive 'can do' attitude, common sense, open mindedness, adaptability, inventiveness, prudent risk taker, fairness and commitment.
Kerzner (2002)	Team building, leadership, conflict resolution, technical expertise, planning, organization, entrepreneurship, administration, management support, resource allocation

Source: Adapted from Jha and Iyer, (2006)

Project management skills (communication, problem solving, technical skills, negotiation skills and leadership) are very important for the project manager to complete a project successfully to estimated budget, time scale, and quality required. These skills should be available for any manager selected for a project to ensure that he/she can resolve any issues or matters during the project life cycle.

3.17. THE ATTRIBUTES OF A GOOD PROJECT MANAGER

In construction projects a project manager requires a number of different attributes as shown in Table 3.3 Mahdi (2007) to enable him/her to lead the project:

Table 3.3: Project Manager Attributes

Hard Attributes	Soft Attributes
Communicator	Generalist
Problem and conflict solver	People management
Experience	Ambition
Knowledge	Energy
Able to take direction and suggestion	Sense of humor
Knowledge of technology	Being organized
Toughness	Familiarity with the organization
Motivating the project team	Maturity
Perspective	Friendly

Source: Adapted from Mahdi, (2007)

3.18. THE INFLUENCE OF THE PROJECT MANAGER ON THE SUCCESS OF THE CONSTRUCTION PROJECT

Past study conducted by the author revealed that, the construction project success in Libya has been adversely influenced by the performance of a project manager, in terms of lack in experience, poor quality and control, the wrong choice of person and the inability to manage the problems as and when they occur

Crawford *et al.* (2005), Turner and Muller (2006) and Muller and Turner (2007) have all stated that there is a growing recognition that different types of projects require different approaches to their management, with management procedures tailored to the needs of the project, and project managers selected with appropriate competencies.

3.18.1. The Performance of the Project Manager

- A good project manager assumes that employee misunderstandings can and will occur, and accepts their resolution as a natural part of his duties. A good project manager constantly attempts to improve and be more communicative.

-
- A poor project manager assumes that employees are unwilling to cooperate and blames subordinates. The poor project manager demands a more authoritarian attitude and relies heavily on material incentives (Kerzner, 1992; 1995 and 2006).

3.19. HEALTH AND SAFETY ON THE CONSTRUCTION SITE

A health and safety element is considered to be an important part of the project. Before commencing the project, a project manager should ensure that health and safety measures are being implemented on site, in particular:

Construction health and safety plan is in place; Site induction of staff are present; Managing health and safety in the site is taking place; Ensuring safe systems of work is ongoing; Maintaining and monitoring of site activities; and Recording of occurrences in the site is taking place.

A Guide to Managing Health and Safety in Construction (HSE, 1995) suggests a number of specific elements which should be considered in compiling the construction-phase health and safety plan. These are:

3.19.1. Project Overview

- Health and safety standards: the standards should have been specified by the client, the designer or principal contractor,
- Management arrangements: the structure and organization of health and safety management of the project and the key responsibilities of the parties are defined and in place,

-
- Contractor information: advice to the contractors about project risks has been given,
 - Communication and cooperation: ensuring that the communication methods for coordination health and safety between the parties are available, and
 - Emergency procedures: the notification of alarms, escape routes and assembly areas, and personnel checks.

3.19.2. Accident Recording on Site

In order to avoid accidents relating to construction works, the following should be in place Griffith and Watson (2004):

Welfare facilities: arrangements for all temporary site welfare facilities; Training the workforce on the health and safety procedure on the site; Site safety rules: the health and safety plan should be included in the construction-phase health and safety plan; and Monitoring of health and safety procedures on site.

For the management of health and safety there are three important elements Griffith and Watson (2004): “Materials: details of any potentially hazardous materials specified in the design and for which specific precautions will be required, should be given; Site elements: includes health and safety information which is important to any persons present on the site, for example temporary accommodation, services and amenities; and Site safety rules: these are imposed to protect persons on site, for example, vehicular speed restriction, material movement, or handling dangerous substances”.

3.19.3. Preliminary Project Arrangement for a Project Manager

The following are some important preliminary arrangements that a project manager needs to do before starting a project.

- Meetings with, clients, architects, consultants and the all engineers in the project,
- Meeting with a contractor and subcontractors, and with all employees,
- Meetings with local authorities,
- All contract documents should be given to the contractor and make sure the contracts are signed,
- Ensuring the health and safety regulations are available,
- Arrange the handover of the site from the client to the contractor,
- Reviewing the contractor's construction schedule, method statements and project drawings, and
- Ensuring design information required by the contractor is supplied by consultants, and ensuring that the site inspections happen.

It is one of the project manager's responsibilities to ensure that health and safety plan is available in the site before starting the project. Also, there should be induction relating to the health and safety assessment for the workers before starting the project as well. Past study conducted by the author revealed that health and safety is not fully considered in Libyan construction projects, which affects human lives and the success of projects. So, it is important for a project manager to ensure that health and safety management is taken into account for achieving success.

3.20. THE MANAGEMENT OF RISK

Managing the risk on the construction sites is considered to be the responsibility of the whole project team but still a project manager is considered the main responsible person for managing risk. He/she should drive the project forward if anything detrimental happens to the project plan, as well as guide and motivate the project team to appreciate any new project plan. Here experience, skills and authority is required. If a project manager has no such experience, skills or authority for managing the risk, he/she will find it difficult to take the project in the right direction and will not be able to achieve complete success. Indication from both pilot study and previous study by the author suggested that, this kind of problem is considered one of the main problems within the Libyan construction industry because some construction project managers are appointed to projects when they don not have enough experience to manage the projects and achieve the project's goals. To overcome such problems the appointment of a project manager has to be carefully undertaken and take into account personal knowledge, skills and the experience

PRINCE2 (2007) emphasises risk management can be a case of adjusting project plans to build in the chosen risk response. The proper managing of risk will significantly enhance the chances of success of the project and assessing potential risks on a regular basis enables a project manager to better foresee problems and engage stakeholders and decision-makers in mitigating the implications.

3.21. MOTIVATION

Motivated employees are considered to be one of the more important of a construction project manager's functions within the project life cycle. A project manager should take

into account the need to motivate employees as well as encouraging them to do quality work to during the estimated time and acceptable performance. The level of motivation looks something like this:

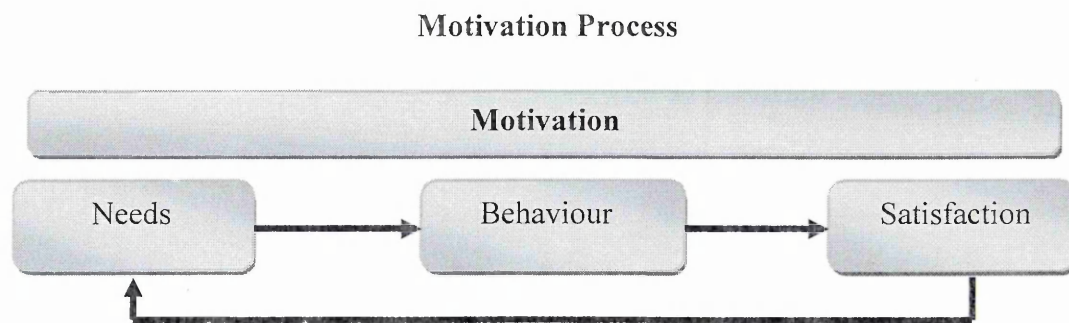


Figure 3.4: Motivation Process

3.22. THE CULTURAL BEHAVIOUR OF LEADERSHIP (A PROJECT MANAGER)

It is even more complex when a project manager has to operate in a multicultural environment where there are onsite differences in language, customs and cultures. In this kind of environment, a project manager requires a greater capacity for understanding and flexibility than that needed by managers in non-multicultural situations. It is essential for a project manager to understand the culture of the employees, e.g. be aware of religions and national holidays of each group of workers.

Loosemore and Lee (2002) argued that language is the most obvious cause of cross-cultural communication difficulties. Most managers intend to learn foreign languages but few actually do so. However, simply learning a language is not enough and an important part of improving inter-cultural communications is giving people a better understanding of their own culture as well as those with which they interact. This may

not be achievable in the classroom environment and may involve providing opportunities for people to socialise with different cultures so that they can understand the values, beliefs, rituals, expectations and superstitions which underpin them.

Makilouko (2004) suggests most project managers adopt task-oriented styles, which are inappropriate in multicultural situations, but suggest some project managers adopt two other more appropriate styles, people-oriented and relationship-oriented. Muller and Turner (2004) have shown a correlation between the cultural preferences of construction project managers and their performance in different contexts. Table 3.4 shows culture dimensions of leadership.

Table 3.4: Culture Dimensions of Leadership after Hofstede (1991) and Trompenaars (1993)

Author	Culture dimension	Explanation
Hofstede (1991)	Power distance Individualism vs. collectivism Uncertainty avoidance Masculinity	Autocracy vs. democracy, range of influence Focus on individual or group Attitude to risk, complexity and ambiguity Differentiation of male and female roles
Trompenaars (1993)	Universalist vs. particularist Specific vs. diffuse Natural vs. emotional Short team vs. long team Achievement vs. ascription Attitudes to time Internal vs. external	Ethics and personal relationship Legal processes and trust Objective vs. emotional Perspective of investment returns and results Status, performance, assignment of rewards Emphasis on past, present, and future Ego versus society

Source: Adapted from Turner and Muller (2006)

3.23. CHOOSING AN APPROPRIATE PROJECT MANAGER

Rose (2007) asserted that project managers, despite current myths, are not a one-size fits- all commodity. Over time, successful organizations have developed a means for selecting project managers who are likely to lead projects to successful conclusions.

Kerzner (2006) has stated that choosing of a project manager depends on the size of the construction project. If the project is small, a part-time project manager may be selected. Meredith and Mantel (2005) emphasized the selection of a project manager is one of the two or three most important decisions concerning a project. They listed some of the most popular attributes, skills, and qualities that have been sought when selecting project managers:

A strong technical background; A mature individual; Someone who is currently available and on good terms with senior executives; Someone who can keep the project team happy; and One who has worked in several different departments.

As mentioned above, the ability of a project manager to manage success depends upon many elements such as experience and knowledge. The methods of choosing a project manager used within the Libyan construction industry in the last ten years has resulted in many problems such as: some project managers not having enough experience of driving projects; some project managers having insufficient background knowledge to enable them to finish the projects within time, budget and quality; others lacking adequate skills and not having sufficient authority to control the projects. To resolve such problems and avoid construction project failure in Libya, choosing a project manager has to be taken into consideration right from the start of the project, and the knowledge and skills of a project manager matched to the project through an agreed and transparent procedure.

3.24. THE AUTHORITY OF THE PROJECT MANAGER

Cleland and King (1983) showed that authority is an intrinsic element in achieving objectives through organizations. Authority which is vested in a person through that

person's position in the organization (and that person's consequent right to make decisions upon which others are required to act) is the most common form of authority in organizations. Such authority is usually regarded as essential in order to get things done.

3.24.1. The Project Manager's Power

To be effective in his role, a project manager needs to have a sense of authority in his decisions. Within any organization there is always possible conflict and confusion arising from the strategy and manipulation of decisions. To minimize such problems, a project manager is advised to write down the terms of reference of all members of the project team and share these with the team members and thus reach a sense of agreement.

Dingle (1997) stated that a project manager's authority will be exercised more effectively if his corporate standing is sufficiently high for a project manager to be accepted as the agent of the parent company when dealing with other organization and parties. A project manager's corporate standing will be adequate if the organization invite and pay attention to his opinions on the following.

- The project objectives and their likely repercussions on the corporation's overall business,
- Features of the project involving unusual complexity or technical uncertainty,
- Features involving unusual interference relationships (interdepartmental, inter-company, national and international),
- Features involving unusual difficult operations or timing, and
- Features involving multi- project management.

3.25. SUMMARY OF THE CHAPTER

In this chapter, the importance of a project manager's roles, responsibilities, skills, knowledge, attributes and the duties have been discussed. The chapter presented the selection of a project manager, Section 3.12. It identified the roles and functions of the project manager in relation to the success of construction projects (time, cost, quality), Section 3.7. The influence of the project manager and his/her relationship to success were also identified and explained. The chapter went further to explain that for projects to be successful a project manager's skills, knowledge and experience need to be assessing before the selection of a project manager, Section 3.12. The chapter also showed that the competencies of a project manager play a very important role to the success of construction projects, Section 3.6. The roles of a project manager for all project stages were also presented. The chapter identified the relationship between motivation, risk and health and safety and a project manager, Section 3.19, 3.20. Chapter Four plans to address the objective (interpret and evaluate the existing barriers that influence the success of construction projects) barriers which obstruct the success of construction projects.

Chapter 4

Barriers to Success of Construction Projects

4.1. AIMS OF THE CHAPTER

The previous chapters introduced a Project Manager (PM) as a key contributor to the success of any project; they also discussed a project manager's roles, duties and responsibilities and how these contributed to project success. Numerous other factors that contribute to the success of construction projects have been presented and discussed. This chapter addresses the barriers that may stand in the way of the success of construction projects. This will be done through a critical literature review of those factors within the construction industry. The information obtained will be examined through quantitative and qualitative approaches, to obtain an understanding of the most significant barriers to success of a construction project.

4.2. INTRODUCTION

There are many barriers that could affect the success of any construction project, these will vary from one project to another, and depend on local, national and international circumstances. For example, the project size; project environment; project location; and project complexity. As previously stated the success of any project is that it is completed within time, within cost, to the agreed quality, and to the client's satisfaction.

Ling *et al.* (2009) carried out a research study through a questionnaire survey to investigate the factors that may affect the success of construction projects. They listed five related factors that could be said to be the most obstructive barriers to the success of a construction project: Project management actions; Project related factors; Project procedures; Human-related factors; and External environment.

4.3. BARRIERS TO THE SUCCESS OF A CONSTRUCTION PROJECT

The concept of success has been introduced into construction by a large number of professionals, which is completing a project within time, estimated cost, acceptable quality and client satisfaction. If the project fails to meet any of the four criteria for success the project will be deemed not to have been successful, and this may be considered as due to a barrier (or barriers) existing somewhere and affecting the progress of the project.

In developing countries there are many barriers that can hinder project success; weakness of the project management; lack of a project manager skills and knowledge; misunderstanding of responsibilities; poor definitions of responsibilities; poor planning and control; and (sometimes) aspects of government policy. To help avoid such problems this study is targeted at developing an operational framework that can be used to deliver projects successfully and satisfactorily for all parties.

Cleland and Ireland (2002) have suggested that success be viewed from two points: the degree to which technical project performance objectives were attained (for example: time, cost, and scope) and the contribution that the project made to the strategic mission of the firm.

Baccarini (1999), Cooke-Davies (2002), and Jugdev and Muller (2005) used questionnaire surveys to investigate the CSFs that might affect project success. They distinguished between project management success being measured by time, cost and quality, and project success which is measured against the overall objectives (time, cost, quality) of the project. Project management success is subordinate to, but will contribute

to, overall project success. These researchers concluded that successful projects are more likely to emphasize project success criteria rather than project management success criteria; however, project management success is much easier to measure because it is less complex and can be assessed at project closure.

According to Meredith and Mantel (2003), there are relatively few fundamental reasons why some projects fail. These are: A project organization is not required; Insufficient support from senior management; Naming the wrong person as a project manager: A common mistake is to appoint as a project manager an individual with excellent technical but weak managerial skills or training; and poor planning.

They asserted that the specific causes of failure, for the most part, derive from these fundamental items:

- No use made of earlier project final reports that contained a number of recommendations for operating projects in the future,
- Time/cost estimates were not prepared by those who had responsibility for doing so,
- Starting late a project manager jumped into the tasks without adequate planning,
- Project personal were moved without adjusting the schedule, or were reassigned during slow periods and then were unavailable when needed,
- The project was allowed to continue in existence long after it had ceased to make cost-effective progress, and
- Evaluations failed to determine why problems were arising during the early phases of the project life cycle due to inadequate, or no, risk assessment and management.

Morris (1988) stated that, to run projects successfully without any problems the following barriers should be taking into consideration as from the formation to the close-out stages:

- Unmotivated team,
- Poor leadership,
- Money (cash flow),
- Poor top management support,
- Technical problems,
- Ill-defined objectives,
- Deficient procedures,
- Poor control, and
- Poor financial support.

4.3.1. A Project Manager as a Barrier to Project Success

Without doubt a project manager is often considered the most important element and key factor contributing to the success and/or failure of any project. Kerzner (2006), a well-known researcher into project management, stated that projects usually fail to meet time and cost targets due to people-related issues, such as poor morale, poor human relations, poor productivity and lack of commitment.

Cleland (1995) and Thite (1999) considered that project failure is the result of the lack of leadership shown by project stakeholders, which is thus a CSF for projects. These authors argued that there is a greater need for leadership rather than management.

The Code of Practice for Project Management for construction and development (CIOB, 2010) provides full information of a project manager roles, responsibilities and duties. The CIOB emphasizes that a project manager plays a very important role in the success of a construction project and that the selection of the project team, and the right selection of project methodologies are very important if a project manager is to run the project successfully. As a result, a project manager could – in certain circumstances - be a barrier to the success of a construction project.

There are many elements that might affect the commitment of a project manager, and turn him into a barrier to the success of a construction project: lack of experience and knowledge; lack of skills; misunderstanding of project objectives; lack of motivation in the project team; inability to finish tasks within time scales that have been established; wrong selection of project team; and using unsuitable methodologies for managing the project. These factors will lead to the failure of projects, and position a project manager as a barrier to project success.

Many projects especially in developing countries have failed because of the lack of ability of project managers. Indeed in Libya a project manager is considered to be one of the most important barriers to project success due to: firstly, lack of knowledge and experience; secondly, weakness of project manager's skill set; thirdly, selection of the wrong project manager for the given project.

Lienz and Rea (1995) listed the ways for a project manager to fail and to succeed in Table 4.1:

Table 4.1: Ways to Fail and/or Succeed as a Project Manager

Ways to fail as a Project Manager	Ways to Succeed as a Project Manager
Take a hands-off approach to project administration.	Know what is going on in the project in detail.
Do not get involved in individuals tasks.	Understand and be sympathetic to project team members.
Let issues drift and remain unresolved.	Be able to make decisions.
Be unwilling to listen to suggestions for change.	Understand issues and their importance and meaning to the project.
Be over focused on specific project management tools.	Communicate effectively with management.
Become obsessed with percentage complete for tasks.	Develop alternative actions.
Measure milestones by presence and not quality.	Translate actions into specific changes in the project.
Devote too much attention to relations with management and not enough to the project team.	Know how to use project management tools and methods effectively.
Be over concerned with project administration and neglect project management.	Be able to learn from past projects.
Attempt to micromanage the project.	Be able to criticize yourself and your performance.
Be formal in relations with project team.	Be able to take criticism.
Do not stay in communications with the line managers.	Understanding trade-offs involving the schedule and budget.
Make too many changes to the schedule.	Listen to project team members.
Be willing to rapidly adopt new tools without assessing the consequences.	Understanding and act on suggestions from improvement.
Be status-oriented and not issue-oriented at project meeting.	Be open to new methods.
Develop an overly general project plan without detailed tasks.	Understand the trade-offs between the projects needs and needs of of the organization.
Be tools-focused as opposed to method-oriented with the tools supporting the methods.	Communicate effectively with line managers.
Fail to regularly communicate in person with all key members of the project team.	Manage your time well.
Leave issues unsolved and allow them to fester and grow.	Set up and manage the project life.
Address issues without analysis.	Be able to generate and use reports from the project management software system
	Have patience.
	Be able to take a longer term perspective.
	Have a sense of humour and be able to run meetings.
	Relate current events to project management and the project.

4.3.2. The HARD and SOFT side of Project Management

Melton (2007) identified that a major issue with most projects, though, has been the inability to successfully merge the "hard" and "soft" side of the projects and the associated project management. Table (4.2) illustrated how to avoid the hard and soft pitfall to the success of projects as conducted by (Melton, 2007).

4.3.3. Defining the Project Scope

Defining the scope of a project to all the project's members is very important, to complete the project successfully without any major problems. Misunderstanding project objectives and project scope will invariably lead to project failure. Thus, all project members (project manager, construction manager, site engineers, project team members, and all workers) should be fully aware of the scope of the project, as well as ensure that the objectives of a project should be achieved.

Gray and Larson (2000) stated that defining project scope sets the stage for developing a project plan. As fundamental and essential as scope definition appears, it is frequently overlooked by project leaders of well-managed, large corporations and poorly defined scope or mission statement is the most frequently mentioned barrier to project success.

Pinto and Slevin (1988) conducted a questionnaire study in the USA to identify factors influencing project success. They found that a clear mission statement is a predictor of more than 50 percent of project success in the concept, planning, and execution stages of the project. Gobeli and Larson (1986) used a questionnaire survey on a large number of construction projects. It was found that approximately 50 percent of the planning problems related to unclear definitions of scope and goals.

Table 4.2: Common Pitfalls - HARD and SOFT

Common Pitfall	How to avoid the pitfall
Hard -Badly defined scope	<ul style="list-style-type: none"> ➤ All project stakeholders need to understand what the project is trying to achieve ➤ Define the critical success factors and work with these to define all sub-projects, activities and tasks required to achieve them.
Soft-Ignoring relationship building	<ul style="list-style-type: none"> ➤ Projects are all about people -people in the project team plus all the external stakeholders ➤ Develop a project stakeholder map, understand who is involved and how it will impact them ➤ Develop a plan to manage all relationships effectively
Hard and Soft- poor or no project planning	<ul style="list-style-type: none"> ➤ Develop a project delivery plan ➤ It is never too early to ask?, how?, when?
Hard and Soft-Unclear business benefits	<ul style="list-style-type: none"> ➤ Develop a robust business case in liaison with the customer -this is what the customer wants and what the scope should deliver ➤ Use the opportunity to begin to build a robust relationship
Hard- Not enough project resources	<ul style="list-style-type: none"> ➤ The lack of money, equipment or people is a critical issue and can only be resolved through effective planning and definition ➤ Work with sponsor to get approval for the business case and delivery plan and release of the approved resources
Soft-Approved resources do not materialize	<ul style="list-style-type: none"> ➤ Work with the sponsor to resolve the issue as early as possible. He is accountable for the benefits delivery and he can not do this if the project manager is unable to deliver the project
Hard and Soft- No live risk assessment	<ul style="list-style-type: none"> ➤ Regular risk reviews versus all for the critical success factors (CSFs)- start early and do not stop ➤ Consider HARD and SOFT risk ➤ Regularly review the overall chances of project success
Hard- Run out of funds	<ul style="list-style-type: none"> ➤ Develop a robust cost plan - review versus scope (quality, quality and functionality) and time goals ➤ Develop robust change control processes
Hard and Soft- Project team do not deliver	<ul style="list-style-type: none"> ➤ Develop a team charter (vision of project success) so that the team have a clear shared goal ➤ Develop a team organization and use something like a RACI (responsible, accountable, consulted, informed) chart to ensure that roles and responsibilities are clear ➤ Use appropriate project team and individual measures to track performance at all levels ➤ Review team performance regularly
Hard- Project is out of control	<ul style="list-style-type: none"> ➤ Define a control plan and stick to it ➤ Get appropriate control tools and use them pragmatically
Hard- Business benefits not delivered	<ul style="list-style-type: none"> ➤ Develop a robust business case and include both "hard" and "soft" benefits. Ensure that this effectively links the benefits with the project scope ➤ Define how the benefits are to be measured-the benefit metrics-and who is accountable for their delivery
Soft- Lack of change sustainability	<ul style="list-style-type: none"> ➤ Change as a result of the project can be checked after project delivery through the use of specific sustainability checklists ➤ Ensure that user groups are involved with the project at an early enough stage so that they can get involved, give the project team their knowledge and support the effective delivery of the benefits from the project

Indeed there is a strong correlation between the project success and clear scope definition. The scope should be developed under the direction of a project manager and project team. It is clear that the scope of a project is considered a very important factor in project success and without definition of project scope and clear objectives, the project will not succeed. As a result, lack of definition of project scope and failure to prepare a mission statement are included as critical barrier factors influencing the success of a construction project.

4.3.4. Construction Health and Safety Management

Health and safety management within any construction project is required and necessary. The application of health and safety within the construction sites is considered to be one of a project manager's responsibilities. Health and safety should be added to the barriers that might hinder project success.

Fellows *et al.* (2002) stated that, safety needs to be established before arrangements are made for the contractor to carry out or manage construction work and the information required in the safety plan should include:

- A general description of the work;
- The timescale of the project;
- Details of risk to the health and safety of the workforce; and
- Details of how resources are allocated in managing safety,

In order to run construction projects successfully, health and safety management within construction site should be considered by both a construction manager and a project manager. In developing countries health and safety management is considered one of

the barriers that could affect the success of any project Smith (2008). In addition, some projects neglect health and safety management which have resulted in project failure project. Thus health and safety management should be taken into consideration before and during the construction process to avoid problems.

4.3.5. Risk Management

Risk management within a construction project could be a barrier to success, depending upon the ability and experience of a project manager. However, Gray and Larson (2000) have said that successful management of risk gives a project manager control over the future of the project and can significantly improve chances of reaching project objectives on time, within budget, and meeting required technical (functional) performance.

For any construction project there should be a contingency plan that can be used to enable the project to achieve its objectives, if anything happens to derail the main project plan. The absence of a contingency plan, when a risk event occurs, can cause a manager to delay or postpone the decision to implement a remedy which can lead to crisis mismanagement, and acceptance of the first remedy suggested. Such after-the-event decision making under pressure can be both dangerous and costly, problems which are avoided if a contingency plan is in place (Gray and Larson, 2000).

4.3.6. Factors Affecting Construction Projects Success

Holroyd (2003) believed that there are some management considerations, which are common barriers project failure. These are:

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- Lack of adequate resources: The failure to provide adequate resources to carry out a project is a common barrier to project success.
 - Lack of teamwork: lack of teamwork means that there is no opportunity to access and use the skills of others, each member of the team has to rely solely on him/herself and discourages team members from taking ownership of the task. A barrier to success is created as each job becomes theirs rather than ours, which feeds back into building an isolationist attitude.
 - Poor communication between managers and their workers, between managers and management, and between managers and contractors or sub-contractors will act as a barrier to ensuring that work is properly directed and resources allocated or re-allocated effectively and efficiently and can lead to failed projects. It also means that disputes that arise will not be resolved swiftly and can build up. Finally, poor communication means that the end product may not comply fully with what the client requested. For example, if the definition of project objectives is not well defined and so not understood by all project members it could lead to a misunderstanding of project objectives and possible project failure.
 - Lack of honesty, integrity and truthfulness: Without these three characteristics project team members become the kind of people no-one really wants to work with. Poor inter-personal relations and personal conflicts invariably result which act as barriers to project success. However, lack of these characteristics if incorporated in the management style for the project could generate wider disputes with the workforce and become a major barrier to project success.

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- Competency: failure to appointment to the project person compatible with the needs of the project, as exhibited by personal skills, experience, knowledge, and authority, could become a barrier to success when the person(s) involved are found not to be up to the job in hand.

All factors that have been introduced in previous chapters can be considered as success and/or failure factors. The barriers to the success of any project are deemed to be internal or/and external and depend on the nature of the project.

Past studies conducted by the author revealed that, in developing country as Libya the percentage of failed projects due to internal factors is considered higher than projects affected by external factors. This does not mean that external barrier factors have no impact on the project success. In some projects, external barriers, such as economical and political factors due to government policy, have a direct impact on project success.

It is essential to appreciate what are the most influential barriers affecting the success of a construction project and understand how to overcome those barriers. Thus, one aim of this work is to create a reference framework that can be used to help overcome barriers and enhance the level of construction project success.

4.4. SUMMARY OF THE CHAPTER

The chapter presented the barriers that affect the success of construction projects. The chapter starts with explanations of how a project manager might act as a barrier to project success. It identifies the ways to fail and/or succeed as a project manager. Experience, knowledge, skills and attributes needed for a project manager to ensure construction projects success have been highlighted. The hard and soft sides of project

management success and definitions of project scope were also identified and explained.

The chapter went on to explain that construction health and safety management, and risk management need to be taken into account before projects commence in order to ensure that projects will succeed. The chapter also identifies many factors that influence the success of construction projects and can be considered as a barrier to success. The chapter concluded by noting that the success/failure of any construction project depends on the same factors. Any barrier can be seen as a success factor if the factor is properly defined. The next chapter discusses in detail the research methodology of this study, the research process, and the research methods that will be used in the study for data collection.

It is anticipated that the development of the framework will address the current shortfalls and gaps within the Libyan construction sector.

Chapter 5

Research Methodology

5.1. AIMS OF THE CHAPTER

The aims of this chapter are to present and discuss the methodological processes adopted for this research. The research methodology was briefly introduced in Chapter one, and this chapter will describe it in more detail. The chapter begins with an explanation of the research and follows with an outline of the methodological framework, including the rationale for the chosen approach. The chapter also explains the research techniques used, including a critical analysis of the research design adopted.

5.2. RESEARCH

The Cambridge Advanced Learner's Dictionary defines research as: "a detailed study of a subject, especially in order to discover new information or reach a new understanding" and "to study a subject thoroughly, especially in order to discover new information or reach a new understanding" (Cambridge Advanced Learner's Dictionary, 2009).

The Oxford Dictionary defines research as: "the systematic investigation into and study of material, sources, etc in order to establish facts and reach new conclusions" and "an endeavour to discover new or collate old facts etc. by the scientific study of a subject or by a course of a critical investigation" (Oxford Dictionary, 2005).

Leedy and Ormrod (2010 page 2) defines research as "a systematic process of collecting and analysing information (data) in order to increase our understanding of the phenomenon with which we are concerned or interested", while Burns (2000) defines research as a systematic investigation to find answers to a problem and Blaxter *et al.* (1996) describe research as planned, cautious, systematic and reliable ways of deepening understanding or finding out.

Generally, then, research may be considered as a process, a structured and systematic examination or extraction of information to improve our knowledge and understanding of a given phenomenon.

5.2.1. Types of Research

Blaxter *et al.* (1996) have explained that research can be undertaken in many different ways and stated that even a brief review of writings on research will uncover a lengthy and potentially baffling list of types of research, including:

- Pure, applied and strategic research;
- Descriptive, explanatory and evaluative research;
- Marketing and academic research;
- Exploratory, testing-out and problem-solving research;
- Covert, adversarial and collaborative research; and
- Basic, applied, instrumental, participatory and active research.

Naturally, the basic characteristics shared by all of these different kinds of research are contained in the definitions given earlier (Blaxter *et al.* 1996).

The importance of different research methodological approaches available with their inherent strengths and weaknesses have been fully considered. However, Bresnen (1990) has argued there are a limited number of methodologies favoured for use within construction management research. Therefore it is not always possible to provide examples from construction management research when discussing aspects of any particular methodology.

Particular attention is drawn to comparing and contrasting the qualitative and quantitative approaches. Wing *et al.* (1998) considered most of the research issues in construction management to be practical problems which required generalization of experience and the formulation of hypothesis that can generate empirically testable implications. The choice of research tools for problems of this nature required the production of a testable hypothesis and reproducible results.

5.2.2. The Research Process

According to Nachmias and Nachmias, (1996 page 18): "the research process is the overall scheme of activities in which scientists engage in order to produce knowledge; it is the paradigm of scientific inquiry". Figure 5.1 shows their schema for the stages of the research process.

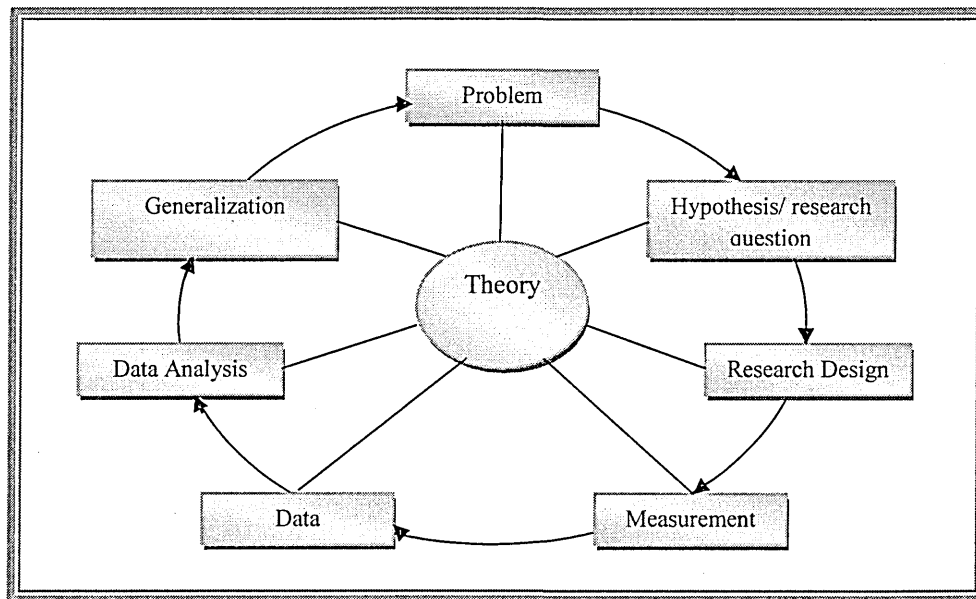


Figure 5.1: Stages of the Research Process

Source: Adapted from Nachmias and Nachmias, (1996: p20)

As shown in Figure 5.1, Nachmias and Nachmias (1996) considered the research process to consist of seven stages: problem, hypothesis/research question, research design, measurement, data collection, data analysis and generalisation, with each stage affecting the theory and being affected by it. Blaxter *et al.* (2003) also suggest the research process is a cycle which starts with a problem and ends with finding solutions to resolve that problem.

5.2.3. Deductive and Inductive Logic

In logic, there are broadly two methods of reasoning; the deductive and inductive.

Figure 5.2 shows the main distinctions between these concepts schematically.

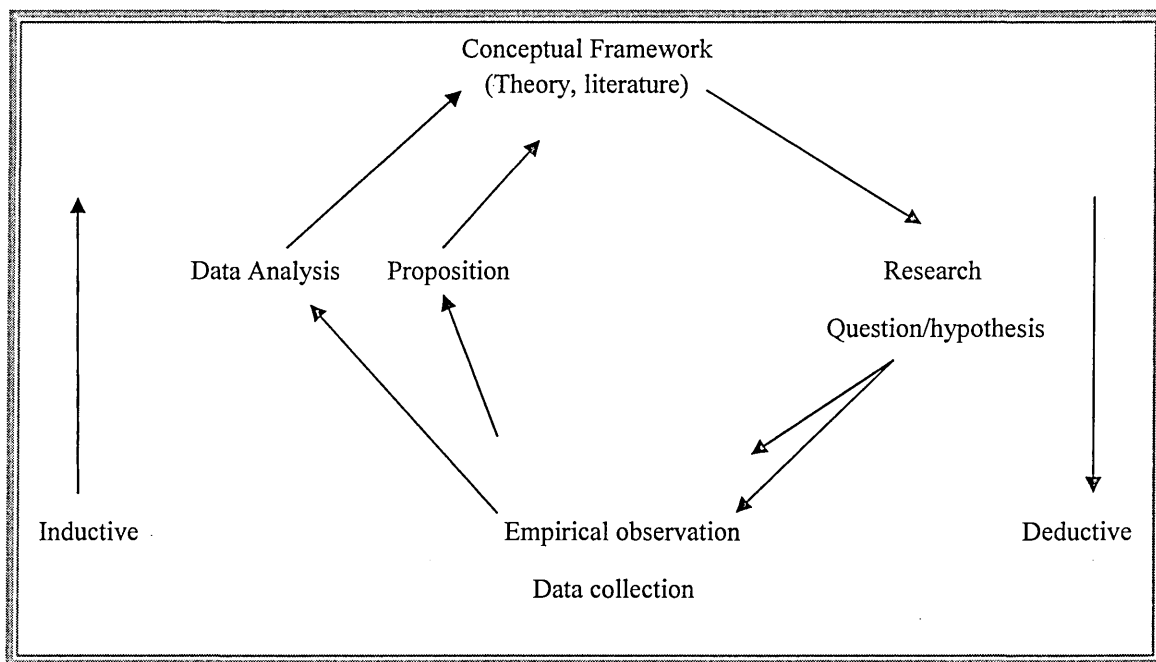


Figure 5.2: Schematic Representation of Research Processes (Inductive and Deductive)

Source: Adapted from Blaxter et al. (2003: p7)

1. Deductive Logic

Leedy and Ormrod (2005) claim deductive logic begins with those principles and statements that the researcher assumes to be true so that the deductive approach involves the investigating and testing of these established ideas, theories and hypotheses using information collected.

The deductive approach starts with an abstract framework based on a theory or ideas from literature on the subject of interest. This structure is then reduced to a more precise hypothesis or research questions that can be explored. Further reduction to greater detail allows the collection of relevant data or observations which can be used to test the hypotheses or research questions. The main purpose of reduction is that it enables the testing of the hypothesis or answering the research question with a set of precise data, thus confirming (or not) the structural framework. This method works well for more specific and the more wide-ranging approach.

2. Inductive Reasoning

In comparison, Inductive reasoning does not start with any pre-established ideas or assumption but is more concerned with observation Leedy and Ormrod (2005). The inductive approach involves generating ideas and opinions straight from the research data to improve the understanding of a topic or situation. This approach differs from the deductive approach, in that it works the opposite way, moving from observations or data to a more general proposition or even universal theory. The inductive approach starts with observation and a process, which allows the observer to detect patterns and regularities, to put together a hypothesis or research question that can be further investigated and ultimately generate the growth of general conclusions or theories.

As characteristic trait, the inductive approach tends to be less restricted and thus more exploratory. This is especially the case at the early stages as it involves a qualitative approach. In comparison the deductive approach tends to be tapered in nature, as such it is concerned with investigating or confirming hypothesis and thus uses quantitative methods. While some studies may appear to be based on a purely deductive (or inductive) approach, most social research use both inductive and deductive reasoning at some point in a project. Initially research splits into deductive and inductive but after this early phase, all research becomes an interaction between the two approaches (Gummesson, 2000).

5.2.4. Research Philosophy

Philosophers of science and methodologists have been occupied in a long-standing epistemological debate about how best to conduct a research. According to Amaratunga *et al.* (2002), this discussion has focused on the relative value of two essentially different and competing schools of thought or inquiry paradigms.

1. Logical positivism uses quantitative and experimental methods to test hypothetical-deductive generalizations.
2. Phenomenological (interpretive science) inquiry uses qualitative and naturalistic approaches to inductively and holistically understand human experience in context specific settings.

5.3. RESEARCH APPROACHES

Vignali and Zundel (2003) have stated that the two dominant paradigms striving for dominance in the social sciences are positivism and phenomenology. Previously Baer (1979) had argued that a philosophical system underpins the choice of methodology: that qualitative and quantitative methods are obtained from entirely different perspectives of the philosophical paradigm (positivism and phenomenology), the researcher should have a clear understanding of the inherent differences between them. These are outlined in Table 5.1.

Table 5.1: Characteristics of Philosophical Paradigms

Positivism	Phenomenology
Outside observer; separate from phenomena	Intertwines observer and phenomena
Seeks causal relationship	Many different but equal truths dependent upon the purpose of the researcher
Seeks one truth to explain a phenomenon of interest	Seeks understanding of the meaning of the phenomena of interest
Qualitative; context stripping assumptions and methodologies	Quantitative, holistic analysis
Increased reliability	Increased validity

Source: Adapted from Shih, (1998)

1. Positivism

Positivism it is likely to be tied to certain assumptions about how to observe and understand human behaviour and ideas. According to Vignali and Zundel (2003), there are two major assumptions that underpin the positivism paradigm: that reality is

external and objective and second, that knowledge is only significant if it is based on observations of external reality. The implication is that this paradigm is nested in the following: Independence, Value Freedom, Causality, Hypothetical-deductive, Reduction, Generalisation and Cross Sectional Analysis. One of the disadvantages of this paradigm can be over-reliance on data dependent on statistics.

2. Phenomenological

Phenomenological it is the idea that reality is socially constructed and given meaning by people rather than objectively determined. Hence the task of the researcher should not be to gather facts and measure how often certain patterns occur, but to appreciate the different constructions and meanings that people place on their experience. The major problems and limitations of this approach are the difficulty in generalising the results, because the observations are normally made in the specific context that the researcher has investigated. Creswell (2007) defined phenomenological study as describing the meaning, for several individuals, of their lived experiences of a concept or a phenomenon.

Moustakas (1994) and van Manen (1990) identified that there are two types of phenomenology that may be used for social science research; the two approaches are Hermeneutic Phenomenology and Empirical, Transcendental, or Psychological phenomenology.

Moustakas (1994) has listed five major procedural steps in the process of conducting phenomenological research:

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1. The researcher determines if the research problem is being examined using a phenomenological approach.
 2. A phenomenon of interest to study, such as anger, professionalism, what it means to be underweight, or what it mean to be a wrestler, is identified.
 3. The research recognizes and specifies the broad philosophical assumptions of phenomenology.
 4. Data are collected from individuals who have experienced the phenomenon.
 5. The participants are asked two broad, general questions.

Van Manen (1990) has concluded that in-depth interviews are the most common means of data collection because the primary source of data is the life world of the individual being studied. As Ploeg (1999) has said, the aim of a phenomenological approach to qualitative research is to describe accurately the lived experiences of people thus emerging themes are frequently validated with participants because the meanings they give to their lived experiences are central in phenomenological study.

5.3.1. Research Paradigms

Guba (1990, p. 17), defined paradigms or worldviews as "a basic set of beliefs that guide action", and cited four worldviews that inform qualitative research and identify how these worldviews shape the practice of research:

- Post-positivism;
- Social Constructivism;
- Advocacy/Participatory;
- Pragmatism.

Post-positivism: This approach tends to be reductionist and logical, with an emphasis on empirical data collection, cause-and-effect oriented and deterministic based on a-priori theories. Post-positivist researchers will likely view inquiry as a series of logically related steps, believe in multiple perspectives from participants rather than a single reality, and espouse rigorous methods of qualitative data collection and analysis.

Social Constructivism: In this worldview, individuals seek to understand the world in which they live and work. They develop subjective meaning of their experiences directed toward certain objects or things. These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrow the meanings into a few categories or ideas.

Advocacy/Participatory: Alternative worldview, advocacy/participatory may be used by the researchers because post-positivism imposes structural laws and theories that do not fit marginalized individuals or groups and the constructivists do not go far enough in advocating action to help individuals.

Pragmatism: In this worldview, individuals focus on the outcomes of the research; the actions, situations, and consequences of inquiry rather than antecedent conditions (as in post-positivism). There is a concern with applications of "what works" as solutions to problems.

Amaratunga *et al.* (2002) listed a number of strengths and weakness for both the positivist (quantitative paradigm) and phenomenological (qualitative paradigm) approaches, see Table 5.2.

Table 5.2: Comparison of Strength and Weaknesses for Research Paradigms

Theme	Positivism	Phenomenological
Strengths	Providing wide convergence for a range of situations; Fast and economic; and Statistics can be aggregated from large samples.	Data are more natural than artificial; Ability to understand people's meaning; Ability to adjust to new issues and ideas as they emerge; Ability to look at change processes over time; and Contribute to theory generation.
Weaknesses	The method tends to be rather inflexible and artificial; Not very effective in understanding processes or the significance that people attach to actions; Not helpful in generating new theories; and Because the focus is on what is, or what has been recently, it is hard for policy makers to infer what changes and actions should take place in the future.	Data analysis can be boring and require more resources; Difficulties of analysis and interpretation of data; and Hard to control the pace, progress and end-points of research process.

5.3.2. Qualitative and Quantitative Approaches

Guba and Lincoln (1994) pointed out the importance of identifying the paradigm within which research is conceived and carried out. In addition, they define human science as being known not by its methodology but by its paradigms. A framework created by Hiles (1999) for disciplined inquiry offers a clear distinction between paradigm, strategy, methodology and (data) analysis, for all social, behavioural and human science research.

Hiles (1999) contends that many of the confusions and problems that qualitative research faces arise from the widely upheld quantitative/qualitative distinction. He illustrated the conventional model of two distinct approaches to research in Figure 5.3. The implication is that science, as a disciplined inquiry, can be divided into two basic ways of approaching research which are more and/or less mutually exclusive.

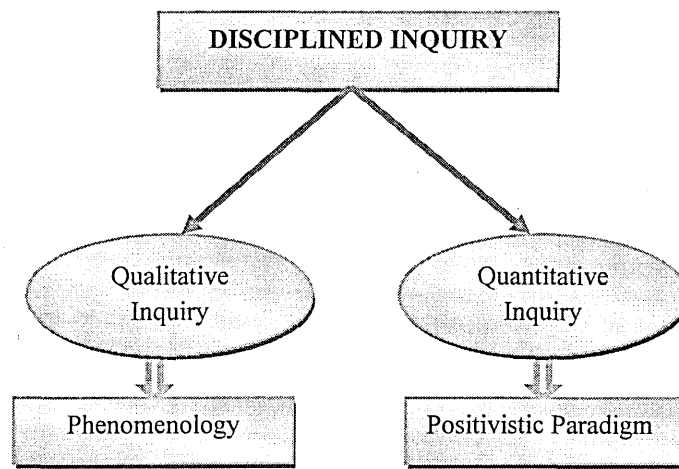


Figure 5.3: Conventional Model of Research

Source: Adapted from Hiles (1999)

5.3.3. Comparing Quantitative and Qualitative Research

Quantitative research in science usually involves an experimental approach, that involves testing a hypothesis, and data collection that relies upon measurement and statistical techniques for analysis. Such methods have a well proven track record in all scientific disciplines, and not least in psychology. However, the limitations of such an approach applied to social questions are obvious because they are restricted to the positivistic paradigm.

Qualitative research differs from experimental/quantitative research in several key respects. There is a deliberate attempt to collect data in the form of descriptions and meanings, especially in a way that is phenomenological sensitive, giving full weight to the experiential component of all knowledge, participation and observation. Qualitative research often utilizes triangulation and the concepts of validity and reliability need to be replaced with: credibility, transferability, and confirmability (Janesick, 1994) and (Robson, 1993).

Table 5.3 shows a comparison between the qualitative and quantitative research methods, indicating the different points between the two approaches.

Table 5.3: Comparisons of Qualitative and Quantitative Research Methods

QUALITATIVE RESEARCH	QUANTITATIVE RESEARCH
Phenomenological	Positivistic
Inductive	Deductive
Holistic	Particularistic
Subjective Centred	Objective Centred
Process Oriented	Outcome Oriented
Anthropological Worldview	Natural Science Worldview
Relative Lack of Control	Attempted Control of Variables
Dynamic Reality Assumed	Static Reality Assumed
Discovery Oriented	Verification Oriented
Explanatory	Confirmatory

Source: Adapted from Ploeg (1999), and Cook and Reichardt (1979) cited in Roberts (1999)

In quantitative research the data collected takes the form of measurements or counts which can be statistically analysed. The process of quantitative research follows standard procedures, methods, forms of analysis and reporting the results of the research undertaken. This standardisation is intended to maximise objectivity.

Qualitative research offers insights and understandings of participants, which is unobtainable by quantitative research, but is more than just non-numerical research. It aims to study the subject in their natural surroundings and to collect naturally occurring, non-biased data. It describes in words, rather than numbers, the qualities of the subject through observation. Methods of qualitative research include structured and unstructured interviews, group interviews and focus groups. Qualitative methods which can highlight key themes or patterns emerging in the project are used to comprehend and manage data and used to develop and test hypotheses (Ploeg, 1999) and (Roberts, 1999).

Tashakkori and Teddlie (2003) have defined multiple method design as research in which more than one method or more than one worldview is used. In multi-method research the research questions or objectives are answered by using two data collection procedures (e.g., participant observation and oral histories) or two research methods (e.g., ethnography and case study), each of which is from the same qualitative or quantitative tradition.

The greatest advantages of qualitative method are firstly; it can address quite focused questions about aspects of organizational life; secondly, it can focus on experiences of a particulate training or development programme, perhaps as part of a wider assessment process; thirdly, it can be used to examine much broader issues (Cassell and Symon, 1994).

5.3.4. Mixed-Method Research

The ultimate goal of using mixed methods in any research project is, according to Tashakkori and Teddlie (2003): to answer the questions or objectives that were specified at the start of the project; to provide better opportunities for achieving the research objectives; and to help researchers meet the criteria for evaluation of the "goodness" of their answers better than single approach designs. Three benefits of using mixed methods are listed:

- Mixed methods research can answer research questions that the other methodologies cannot.
- Mixed method research provides better (stronger) inferences.

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- Mixed methods provide the opportunity for presenting a greater diversity of divergent views.

Creswell (2002) classified mixed methods designs in three types: triangulation, explanatory, and exploratory. In triangulation the investigators collect both quantitative and qualitative data, and use the results to best understand a research problem. Explanatory design consists of collecting quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results. Exploratory design has the opposite sequence of first gathering qualitative data to explore a phenomenon, and then collecting quantitative data to explain relationships found in the qualitative data.

Hesse-Biber and Leavy (2006) listed five major reasons for researchers to use a mixed methods approach:

- **Triangulation:** This strategy involves using more than one method to study the same research question. The researcher is looking for a “convergence” of the research findings to enhance their credibility.
- **Complementarily:** The researcher in this strategy seeks to gain a fuller understanding of the research problem and/or to clarify a given research result. In addition, a mixed method approach is used to assist the researcher’s total understanding of the research problem.
- **Development:** This is a case whereby results from one method help develop or inform the other method.

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- **Initiation:** The findings of one research study raise questions or contain contradictions that require clarification and a new study is initiated to obtain new insights to the understanding of the phenomenon under investigation
 - **Expansion:** Expansion is initiated to extend the breadth and range of the study.

5.3.5. Triangulation

Triangulation is a commonly used technique to improve research validity. Burns (2000 page 419) defined triangulation as "The use of two methods of data collection in the study of some aspects of human behaviour". Gray (2009) has explained that triangulation means combining several qualitative methods or combining quantitative and qualitative methods. Combining methods allows for one method compensating for weaknesses or blind spots in the other, but the different methods remain autonomous, operating side by side.

According to Nachmias and Nachmias (1994) triangular techniques explain more fully the richness and complexity of human behaviour by studying it from more than one stand-point and/or using a variety of methods. Burns (2000) argues that triangulation in interpretive research will naturally produce different sets of data. The more the methods contrast with each other, the greater the confidence in the findings. Denzin and Lincoln (1998) identified five types of triangulation:

1. Data triangulation: use of multiple data sources in a study.
2. Investigator triangulation: use of a number of different researchers or evaluators.
3. Theory triangulation: use of multiple perspectives to interpret a single set of data.

-
4. Methodological triangulation: use of multiple methods to study a single problem.
 5. Interdisciplinary triangulation: use of multiple disciplines input into a research inquiry.

Shih (1998) identified a sixth type of triangulation in addition to the five above:

1. Analysis triangulation: Use of more than one strategy to analyse the same set of data for the purpose of validation.

Fellows and Liu (2008) defined triangulation (combination of qualitative and quantitative methods) as the combined use of qualitative and quantitative techniques, and claimed it as a very powerful approach to gain insights and results, and to assist in making inferences and in drawing conclusions:

- The adaptability and flexibility of qualitative research methods and techniques throughout the entire research process can allow the research to become familiar with the area of interest at an early stage, explore the field and consider the dimensions involved because of its open-ended, preordained nature. For example, services have tangible and intangible dimensions and are often vague with no clear cut boundaries between various aspects of construction activities.
- The adaptability of qualitative research allows for a relatively flexible plan of action to be followed as the research develops, evolving with the experiential learning and development of the researcher as new themes, ideas and topics of interest emerge.

- Quantitative research methods can help the researcher understand quickly the context in which a phenomenon takes place.
- Qualitative research allows the researcher to experience directly the world of information and all of its variations and by living through the ‘highs’ and ‘lows’ of their lives, the researcher is able to appreciate the phenomenon under investigation in a way that few other methodologies can permit. Also, the fact that qualitative research takes a holistic approach permits the research to gain a comprehensive and complete picture of the whole context in which the phenomenon of interest occurs.

Using triangulation a user is enabled to research each objective from different perspectives, thus strengthening the reliability and validity of the data. Figure 5.4 depicts the triangulation of quantitative and qualitative data.

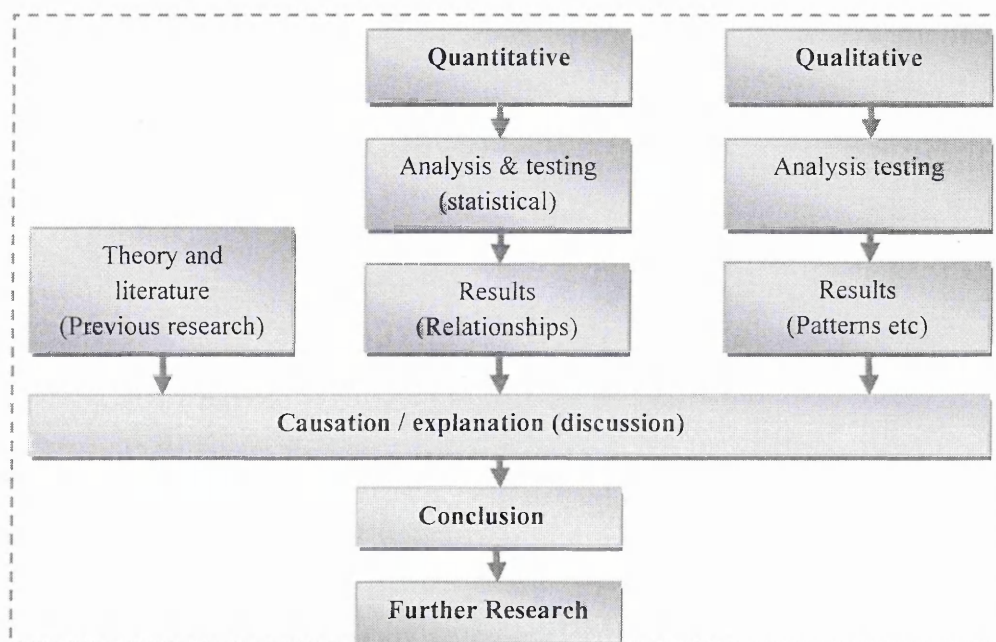


Figure 5.4: Triangulation of Quantitative and Qualitative data Paths for Research

Source: Adapted from Fellows and Liu (2008: p8)

5.3.6. Case Study

According to Yin (2009) a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. This method of data collection encourages in-depth investigation of particular instances within the research subject Fellows and Liu (2008). Case studies can incorporate several different methods, including participant observation, structured or unstructured interviews and examination of documentary materials. Though having its benefits Simon *et al.* (1996) identified the following weaknesses:

- Case studies are largely descriptive,
- Usually only tell about positive aspects, and
- Generally do not seek to analyse issues.

Sohal *et al.* (1996) have highlighted a number of difficulties associated with case study research, including;

- Research "purists" or quantitative advocates tend to see case studies as lacking academic rigour.
- An obvious difficulty is the labour-intensive nature of such research. Processing interview transcripts is usually a very laborious task.
- Confidence in conclusions may be statistically limited because often only a handful of cases are used to generalise about certain research questions.

The key benefits of case study research as advocated by Simon et al (1996) include:

- Collaborative research either on a national or international scale can offer rich insights into similar issues and themes in different geographical, social, political and other contexts. Collaboration also reduces the time-consuming problems normally associated with case studies.
- Case studies provide a wealth of examples and stories for use in teaching and training courses.
- Cases permit multiple sources of information and materials.
- One or several cases can lead to a range of further research needs to be identified. In this particular case, issues relating to the impact of sustainable constructions on competitive advantage could emerge.
- The findings of case study research tend to be widely accepted by industry. This may be related to individual curiosity about what others have done. The style of writing is often more readable than is the case with quantitative research.
- Case research enables varying perspective from a range of organizational personnel on selected research focus to be developed. Questionnaires usually reach one person, whereas an extensive case study program can involve many interviews with a cross-section of people.

5.4. METHODOLOGICAL FRAMEWORK ADOPTED FOR THIS RESEARCH

As stated earlier, Bresten (1990) has argued there are a limited number of methodologies suited for use within construction management research and that there are two types of survey for such research - exploratory and explanatory. What kind of

research approach should be used, and what kind of methodology will be most effective in collecting the data needed and ensuring that the research objectives are in place, require major decisions.

According to Nachmias and Nachmias (2000) scientific methodology as a system of explicit rules and procedures provides the foundations for conducting research and evaluating claims for knowledge. While the basic scientific method does not change its application is neither static nor infallible. As would be expected from any dynamic system its rules and procedures are constantly being reviewed and improved as scientists look for new means of observation, analysis, logical inference, and generalization.

These authors argue that the scientific method:

- Provides rules for communication,
- Provides rules for reasoning, and
- Provides rules for inter-subjectivity.

For this research study, the aims and objectives presented in Chapter One have described the study as concerned with investigating and exploring factors that affecting the success of construction projects in Libya and finding means of optimising those factors. It is therefore, an exploratory research study with the principal aim to develop a framework for construction organisations for completing projects successfully (within time, cost, and quality), the resulting increased successes will reflect back on the development and growth of the construction sector in Libya.

5.4.1. RESEARCH STATEMENT

The construction industry is an essential sector in terms of improving any country's economy; construction products (residential, economic and industrial areas) are all aimed at improving the economy of any country. From the literature review, it has been identified that the success of any construction project depends on many factors; which will vary from one project to another and from one environment to another, depending on the nature of the project. In addition, some factors have greater relative impact on project success. In Libya, the problems that cause construction projects to fail relate to the three key areas: project duration, project budget, and quality of work. This tends to indicate that the construction sector in Libya is developing slowly compared to other sectors.

However, past studies conducted by the author revealed that the construction industry in Libya is much more developed than previously, and major construction projects are taking place everywhere in the country especially in the capital city (Tripoli). Moreover, the government is concentrating more on the construction industry in its aim to convert Libya from a "developing" country to a "developed" country. Consequently there is great need to study and understand the factors affecting the success of projects in terms of developing a new, possibly regulatory, framework that could enhance the level of success of Libyan construction projects. This research work is novel as it will enhance the success of Libyan construction projects through the development of such a framework to be applied in Libya. The framework is targeted at improving and benefiting the Libyan construction industry by providing guidance on specific measures for improving the management of construction projects in Libya.

5.4.2. RESEARCH QUESTION

The research question is a most important element of the investigation, as it characterizes the proposal and guides the direction of the researcher's arguments and investigation (IIS, 2001). Designing a good research question is one of the most difficult aspect of the research study Yin (2002) and Stake (1995). Getting the research question right; suggests not only the field for study, but also the methods for carrying out the research and the kind of analysis required Baxter *et al.* (2001). Research questions need to meet a number of requirements. According to Ritchie *et al.* (2003) they need to be: (i) clear (intelligible and unambiguous), (ii) focused, but not too narrow, (iii) relevant and useful (here to policy and practice of the Libyan construction industry), (iv) informed by and connected to existing research or theory (but capable of making an original contribution or to fill a gap), and (v) feasible given the resources available.

5.4.2.1. Advantages of the Research Question

According to Punch (1996) the importance of the research question is:

- It helps organise the project and gives it direction and coherence of research method and design.
- It shows the delimitation of the research work and its boundaries.
- It keeps the research focused during the project.
- It helps in framework development for writing-up the project.
- It indicates and gives direction on the research data needed.

The main research question for this thesis project, after carrying out the critical literature review, has been identified as:

"How can the client ensure the success of construction projects in Libya will be enhanced?"

Essentially the research is about identifying the causes of project failure and developing a framework to ensure greater construction project success will be achieved. To do this, the following questions need to be considered.

- What are the most significant factors affecting project success?
- What are the conditions that make a construction project successful or a failure?
- What are the management methodologies applicable to construction projects to ensure success?
- In what ways can the affected factors improve and develop the construction sector?

Marshall and Rossman (1999) pointed out that a research question needs to be flexible in order that the data gathering can respond to increasing refinement of the research question, especially in a qualitative approach, which is uniquely suited to uncovering the unexpected and exploring new avenues. It should also be sufficiently clear to be practically evaluated. This suggests that the research question should be general enough to permit exploration but focused enough to delimit the study.

5.5. SELECTION OF THE RESEARCH APPROACH

The most effective methodology for data collection needed to answer the research question and achieve the research objectives, should be selected. This will require the most careful consideration. The research's aims and objectives, the research question, and the nature of the research should be taken into account when selecting the research

methodology Allison *et al.* (1996), Anderson (1993), Finn *et al.* (2000) and Crotty (1998). Shih (1998) suggests four issues need to be fully and carefully evaluated before choosing the research method.

1. Philosophical paradigm and goal of the research

Since qualitative and quantitative methods are derived from entirely different perspectives, the researchers should have a clear understanding of the inherent differences between them. Shih (1998) citing Mischler (1979) and Duffy (1987) distinguishes the salient points of each of Positivism and Phenomenology very succinctly and suggests that the relative strengths and weaknesses of each position must be continually considered.

2. The nature of the phenomenon

Choosing the methodology based on the nature of the phenomenon of interest to be studied is an approach particularly popular with qualitative studies. In order to use an idea about a phenomenon as a methodological guideline it is first necessary to have a good understanding of the phenomenon of interest.

3. The level of the research question

A number of authors Allison *et al.* (1996), Anderson (1993), Finn *et al.* (2000), Crotty (1998), Ryan (1983), Goodwin and Goodwin (1984), Duffy (1987), Schultz (1987) and Brink and Wood (1988) propose that the research questions used should govern the decision about whether to utilize qualitative, quantitative or mixed methods.

4. Practical considerations

Some scholars believed that it is a mistake to attempt to link paradigms and methods, while others recognised that the paradigms will have some impact on the choice of the methodology. They propose the decision be guided at least in part by the demands of the research situation at hand, and suggest that these demands should be evaluated based on a "common-sense" combination of the intelligent and efficient use of resources and the practical goals of the research.

5.5.1. APPROACHES ADOPTED FOR THIS RESEARCH

For the purpose of this research, a mixed-method approach (qualitative and quantitative) is used in order to fulfil/address the research aims, objectives and answer the research question. The decision was made after a thorough review of the nature of the phenomena involved. Indeed, the use of a mixed-method approach will help the researcher to ensure that the research aims and objectives will be achieved. This does not mean that one method cannot achieve the research objectives but that with a mixed-method approach the credibility of the research findings can be enhanced. To answer the research questions adequately both confirmatory and exploratory approaches are required. Greene and Caracelli (1997) indicated that social phenomena cannot be fully understood using either purely qualitative or purely quantitative techniques. A variety of data sources and analyses is needed to completely understand complex multifaceted institutions or realities. They emphasised that mixed methods can provide that.

Cassel and Symon (1994) believed that qualitative methods are more appropriate to the kind of research questions which focus on organisational processes as well as outcomes,

and is concerned with attempting to understand both individual and group experiences of work. Marshall and Rossman (1999) emphasise the strength of qualitative methodology in studies for the following types of research.

- Research that delves in depth into complexities and processes,
- Research on little-known phenomena or innovative systems,
- Research that seeks to explore where and why policy and local knowledge and practice are at odds,
- Research on informal and unstructured linkages and processes in organisations,
- Research on oral, as opposed to stated, organisational goals,
- Research that cannot be done experimentally for practical or ethical reasons, and
- Research for which relevant variables have yet to be identified.

In order to determine the most significant factors affecting the success of construction projects within the Libyan construction sector, questions and sub-questions need to be set and answered to help identify the most important factors affecting project success. According to Naoum (1998) quantitative data are not abstract, but are hard and reliable; measurements of tangible, countable, sensible features, and that quantitative research should be selected when the facts about a concept, a question or attributes are required, and when factual evidence and the study of relations between the facts is needed in order to test a particular theory or hypothesis.

From the above, it is clear that and very evident that mixed method research (qualitative and qualitative methods) is appropriate for this research study.

5.6. SELECTION OF THE RESEARCH STRATEGIES

A mixed method approach is most appropriate for this research work, but there are different research strategies related to both qualitative and quantitative approaches. In order to ensure that the most suitable research strategy is chosen a review of the possible different strategies is given:

1. Quantitative research strategies

Qualitative research is a method of inquiry appropriate to many different academic disciplines, particularly the social sciences. According to Ismail (2005) there are two kinds of quantitative research strategies based on with or without cause-and-effect relationships, these are as follows.

a. Cause-and-effect research

- A pure experiment: This type of approach enables the researcher to manipulate an independent variable in order to see the effect on the dependent variable.
- A quasi-experiment: The essential difference between a quasi-experiment and a true experiment is that in quasi-experiment there is no randomization of subjects between levels of the independent variable.
- Ex-post-facto or causal-comparative: A causal relation could also be established by causal-comparative method although not as strongly as the experimental method.
- Time series design: A cause-and-effect relationship could also be established using a time series design. A series of observations based on a defined duration

between observations are recorded for a group of subjects before and after an event.

b. Descriptive research

- Survey research: This focuses on the description of a phenomenon such as relationship between variables, survey research is appropriate.
- Correlational research: Examines the extent to which differences in one characteristic or variable are related to differences in one or more other characteristics or variables.
- R&D type of research: The focus is on development of a prototype and validation process to justify its usefulness.
- Evaluation research: The focus is on evaluating an event by means of the above types of research and to make judgment about its usefulness.

Bryman (2008) has stated that quantitative interpretation is the research strategy that emphasises quantification in collection and analysis of data and that it entails a deductive approach to the relationship between theory and research. Bryman (2008) further argues that the quantitative interpretation has incorporated the practices and norms of the natural scientific model and of positivism in particular, and embodies a view of social reality as an external, objective reality. For this research work the survey was found to be an appropriate quantitative research method.

2. Qualitative research strategies

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Quantitative data is good at providing rich explanations and descriptions of information that might not be covered by quantitative data Miles and Huberman (1994). Quantitative

data and qualitative data complement each other to achieve the research objectives. According to Denzin and Lincoln (2000) the strategy of inquiry comprises the skills, assumptions, and practices used by the researcher when moving from a paradigm and research design to the collection of empirical materials. Strategies of inquiries connect researcher to specific approaches and methods for collecting and analysing empirical material. They listed some qualitative strategies as follows: Case study; Ethnography and participant observation; Phenomenology, ethnomethodology and interpretive practice; Grounded theory; Biographical method; Historical method; Applied and action research; and Clinical models.

On the other hand Marshall and Rossman (1999) have grouped qualitative research strategies into two methods (core and secondary). The core methods consist of participation in the setting, direct observation, in-depth interviewing, and analysing documents and material. The secondary methods consist of life histories and narrative inquiry, films, videos, and photographs, kinesics, proxemics, unobtrusive measures, questionnaires and surveys, projective techniques and psychological techniques. Leedy and Ormarod (2010) gave descriptions and comparisons of the major types of qualitative strategies, see Table 5.4.

As mentioned above, the research strategy is determined by the nature of the research aims, and objectives. Denzin and Lincoln (1998) suggest that research strategies are merely tools; it is the researcher's responsibility to understand the variety available and the different purposes of each strategy, to appreciate in advance the ramifications from selecting one method over other and to become astute in the selection of one method over another. Each qualitative research strategy proffers a particular and unique

perspective that illuminates certain aspects of reality more easily than others, and produces a type of results more suited for some applications than others. For this study phenomenological study and survey research are the most appropriate strategies (qualitative and quantitative).

Table 5.4: Comparison of the Major Types of Qualitative Strategies

Design	Purpose	Focus	Method of Data Collection	Method of Data Analysis
Case Study	To understand one person or situation in great depth	One case or a few cases within its/their natural setting	Observations, interviews, appropriate written documents and/or audiovisual material	Categorization and interpretation of data in terms of common themes. Synthesis into an overall portrait of the case(s)
Ethnography	To understand how behaviours reflect the culture of a group	A specific field site in which a group of people share a common culture	Participant observations, structured or unstructured interviews with "information" artefact/document collection	Identification of significant phenomena and underlying structures and beliefs Organisation of data into a logical whole e.g. chronology, typical day.
Phenomenological Study	To understand an experience from the participants' points of view	A particular phenomenon as it is typically lived and perceived by human beings	In-depth, unstructured interviews. Purposeful sampling of 5-25 individuals	Search for "meaning units" that reflect various aspects of the experience. Integration of the meaning units into a "typical" experience.

There are other types of qualitative strategies such as grounded theory and content analysis were not included in the above table because they were not related to this research work.

5.7. SURVEY RESEARCH

The questionnaire survey is considered the first major method of data collection. Malhotra and Grover (1998) believe that the use of a survey designed using

questionnaires is the most important and commonly used method. The use of a questionnaire to collect descriptive information that will enable the researcher to identify the idea of the research and obtain wider opinions from those surveyed – in this project these individuals will be building professionals. Blaxter *et al.* (2006) confirm that questionnaires are one of the most widely used social research techniques.

Survey research involves acquiring information about one or more groups of people (usually concerning their characteristics, opinions, or previous experience) by asking questions and analysing this information to illuminate important issues Leedy and Ormrod (2005, 2010). Of course the surveys will be of a sample population drawn from the larger target group of persons who are of interest Rosier (1988). Surveys collect information by asking a set of pre-formulated questions in a predetermined sequence structured into a questionnaire, to a sample of individuals drawn so as to be representative of a defined population (Hutton, 1990).

5.7.1. Advantages of Survey Research

Blaxter *et al.* (2006) identified the following advantages of survey research.

- With an appropriate sample, surveys may be representative and provide generalized results.
- Surveys can be relatively easy to administer, and need not require any fieldwork.
- Surveys may be repeated in the future or in different settings to allow comparisons to be made.
- With a good response rate, surveys can provide a lot of data relatively quickly.

5.7.2. Survey Methods

Nachmias and Nachmias (2000) and Bryman (2001) have identified three methods of collecting data using surveys: self-completion questionnaire, personal interview, and telephone interview. Evaluation of the three methods is explained in Table 5.5.

Table 5.5: Evaluation of three Survey Methods

Criterion	Personal Interview	Mail	Telephone
Cost	High	Low	Moderate
Response rate	High	Low	High
Control of interview situation	High	Low	Moderate
Applicability to geographically dispersed population	Moderate	High	Moderate
Applicability to heterogeneous populations	High	Low	High
Collection of detailed information	High	Moderate	Moderate
Speed	Low	Low	High

Source: Adapted from Nachmais and Nachmias (2000: p225).

5.7.2.1. Mail Questionnaire (postal survey)

There are a number of different ways in which questionnaires can be administered. One way is to send them out by post to the intended respondents, who are then expected to complete and return them using pre-paid envelopes. For this research work, the mail questionnaire was used for quantitative data collection, this because such method is more appropriate compared with other methods like internet questionnaire for the internet service and speed in Libya is not as good as developed in other countries.

Advantages of Mail Questionnaire

Nachmias and Nachmias (2000) identified the mail questionnaire as an impersonal survey method. Under certain conditions and for a number of research purposes, an

impersonal method of data collection can be useful. Advantages of mail questionnaires are:

1. Low cost: Economy is one of the most obvious appeals of mail questionnaires. The mail questionnaire does not require trained interviewers, all it entails is the cost of planning, sampling, duplicating, mailing, and providing stamped, self-addressed envelopes for returns. Processing and analysis are usually also simpler and cheaper than for other survey methods. The lower cost of administering a mail questionnaire is particularly evident when the population under study is spread over a large geographic area. Under such circumstances, the cost of interviewing could become prohibitive.
2. Reduction in biasing error: The use of mail questionnaire reduces biasing errors that result from the personal characteristics of interviewees, interviewers and variability in their skills. Personal interview situations are fraught with possibilities for bias because of the nature of the interaction between the interviewer and the respondent.
3. Greater anonymity: The absence of an interviewer also provides greater anonymity for the respondent. The assurance of anonymity that a mail questionnaire provides is especially helpful when the survey deals with sensitive issues.
4. Considered answers and consultations: Mail questionnaires are also preferable when questions demand a considered answer or if the answer requires respondents to consult personal documents or other people.
5. Accessibility: Mail questionnaires permits wide geographic contact at minimal cost and are particularly suitable when a survey requires wide geographic coverage with a dispersed population, where interviewing would involve a disproportionate large investment of time by the research team.

On the other hand, Nachmias and Nachmias (2000) have stated that there are disadvantages with using a postal questionnaire, these include requires simple questions, no control over who fills out the questionnaire, and a low response rate. In fact, one of the primary problems for postal questionnaires is that the researcher cannot be sure that the right person completes the questionnaire Moses & Kalton (1979). For this study these disadvantages been taken into account, by making the questions simple, sending the questionnaire direct to the relevant persons, and telephone follow-ups to ensure getting a good response rate.

5.7.2.2. Questionnaire Design

The questionnaire was designed and guided primarily by the research aims, objectives, and the research question. The questionnaire design was also guided by the guidelines published in (a) Wilson and McClelland's Questionnaire Design: A Practical Introduction (1994), (b) Youngman's (1978) Designing and Analyzing Questionnaires, and (c) (Leedy and Ormrod, 2010).

The questionnaire was pre-tested (piloted) by sending it to randomly selected professionals in the construction sector in Libya. Based on the feedback, the questionnaire was modified. Piloting is necessary as it is very difficult to precisely predict how respondents will interpret and react to questions Gill and Johnson (1991). Another reason for piloting is to estimate the probable numbers of refusals and non-contacts and then prepare ways of reducing non-responses (Moser and Kalton, 1979).

According to Leedy and Ormrod (2010) guidelines for producing a questionnaire that encourages people to be cooperative and produces a good response include:

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- Keep it short;
 - Keep the respondent's task simple;
 - Provide clear instructions;
 - Use simple, clear, unambiguous language;
 - Give a rationale for any items whose purpose may be unclear;
 - Check for unwarranted assumptions implicit in your questions;
 - Word your questions in ways that do not give clues about preferred or desired responses;
 - Determine in advance how you will code the responses;
 - Check for consistency; and
 - Conduct one or more pilot tests to determine the validity of your questions.

In designing and managing the distribution of the questionnaire, careful consideration was given to the following questions and factors:

- Geographical Dispersion: To which area would the questionnaires be sent, and what are the consequent limitations? To minimise methodological problems associated with questionnaires, the first step must be to define the population size (Moses and Kalton, 1979).
- Construction Respondents: Are there particular persons in the host organization to whom the questionnaires should be addressed? Do the respondents possess the required data and knowledge? This problem was overcome by asking the respondent their job title, thereby indicating the credibility and authority of those views (Fellows and Liu, 2008). (See Chapter Six, Table 6.1).

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- **Response Rate:** It is generally acknowledged that the main problem with mail surveys is that getting an adequate response rate. Moses and Kalton (1979) have identified factors influencing the response rate, these include population surveyed, subject matter (e.g. research topic) and which organisation is sponsoring the survey. Response rates for postal surveys are between about 20-30%, which is acceptable (Malhotra and Grover, 1998).

According to Nachmias and Nachmias (2000) survey questions may be concerned with facts, opinions, attitudes, respondents' motivation, and their level of familiarity with a certain subject. Most questions, however, can be classified in one of two general categories: factual questions and questions about subjective experiences.

1. Factual questions

Factual questions are designed to elicit objective information from the respondents regarding their background, environments, habits, and the like. The most common type of factual questions is the background question, which is asked mainly to provide information that can be used to classify respondents.

2. Questions about subjective experiences

Subjective experience involves the respondents' history, beliefs, attitudes, feelings, and opinions. Surveys conducted in the social sciences, particularly those designed to explore property-disposition relationships, often include questions about attitudes. Attitudes are general orientations that can incline a person to act or react in certain manner when confronted with certain stimuli. As Nachmias and Nachmias, (2000) explained, attitudes can be described by their content, their direction (positive, neutral,

or negative feelings about the object or issue in question), and their intensity (an attitude may be held with greater or lesser vehemence).

5.7.2.3. Types of Questions

As Nachmias and Nachmias (2000) explained that there are three types of questions used for survey questionnaires: Closed-ended questions, Open-ended questions and Contingency questions.

1. Closed-ended questions

In close-ended questions, respondents are offered a set of answers and asked to choose the one that most closely represents their views. Closed-ended questions are easy to ask and quick to answer, they require no writing by either respondents or interviewer, and their analysis is straightforward. Their major drawback is that they may introduce bias, either by forcing the respondent to choose from given alternatives or by offering the respondent alternatives that might not have otherwise come to mind.

2. Open-ended questions

Open-ended questions are not followed by any kind of specified choice, and the respondents' answers are recorded in full. The virtue of the open-ended question is that it does not force the respondents to adapt to preconceived answers. Once respondents understand the intent of the question, they can express their thoughts freely, spontaneously, and in their own language. If the answers to open-ended questions are not clear, the interviewer may probe by asking the respondent to explain further or to give a rationale for something stated earlier.

The appropriateness of either closed-ended or open-ended questions depends on a number of factors. Some years ago, Lazarsfeld (1944) suggested that researchers use the following considerations to determine appropriateness.

1. The objective of the questionnaire. Closed-ended questions are suitable when the research's objective is to lead the respondent to express agreement or disagreement with an explicit point of view. When the researcher wishes to learn how the respondent arrived at a particular point of view, an open-ended question is likely to be more appropriate.
2. The respondent's level of information about the topic in question. Open-ended questions provide opportunities for the interviewer to ascertain a lack of knowledge (information) on the part of the respondent, whereas closed-ended questions do not. Obviously, it is futile to raise questions that are beyond the experience of respondents.
3. The extent to which the topic has been thought through by the respondent. The open-ended question is preferable in situations where respondent's opinions have not yet crystallized. Using a close-ended question in such situations involves the risk that in accepting one of the alternatives offered, respondents may make a choice that is quite different from the opinion they would otherwise have expressed had they gone through the process of recalling and evaluating past experiences.
4. The ease with which respondents can communicate the content of their answer, or the extent to which respondents are motivated to communicate on the given topic. The closed-ended question requires less motivation on the part of the respondent to communicate, and the response itself is usually less revealing than

in the case of the open-ended question. The researcher who uses closed-ended questions tends to encounter refusals to respond less frequently.

3. Contingency questions

A contingency question is a special-case of the closed-ended question and applies only to a subgroup of respondents. The investigator determines the relevance of the question to this subgroup by asking all respondents a preceding filter question.

5.7.2.4. Avoiding Bias

According to Bryman (2001) the following points need to be avoided to prevent response bias:

1. Avoid ambiguous terms in questions;
2. Avoid long questions;
3. Avoid double-barrelled questions;
4. Avoid very general questions;
5. Avoid leading questions;
6. Avoid questions that are actually asking two questions; and
7. Avoid technical terms.

5.7.2.5. The Questionnaire Sampling Size for this Study

A directory of construction professionals (the Association of Libyan Engineers' Magazine, 2008) showed that there were 4000 professionals cutting across academic institutions, construction firms (contractors, project managers), government departments

and others. For the purpose of this research, the total population was adopted to be 4000. According to Krejcie and Morgan (1970) to achieving a statistical confidence from a population of 4,000, it requires that a minimum of 351 questionnaires to be sent out. In order to reduce the level of non-return, 400 questionnaires were sent out and 161 were returned representing 40.25% return rate. According to Akintoye (2000), Malhotra and Grover (1998) and Krejcie and Morgan (1970), a return rate of 20-30% is acceptable. Libya was divided into four zones viz; East, West, North and South. questionnaires were sent out to 100 construction management professionals in each zone including; Project Managers, Construction Managers, Consultants, Contractors, Clients/Top Management, Academic Lecturers, and others working in the field at a suitable level of seniority. Four different organisational groups in each zone were used: Contracting organisations, Universities, Government departments and consulting firms.

The reason for sending 100 questionnaires to each zone is because this research is not a comparative study, the four zones are considered as one population and the process is to collect a questionnaire from the entire population. If this study had been by stratified sampling (by geographical area) then the number of questionnaires sent to each zone would have been proportional to the construction professionals working in that zone. The study and the distribution was by cluster sampling as it called in statistics.

5.7.2.6. Steps to Improve Response Rates to Postal Questionnaire

Burns (2008) suggested the following steps for improving the response rate.

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- Write a good covering letter explaining the reasons for the research, why it is important, and why the recipient has been selected; mention sponsorship if any, and provide guarantees of confidentiality.
 - Postal questionnaires should always be accompanied by a stamped addressed, prepaid envelope.
 - Follow up individuals who do not reply at first, possibly with two or three further mailings.
 - Shorter questionnaires tend to achieve a better response rates than longer ones.
 - Clear instructions and an attractive layout improve postal questionnaire response rates
 - Do not allow questionnaire to appear unnecessarily bulky.
 - Personalize covering letters by using the respondent's name and address.

The questionnaires were also translated from English to Arabic, and this was done by a qualified independent translator in order not to lose the meaning.

5.7.3. Interviews

Interview research is considered the second major method of data collection. Knight and Ruddock (2008) stated that the interview method can be used by quantitative and qualitative researchers alike, and used to gather both quantitative and qualitative data. Interviews can be used by researchers in built environment disciplines for a variety of purposes. Qualitative interviews have the potential to generate insights and concepts, and expand understanding. They can also be used to search for exceptions to the rule by charting extreme cases. Without doubt, the most widely used qualitative method in

organizational research is the interview. It is a highly flexible method and, it is claimed, is capable of producing data of great depth Cassell and Symon (1994). In the view of Marshall and Rossman (1999) interviews with multiple informants at each site will allow the researchers to triangulate findings across sources and best issues of reliability and validity.

In qualitative research studies, interviews are often quite open-ended, perhaps addressing one or a few central issues but otherwise going in different directions for different participants. In survey research, however, interviews are fairly structured (Leedy and Ormrod, 2005):

- In structured interviews the researcher asks a standard set of questions and nothing more.
- In semi-structured interviews the researcher may follow the standard questions with one or more individually tailored questions to get clarification or probe a person's reasoning.

According to Bryman (2008) the structured interview, or standard interview, entails the administration of an interview schedule by an interviewer. The aim is for all interviews to be given the same context of questioning to ensure that the interviewees' replies can be aggregated which can be achieved reliably only if the replies are in response to identical cues. Also in this style of interviewing the interviewers are supposed to read out the questions exactly as they are printed on the schedule. The questions are usually very specific and very often offer the interviewee a fixed range of answers (this style called closed, closed ended, pre-coded, or fixed choice). The structured interview is the typical form of interview in survey research.

The semi-structured interview typically refers to a context in which the interviewer has a series of questions that are in the general form of an interview schedule but is able to vary the sequence of questions. The questions are frequently somewhat more general in their frame of reference from that typically found in a structured interview schedule. The interviewer usually has some latitude to ask further questions in response to what are seen as significant replies (Bryman, 2008).

In unstructured interviews the interviewer typically has list of topics or issues, often called an interview guide or aid-memoire, which are to be covered. The style of questioning is usually informal. The phrasing and sequencing of questions will vary from interview to interview (Bryman, 2008).

Yin (2009) claims that interviews are particularly good for getting the story behind a participant's experiences. The interviewer can pursue in-depth information around the research topic. Also, the interviews should be guided conversations rather than structured queries.

Bryman (2008) listed the common types of interviews as shown in Table 5.6.

Table 5.6: Major Types of Interviews

Major Types of Interviews
Structured interview
Standardized interview
Semi-structured interview
Unstructured interview
Intensive interview
Qualitative interview
In-depth interview
Focused interview
Focus group
Oral history interview
Life history interview

Source: Adapted from Bryman (2008: p196)

5.7.3.1. Conducting the Interviews

When conducting an interview there are steps that should be taken to ensure the interview is successful, these steps have been listed by (Bryman, 2008) as:

1. Knowing the schedule, before the interview, the interviewer should be fully conversant with the schedule.
2. Introducing the purpose of the research and stressing the confidentiality of the interview.
3. It is important that interviewer to achieve a rapport with the respondents; a relationship must be quickly established so that the participant wants to participate in, and persist with, the interview.
4. Recording the interviewee's answers helps the interviewer to not miss any content and/or the meaning of sentences. Also errors occur far less frequently when answers to open questions are written down.
5. In addition to instructions about the asking of questions and the recording of answers, interviewers need feed-back on their progress through an interview schedule.
6. Question order is important. Varying the question order can result in questions being accidentally omitted, simply because the interviewer forgets to ask those that have been leapfrogged. Also, variation in question order may have an impact on replies and be a source of variability and therefore a potential source of error.

5.7.3.2. Major Purposes of the Interviews

Simons (2009) suggests that interviewing has four major elements:

1. To document the interviewee's perspective on the topic or to find out what is in and on the mind of someone else.
2. To be an active engagement that promotes learning for both the interviewer and the interviewee in identifying and analysing issues.
3. It offers inherent flexibility to change direction to pursue emergent issues, to probe a topic or deepen a response, and to engage in dialogue with the participants.
4. It has the potential for uncovering and representing unobserved feeling and events that cannot be observed by questionnaires.

5.7.3.3. Criteria used for Selecting Interviewees and Organisations

Ten face to face interviews were performed in seven organisations in the Libyan construction industry; details of the interviews conducted in this research study are provided in Chapter Seven. The selection of the organisations and the interviewees was based on the following criteria:

1. The criteria used for selection of the organisations

The criteria were base on the amount of contracts they give out. The seven organisations are those award most government construction contracts. The interview tried to find out the following:

- The success of projects in terms of duration of completion.
- Success in terms of cost/less variations.
- Success in terms of expected quality.

2. The criteria used for selection of the interviewees

The choice of the interviewees was according to positions they occupy in their organisations, most of them were senior officers, and their experience in the Libyan construction industry.

In this research work, semi-structured interviews with highly experience and professional persons with the construction industry in Libya were used, because semi structured interviews affords the research to probe further to clarify the points made by the respondents. The use of interviews is very important because such a technique allows the interpreting of insights and opinions which will assist in identifying possible additional sources of evidence as to what factors affect the success of construction projects in Libya, and how those factors reflect on the growth and development of the construction sector in Libya.

5.7.4. Reliability and Validity of Survey Research

5.7.4.1. Reliability

Cassell and Symon (1994) defined reliability as existing where the measures used produce the same results when applied to the same subjects by different researchers. Sarantakos (2001) similarly defined reliability as the ability of an instrument to produce consistent results whenever it is repeated, even by another researcher. That is, whether the results obtained in a study is repeatable. Bryman (2008) has stated that reliability refers to the consistency of a measure of a concept. Stability, Internal reliability, and Inter-observer consistency are three prominent factors involved when considering whether a measure is reliable.

5.7.4.2. Validity

Cassell and Symon (2004) have stated that a valid instrument is one which actually measures what it claims to measure. They added that a study is valid only if it truly examines the topic which it claims to have examined. According to Punch (1998), who claimed validity as complex, controversial and peculiarly important in research, validity is the term used to describe how well the research instrument measures what is intended to measure.

To avoid any errors and problems, the researcher should be very careful when collecting data in order to present valid conclusions. To obtain a high level of valid information in this research, the questionnaires will be sent to professionals in the construction industry, and interviews will be carried out with several professionals who are knowledgeable, experienced and have been working in the industry over a long of time.

The concept of validity is the same for both research traditions whether quantitative or qualitative (Cassel and Symon, 1994). They further argued that in quantitative research, a valid instrument is one which actually measures what it claims to measure. Similarly, in qualitative research, a study is valid if it truly examines the topic which it claims to have examined. The questionnaire was derived from concepts relating to the topic and in relation literature and validated through a pilot study. For the interviews the questions were also related to the concepts measured by the questionnaire.

5.7.4.3. Assurance of Validity and Reliability

To complete this research successfully and develop a validated framework for the Libyan construction industry, the researcher will ensure the validity and reliability of

the research information. Considerations that the researcher should take into account in terms of obtaining valid and reliable information are:

- **Triangulation:** The use of multiple approaches to data collection will make the research more valid and reliable.
- **Population:** The use of a large number of respondents for the questionnaire or/and interviews for data reliability and validity.
- **Experiences/Professionals:** Ensuring the respondents and the interviewees are experienced professionals will increase the validity and reliability of the research.
- **Pilot study:** A pilot study will enable the researcher to ensure the questionnaire is suitable to obtain valid and reliable data.
- **Time:** creating adequate time for data collection and collation.
- **Electronic recording system and software:** The use of a digital recording system such as voice recorder for the interviews and software for data analysis.
- **Framework validation:** The framework developed as a result of the questionnaire and interviews with experienced professionals in the Libyan construction sector was validated by one of the validation methods in order to find out to what extent the framework will succeed.

5.8. PILOT STUDIES

Pilot study is usually advised before the start of any major research project. According to Knight and Ruddock (2008), and Bryman (2008) piloting or pre-testing is absolutely vital to the success of a questionnaire/interview study. Piloting should be with the same type of person as will make up the main study sample.

Pilot studies are also crucial to research based on self-completion questionnaires. When piloting interviews, problems may emerge after a few interviews and these can be addressed. Benefits of using a pilot study in survey research include:

- If the main study is going to employ mainly closed questions, open questions can be asked in the pilot study to generate the fixed-choice answers.
- Piloting an interview schedule can provide interviewers with some experience of its use and can give them a greater sense of confidence.
- If everyone who answers a question replies in the same way, the resulting data are unlikely to be of interest because they do not form a variable. A pilot study allows such a question to be identified.
- In an interview survey, it may be possible to identify questions that make respondents feel uncomfortable and to detect any tendency for respondents' interest to be lost at certain junctures.
- Questions that not are understood, are not clear and often not answered should become apparent. Questions being skipped may be due to confusing or threatening phrasing, poorly worded instructions, or confusing positioning in the questionnaire or interview schedule. Whatever the cause, missing data are undesirable and a pilot study can identify such problems.
- Pilot studies allow the researcher to determine the adequacy of instructions to interviewers, or to respondents completing a self-completion questionnaire.
- It may be possible to assess how well the questions flow and whether it is necessary to move some of them around to improve this feature.

5.8.1. Reasons of Conducting Pilot Studies

Woken (2009) identified the following as reasons for conducting a pilot study:

1. Pilot study often gives the researcher ideas, approaches, and clues not foreseen before conducting the pilot study. This may increase the chance of getting clearer findings in the main study.
2. A pilot study can generate ideas about the proposed statistical and analytical procedures, allowing the researcher the opportunity to evaluate their actual usefulness, allowing alterations to the planned data collecting methods and more efficient analysis of data in the main study.
3. Pilot study may save a lot of time and money as it almost always provides enough data for the researcher decide whether to go ahead with the main study. Many research ideas that appear to show great promise are unproductive when actually carried out.
4. Pilot studies can reveal unexpected problems and give researchers the opportunity to redesign parts of the study to overcome them.
5. Pilot studies allow the researcher to try out a number of alternative measures and to select those that produce the clearest results for the main study.

5.8.2. Pilot Studies Adopted in this Research Work

In this research two pilot studies were carried out. In addition to all the reasons listed above pilot studies were carried out here for the researcher to get a better insight into the construction sector in Libya, to get an idea of the most important factors affecting

construction projects success as well as possible inadequacies, ambiguities and problems in all aspects of the research.

1. Pilot study I

This pilot study involved interviews with managers/engineers working in the construction industry in Libya. The main reason behind this pilot study was to better define the need for this research work. One of the most important criteria for selecting the interviewee was their experience in the Libyan construction sector. Some of the interviews were carried out before starting the research and others were carried out before the data collections. The outcomes of this pilot study were that there are many factors affecting the success of construction projects in Libya and if those factors were properly managed the success rate of construction projects would significantly improve. The study assisted the researcher in the development of the substantive research problem (e.g. ability to identify problems affecting construction projects in Libya) and confirmed that the target sample population was ready to contribute to the study when called upon.

2. Pilot study II

Pilot study II was carried out before posting out the questionnaires. This assisted in refining the questions to better obtain the data needed for the research. The purpose of this study was to check if the questionnaires were adequate for the research problem; would the question design enable the researcher to obtain valid and useful answers; would the research questions assist in developing the research framework. The feedback obtained from this pilot study was used to refine the questionnaires design and to develop the final questionnaire. (e.g. improving the design of the questions).

5.9. CONCEPTUAL RESEARCH FRAMEWORK

Through an understanding gained from the literature review it is considered possible to create, formulate, develop and adopt a theoretical frame for a research study to investigate and identify the requirements for a framework for the successful implementation of construction projects in the Libyan construction sector. The theoretical frame will be used as a guideline to determine the research problems and direct the researcher on how to investigate these problems in order to generate a framework for enhancing the success of construction projects in Libya. The theoretical frame consists of four components (see Figure 5.5), the External environment (economical and political environment), Managerial organisation, Project success implementation and project success evaluation. The frame suggests that enhancement of construction project success can be achieved through the following theoretical hypotheses based on the literature review and refined by the first pilot interviews.

- The top management of the organisation is responsible for appointing a project team with a high level of knowledge, skills and personal attributes in order to achieve a successful project.
- A project manager is responsible for selecting the project team members with careful consideration of their skills, knowledge, and efficiency. The project manager and the team play a crucial role of completing the different stages of the project within the agreed time scale.
- Because 90-95% of construction projects in Libya are government-owned the framework will evaluate the various ways in which the external environment (economic and political) affects construction projects in Libya.

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- The top management of the organisation is responsible for using the right methodologies, planning and the most suitable management system to manage the critical success factors affecting the project's activities.

5.9.1. Rationale for the Framework

The rationale for the framework is to reduce failure within Libyan construction projects. This project is considered to be the first research work in the field which seeks to ask questions, the answers to which will allow enhancement of the level of success within the Libyan construction industry. Before the study began, factors that are critical to the successful implementation of construction projects were identified through pilot studies and literature review. The research was used to confirm the initial assessment. Thus this framework will be used as reference/guidelines for achieving project success within the Libyan construction industry.

5.10. RESEARCH DESIGNS AND PROCESS ADOPTED FOR THIS RESEARCH

Nachmias and Nachmias (1996) defined a research design blueprint that enables the investigator to come up with solutions to problems. It guides the researcher in the various stages of the research (collecting, analysing and interpreting data). The main purpose of the research design is to help to avoid the situation in which the evidence does not address the initial research questions. The research design of this research study is explained in Figure 5.5. The research design consists of an in-depth literature review, conceptualisation of a theoretical framework, research design and methods, survey research, data analysis, developing of the framework and validation of the framework.

Data from literature suggests that the success of any project is dependent of some factors which include the external environment such as the economy and political. Furthermore, managerial and organisational factors such as the experience, skills, capabilities and knowledge of project team are relevant factors in project success, as these influence the management methodologies and project activities, and eventually determine the ultimate outcome of project. It also helps to achieve project delivery to time, cost, quality and client satisfaction. The conceptual theoretical framework is based on the points suggested by literature.

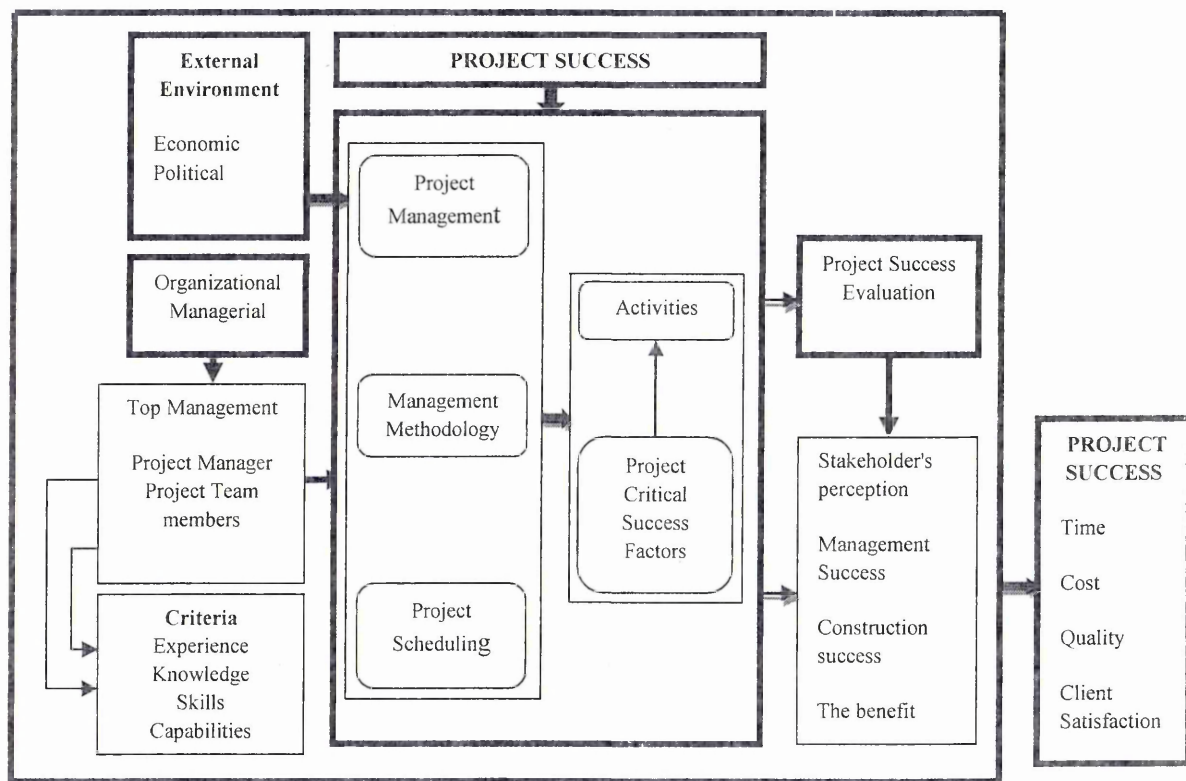


Figure 5.5: Conceptual Theoretical Framework

5.10.1. Literature review

The purpose of the literature review is to find and compare insights from different authorities on success/failure directed towards construction projects and Libya. Naoum (2007) has stated that the process literature review involves reading and appraising what other people have written about the subject area. That it can be both descriptive and analytical, where descriptive means that it explains the work of the others and analytical means that it critically examines their contribution with a view to identifying similarities, controversies and areas of theoretical or empirical weakness. To be able to make an original contribution to knowledge in the research area, the literature review should demonstrate a comprehensive grasp of existing knowledge, identify gaps in that knowledge and suggest possible areas for further research.

5.10.2. Conceptualisation Theoretical Framework

The conceptual framework directed the researcher to those factors which needed investigation. This was done through critical analysis of the literature review and from the pilot study to determine the research problem and formulate the research question and questionnaire.

5.10.3. Research Design and Methods

The primary research is the stage of obtaining data and information for the research study. Both qualitative and quantitative methodologies will be used to obtain primary information. The quantitative approach will be used through the questionnaire survey, whereas a qualitative approach will be used through interviews with professionals in the Libyan construction industry.

Questionnaires were sent to the construction professionals within the Libyan construction sector (details are provided in Chapter 6, which includes questionnaire design, and data collection and analysis). Interviews were carried out with a number of experience people in the construction sector in Libya (see Chapter 7 for full details).

5.10.4. Data Analysis

1. Analysis of quantitative data

After collection of data through the questionnaire survey, quantitative analysis will be performed using the SPSS software package (Statistical Package for Social Sciences, version 17). The raw data will be analysed using frequency and cross-tabulation statistical functions. The results of the SPSS will be presented in tabular forms to show frequencies and the relationship between variables. The level of significant of the factors as they affect project success was determined using chi-square.

2. Analysis of qualitative data

After data collection through interviews, the data will be analysed with the help of NVivo 8 software. This analysis is called qualitative data analysis. The information obtained from the interviews will be refined, coded and then interpreted using thematic analysis.

5.10.5. Developing and Validation of the Framework

The main aim of the research project is to develop a framework to enhance the success of construction projects in the Libyan construction industry (Chapter eight gives details of the development framework).

As a final phase of the research design, the external validation of the framework was established through feedback from professionals in the construction industry in Libya (details of the validation process are given in Chapter Nine). There are a number of ways to validate such frameworks, which include sending the framework to professionals and experts in the field area, presenting the framework in workshops and inviting people highly experienced in the relevant arena, and practicing the framework in the place that needs to be improved. This latter approach can take a long time and is more suitable for modelling than frameworks.

As mentioned above, the framework was validated through sending it to the professionals and experts in the construction industry in Libya. The reason of choosing this validation method came from the previous successes obtained by the majority of previous researchers in the built environment when using such a method (e.g. Obiajunwa (2010) and Bhutto (2004)) and it is also was recommended by Inglis (2008). Thus, this validation method was used in this research study because it is commonly used, but the use of other methods such as presenting the framework in a workshop or seminar can also provide good results, and are not ruled out, simply that no workshops or seminars are presently planned.

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5.11. SUMMARY OF THE CHAPTER

In this chapter, a description of research methodology the research process has been given. To achieve the research aim and objectives and achieve successful operational frame for this study, a mixed-method research approach of qualitative and quantitative methods has been identified. The quantitative approach will be through a questionnaire survey, and the qualitative approach will be through interviews with professionals and experts in the Libyan construction industry. The chapter also explains the research philosophy paradigms (positivism and phenomenological), and the characteristic of these paradigms.

The use of a mixed-method research approach is considered a very good method, in terms of obtaining extensive information and answering the research questions independently, justification of this choice is explained above. The characteristics of qualitative and quantitative strategies are outlined in this chapter. Survey (quantitative and qualitative) research strategies were chosen. The data collection and analysis methods were also explained, as were the pilot studies used in this research. It also gave description about the research design and process. The conceptual theoretical framework that guided the researcher is also identified.

The next chapter describes the quantitative data analysis using statistical software package SPSS (Statistical Package for the Social Science, Version 17).

Chapter 6

Quantitative Data Collection and Analysis

6.1. AIMS OF THE CHAPTER

This chapter reports the first phase of data collection using the questionnaire survey conducted to identify and examine the most important factors affecting the success of construction projects in Libya. The chapter introduces the questionnaire as a method of data collection. The data analysis is presented under the following headings: evaluation of the project manager, construction project success factors, and barriers to success of construction projects. Finally, there is a summary of the chapter.

6.2. QUESTIONNAIRE

The main aim of the questionnaire survey was to assess the respondents' perception of the most important factors affecting the success of construction projects in Libya. The questionnaire comprised four sections: The first section contains exploratory questions in relation to the activities of the respondents; their position and experience. The second section evaluates project managers and their contribution to project success. Section three identifies factors contributing to the success of a construction project in Libya and the relative impact of those factors. The fourth section explores barriers to success of construction projects in Libya and the magnitude of those effects. The questionnaire included areas and factors that need more clarity for the development of a framework for the success of construction projects. A copy of the questionnaire is attached as Appendix A. The respondents were asked to give their views by selecting the appropriate option on a five point Likert Scale relating to assessment of relative importance (1 - Not Important (NI), 2 - Fairly Important (FI), 3 - Moderately Important (MI), 4 - Important (I) and 5 - Very Important (VI)), and degree of respondent's

agreement (1 - Strongly Disagree (SD), 2 - Disagree (D), 3 - Neutral (N), 4 - Agree (A), 5 - Strongly Agree (SA)).

A total of 400 questionnaires were sent to a selection of different categories of respondents including; Project Managers, Construction Managers, Consultants, Contractors, Clients/Top Management, Academic Lecturers, and others working in the field. The respondents for a subsequent follow up meeting were selected from construction management professionals within Libya. For the purposes of this research Libya was divided into four zones viz; East, West, North and South. 100 questionnaires were sent out to construction management professionals in each zone. Four different organisational groups comprising Contracting organisations, Universities, Government departments and consulting firms in each zone were used for this survey. A convenient sample of 5 organisations was selected from each organisational group and 5 questionnaires were distributed in each of the organisation. A total of 161 questionnaires were returned (36% achieved). Akintoye (2000) stated that the average response rate of most postal questionnaire surveys used in relation to construction industry studies is 20-30%, so the 40.25% achieved here is considered acceptable. The reason for such response rate may be due to the researcher telephoning contacts and meeting Directors in some organisations to urge collaboration.

Table 6.1 shows details of respondents who completed and returned questionnaires. From the background information provided, the largest single group of respondents were Construction Professionals, 39.8% of the total respondents; 16.1% were Project Managers; 13.7% were Client/Top Management; 13.7% were Consultants and 8.7%

were Construction Managers. The remaining respondents were Academic Lecturers and Contractors at 5.0% and 3.7%, respectively.

Table 6.1: Analysis of Respondents

Respondents	Frequency	Percent %	Cumulative Percent
Project manager	26	16.1	16.1
Construction Manager	14	8.7	24.8
Academic Lecture	8	5.0	29.8
Contractor	6	3.7	33.5
Consultant	21	13.0	46.6
Client/Top Management	22	13.7	60.2
Construction Professionals	64	39.8	100.0
Total	161	100.0	

Table 6.2 analyses work experience and describe the experience of the respondents in terms of years of practice. For example, 46.0% of practitioners have less than five years' experience as a member of a construction team, while 17.4% had more than ten years' experience as consultant and/or contractor. It can be seen that between a third and a half of respondents had less than five years' experience; between about 10% to about a quarter had more than ten years' experience. 36.7% of the respondents claim that they been working as a Client/Top Management for between 0 - 5 years, 11.2 % claimed to have worked in his capacity for a period between 6 - 10 years, and 9.9 % of them said they have been working as Client/Top management for more than 10 years. In terms of experience of the academic staff in engineering and construction/ project management, Table 6.2 shows that 30.5% of respondents claimed that they had been working for less than 5 years, while 6.9 % of the respondents' said they been working as lecturers between 6 - 10 years.

Table 6.2: Respondents' Years of Experience

Years experience (range)	Practitioner respondents' experience					Years experience (range)	Practitioner respondents' experience and Academic respondents' experience		The employees number (range)	The number of employees for the respondent's firm
	Relevant experience as a member of a construction team, % N = 161	Relevant experience as a construction and/or project manager, % N = 161	Relevant experience as a consultant or/and contractor, % N = 161	Relevant experience as a client/top management, % N = 161			Relevant experience in engineering construction/project management, % N = 161	Relevant experience as an academic lecturer in engineering construction/project management, % N = 161		
0 - 5	46.0 %	43.4 %	37.2 %	36.7 %		0 - 5	22.4 %	30.5 %	< 50	24.2
6 - 10	21.0 %	20.5 %	13.7 %	11.2 %		6 - 10	32.9 %	6.9 %	51 - 100	10.6
> 10	25.5 %	8.1 %	17.4 %	9.9 %		11 - 15	17.4 %	1.2 %	101 - 499	34.1
Missing	7.5 %	28.0 %	31.7 %	42.2 %		> 15	27.3 %	1.2 %	> 500	29.2
Total	100 %	100 %	100 %	100 %		Missing	-	60.2 %	Missing	1.9
						Total	100 %	100 %	Total	100%

6.3. METHOD OF QUESTIONNAIRE DATA ANALYSIS

The Statistical Package for the Social Sciences (SPSS 17) for Quantitative Analysis was used to analyse the data. This provides structured and robust analysis and is probably the most popular statistical software package used by social science and engineering students Bryman (2001). The 161 completed questionnaires returned by the respondents were used in the analysis.

6.4. ANALYSIS TECHNIQUES

During the analysis adequate care was taken to ensure reliability and validity checks of the data were established. The initial stage involves observing, sorting and grouping the data. The code book (Appendix B) was developed for the coding of the propositions contained in the questionnaire. Some uncompleted questionnaires were rejected because these respondents failed to complete key questions. A double checking of data entry was carried out to ensure that data were entered correctly. Descriptive and inferential test statistics procedures were administrated for the analyses of data. The use of statistics techniques for the data analysis is explained below:

I. Descriptive

The descriptive aspect of statistics allows researchers to summarise large quantities of data using measures that are easily understood by an observer. The main advantage of descriptive analysis is to enable the researcher to reduce large masses of data to simpler and more understandable terms Burns (2000).

▪ The Median

The median was chosen as the measure of central tendency to draw inferential differences from measured values, and here has the added advantage that it is ordinal (Field, 2009), (Burns, 2000) and (Bryman, 2001). Because the median is relatively free from distortion by skewness in an ordinal distribution, it becomes a particularly desirable parameter for descriptive purposes, and thus is considered to be a "typical" observation (Hamburg, 1970). The implication is that the median provides a more accurate value for the analysis than the mean, this because the median is not affected by the outliers that affects the mean.

▪ The Mean

The mean is the total of a distribution of values divided by the number of values (Bryman, 2008). The reason of using mean is that the mean can order and rank the factors affecting the success of the construction projects in Libya.

II. Reliability Tests

Reliability refers to the consistency of a measure. It is important to check that the scales being used are reliable. This can be done by calculating the Cronbach's alpha coefficient, which is one of the most widely used scales for internal consistency (Pallant, 2007). For a set of items to be considered self consistent and reliable the Cronbach's alpha should be at least 0.7, however, with scales of fewer than ten items it is common to find quite low Cronbach values (Pallant, 2007) and (Bryman and Cramer, 2005). For an item to be included in the scale its corrected Item-Total Correlation value should not be less than 0.3, and if its value is less than 0.3 it should be deleted from the scale to improve the data reliability. For a scale to be reliable the value of Cronbach's alpha should increase

when such an item is removed (Pallant, 2007) and (Field, 2005). If the number of items on the scale is less than 10, lower values of Cronbach's alpha can be accepted provided that the inter item correlation of all items in the scale ≥ 0.2 . If an item has an inter-total correlation coefficient of less than 0.3 it should be deleted. (Cronbach's alpha examines the "consistency" of data).

III. Chi-Square Test for Goodness-of-fit (Non-parametric)

The Chi-Square test is undertaken to test the validity of items (Chi-Square test looks at "variance" of data). The Chi-Square test is a non-parametric test that can be used to find out whether an observed value is significantly different from an expected value. The Chi-Square is usually considered significant (alpha level) at values less than 0.05 (5%), (Bryman and Cramer, 2005), (Pallant, 2007) and (Field, 2005). The Chi-Square goodness-of-fit test is used to compare the observed sample distribution with the expected probability distribution (Hamburg, 1970).

IV. Analysis of Variance (ANOVA) - The One-way ANOVA

For this research and data available, One-Way Between-Groups ANOVA was used, because this method identifies whether the items/variables have significant differences in the mean score in the dependent variable across the several groups. This method measures between one dependent variable and independent variable with three levels or more. When the One-Way Between-Groups ANOVA with planned comparisons is measuring between groups, it can be used for two or three groups. So, the One-Way between groups ANOVA is considered to be a very suitable method for this kind of data. The ANOVA is a way of examining differences between the means of groups as well as

evaluating whether the mean differences found in the sample would hold in the population (de Vaus, 2007) and (Pallant, 2007). It used to compare the variance mean values between the groups to evaluate the extent of differences between the perceptions of the respondents in the propositions. The test value is considered significant when the value is ≤ 0.05 (5%) (Coakes and Steed, 2003) and (de Vaus, 2007).

6.5. QUESTIONNAIRE SURVEY RESEARCH OUTPUT

The data collected from the respondents were analysed and the findings summarized in the following sections.

6.5.1. EVALUATION OF PROJECT MANAGERS

This section contains four parts; each part examines several related factors in order to evaluate the project manager's roles - attributes, attitudes and traits; management skills; the manager's knowledge; and selection criteria for project managers.

6.5.1.1. Evaluation of Attributes and Traits for Project Managers

Examination of Table 6.3 illustrates that the perceived importance of attributes and traits of a project manager in managing construction projects successfully. The Chi-square test results and the Cronbach's alpha (0.802) confirm the validity of the propositions. It concludes that all items in the scale are reliable.

The table shows, for example, that 38.5% of the respondents considered the ability to delegate moderately important, with a median score of 3. It should be noted that the ability to delegate had the lowest mean score of the propositions tested. The majority of respondents considered decision-making very important for managers to run projects

successfully, with 96.9% of respondents claiming this ability to be important or very important, with a median score of 5. Similarly over 90% of respondents rated leadership and problem solving as important or very important and gave these characteristics median scores of 5.

All the remaining attributes and skills had a median score of 4. However, in terms of the percentage of respondents who rated that attribute or skill as important or very important to the successful delivery of the project within time, cost and quality, we obtain the following ranking: ability to build a team (82.6%), good organiser (80.2%), capable negotiator (76.4%), adaptable (73.3%), ability to motivate others (65.3%), shares vision with workforce (64.0%) and should be able to communicate well with others (62.8%). There is some variation in the relative proportions of respondents that rate the particular attribute or skill as important or very important.

Table 6.3: Scores, median and ANOVA and Validity Analyses and Reliability of Scales of a Project Manager's Evaluation

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Decision making	0	0	3.1	34.2	62.7	4.60	5	.155	P < 0.000	0.802
Problem solving	0	1.2	6.2	32.3	60.2	4.52	5	.219	P < 0.000	
Leadership of the project	0	1.2	6.2	31.1	61.5	4.53	5	.044	P < 0.000	
Team building	0.6	1.2	15.5	35.4	47.2	4.27	4	.238	P < 0.000	
Good organiser	0.6	3.1	16.1	34.2	46.0	4.22	4	.884	P < 0.000	
Capable Negotiator	1.9	5.0	16.8	38.5	37.9	4.06	4	.875	P < 0.000	
Adaptable	1.2	7.5	18.0	44.1	29.2	3.93	4	.910	P < 0.000	
Capable motivator	3.1	3.1	28.6	34.2	31.1	3.87	4	.770	P < 0.000	
Shares vision	1.2	5.6	29.2	41.6	22.4	3.78	4	.198	P < 0.000	
Good communicator	0.6	4.3	32.3	28.6	34.2	3.91	4	.188	P < 0.000	
Delegation	5.6	12.4	38.5	29.2	14.3	3.34	3	.834	P < 0.000	

From Table 6.3 it can be seen that the ANOVA test results show that there is significant difference (< 0.05) in the mean score values allocated by respondents to the ability to lead the project (sig. 0.044). This indicates that the project manager needs all other attributes than just the ability of leading the project. The ANOVA tests show no significant difference in the mean scores of any other propositions.

Table 6.3 ranks the mean scores of the different attributes and skills. It can be seen that the highest mean scores are for decision making, problem solving and leadership of the project. This implies that to successfully complete projects the project manager should concentrate on these aspects of his job.

6.5.1.2. Findings from the Analysis of a Project Manager's Attributes and Traits

The lack of certain personal attitudes, attributes and traits by a Project Manager has been identified as one of the major implementation problems for construction projects. Certain personal skills are found to be required for the project managers to ensure successful management of construction projects implementation. These skills were identified in the literature review and Table 6.4 shows the rank of the importance of the attributes, attitudes and traits based on the mean score. Score of the importance level is based on Table 6.5.

Table 6.4: Ranking of a Project Manager's Attributes and Traits

Project Manager's Attitude, Attributes, and Traits	Mean Score	Rank	Level
Decision making	4.60	1	H
Leading the project	4.53	2	H
Problem Solving	4.52	3	H
Team building	4.27	4	H
Good organiser	4.22	5	H
Capable negotiator	4.06	6	H
Adaptable	3.93	7	M
Capable motivator	3.91	8	M
Shares vision	3.87	9	M
Good communicator	3.78	10	M
Delegation	3.34	11	M

Table 6.5: Score Level of the Project Managers' Attributes and Traits

Average Score ($\sum W_i$)	SSAI Level
4.0 to 0.5	High (H)
3.0 to < 4.0	Medium (M)
1.0 to < 3.0	Low (L)

(Source: Adapted from Chileshe, 2004)

($\sum W_i$) = The sum of the average of each profession (construct).

6.5.1.3. Project Managers' Management Skills

As identified in the literature review Table 6.6 lists essential management skills of project managers necessary for project success. The Cronbach's alpha was (0.793) for the scale, and the Chi-square test results were for all the propositions. These confirm the validity and reliability of the propositions regarding management skills for project managers.

The survey shows that the respondents gave a median rating of 5 to five of the skills; planning and control (rated as Agree or Strongly Agree by 94.4% of respondents),

supervision (90.7%), leadership (90.1%), time management (90.0%) and quality management (87.8%). A somewhat anomalous result was obtained for cost management. Although 90.0% of respondents considered this a necessary skill the median rank was only 4 due to the distribution of responses.

The remaining seven skills listed all had a median score of 4. The percentages of respondents who either agreed or strongly agreed that these were necessary skills were: organisational abilities (86.9%), motivation (80.8%), risk management (80.7%), negotiating skills (80.3%), resource allocation (77.1%), communication (73.9%) and adaptability (65.2%).

Between the respondents' group, the ANOVA test result (sig: 0.029) shows significant variation on the supervision of using project management skills for the success of the project. However, ANOVA test results (>0.05) for the other propositions infer that there are no significant differences to the other propositions.

Regarding the relative importance of the management skills required by project managers to manage construction projects successfully Table 6.6 shows the mean scores for planning and control, and leadership have the highest mean scores (4.60 and 4.50, respectively) and adaptability and resource allocation are cited as the least important factors with mean scores of 3.83 and 4.06, respectively.

Table 6.6: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales of Management Skills for the Managers

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree					
Planning and control	0.6	0.6	4.3	27.3	67.1	4.60	5	.567	P < 0.000	0.793
Supervision	0	0.6	8.7	31.7	59.0	4.50	5	.029	P < 0.000	
Leadership	0.6	1.9	7.5	26.7	63.4	4.49	5	.215	P < 0.000	
Cost management	0.6	0.6	8.7	42.2	47.8	4.43	4	.646	P < 0.000	
Time management	0	0.6	9.3	36.6	53.4	4.37	5	.203	P < 0.000	
Quality management	0	1.2	11.2	37.3	50.3	4.36	5	.618	P < 0.000	
Organisational abilities	0	0.6	12.4	45.3	41.6	4.28	4	.300	P < 0.000	
Motivation	0.6	0.6	18.0	40.4	40.4	4.19	4	.921	P < 0.000	
Risk management	1.2	0	18.0	42.2	38.5	4.17	4	.791	P < 0.000	
Negotiating skills	0.6	1.9	17.4	41.6	38.5	4.16	4	.723	P < 0.000	
Resource allocation	0	1.9	21.1	46.0	31.1	4.07	4	.095	P < 0.000	
Communication	1.2	2.5	22.4	35.4	38.5	4.06	4	.075	P < 0.000	
Adaptability	0	5.6	29.2	41.6	23.6	3.83	4	.795	P < 0.000	

6.5.1.4. Findings from the Analysis of a Project Manager's Management Skills

It is evident from the literature review that the possession of certain management skills by project managers is essential for the successful implementation of construction projects, and the absence of those skills is considered a common reason for failure to complete projects successfully. Table 6.7 sets out the mean score, relative ranking the most important project management skills listed. The table strongly suggests that to be successful project managers should be knowledgeable of, and understand, at least those management skills given the level H.

Table 6.7: Ranking of a Project Manager's Management Skills

PM's Management Skills	Mean Score	Rank	Levels
Planning and control	4.60	1	H
Leadership	4.50	2	H
Supervision	4.49	3	H
Time management	4.43	4	H
Quality management	4.37	5	H
Cost management	4.36	6	H
Organisational abilities	4.28	7	H
Motivation	4.19	8	H
Risk management	4.17	9	H
Negotiating skills	4.16	10	H
Communication	4.07	11	H
Resource allocation	4.06	12	H
Adaptability	3.83	13	M

6.5.1.5. Project Managers' Knowledge

Table 6.8 lists the important areas of knowledge the project manager needs for ensuring construction project success as identified in the literature review. All six propositions on the list attained a median score of 4. The percentage scores obtained by the propositions for important and very important were: technical knowledge (89.5%), project management techniques (88.2%), risk identification (82.0%), tendering and procurement strategies (81.3%), communication systems (78.9%) and health and safety regulations (78.9%).

From Table 6.8 the ANOVA test results between respondents means that there are no significant differences in the mean scores for all propositions. The results shown for the Chi-square test (0.000) confirm that all propositions are equally valid. The Cronbach's alpha for the scale was only 0.600, which is less than the usually recommended 0.7, but here this could be an acceptable result, because there are fewer than ten items in our list.

Table 6.8: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for a Project Manger's Knowledge

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Technical knowledge	0.6	0	9.9	43.5	46.0	4.34	4	.254	P < 0.000	0.600
Project management techniques	0.6	1.9	9.3	40.4	47.8	4.33	4	.364	P < 0.000	
Risk identification	0.6	3.1	14.3	47.2	34.8	4.15	4	.176	P < 0.000	
Tendering and procurement strategies	0	3.7	14.9	54.0	27.3	4.12	4	.398	P < 0.000	
Communication systems	0.6	2.5	18.0	39.1	39.8	4.12	4	.280	P < 0.000	
Health and safety regulations	0	1.9	19.3	43.5	35.4	4.05	4	.068	P < 0.000	

Table 6.8a shown that the Cronbach's alpha remained low (.610) with only three items in the scale (the other three items were deleted). In this case, the scale was considered reliable since the inter-item correlation is 0.214 which is greater than the recommended minimum 0.2.

Table 6.8a: Reliability analysis of a Project Manager's Knowledge towards ensuring Construction Project Success

Propositions	Inter-item Correlation			Cronbach's Alpha
	Tendering and procurement strategies	Communication systems	Risk identification	
Tendering and procurement strategies	1.000	.242	.214	.610
Communication systems	.242	1.000	.555	
Risk identification	.214	.555	1.000	

Descriptive analysis, see Table 6.8, shows that technical knowledge and project management techniques with mean score of 4.37 and 4.33, respectively, are considered

the most important areas of knowledge for the project managers to ensure construction project success.

6.5.1.6. Findings from the Analysis of a Project Manager's Knowledge

Table 6.9 shows the mean scores for the six areas of knowledge and understanding required by project managers and all were given the level H. This is interpreted as showing that in the judgement of the respondents these six areas of knowledge are critical factors in the success of construction projects: for example, that to be successful the project manager should have established suitable tendering and procurement strategies and ensured that communication and risk identification systems are in place. The result shows that the majority of those surveyed strongly agree that the project manager's knowledge will have an impact on the success and/or failure of a construction project.

Table 6.9: Ranking of a Project Manger's Knowledge

PM's Knowledge	Mean Score	Rank	Levels
Technical Knowledge	4.34	1	H
Project Management techniques	4.33	2	H
Communication Systems	4.15	3	H
Risk Identification	4.12	4	H
Health and safety Regulations	4.12	5	H
Tendering and procurement strategies	4.05	6	H

6.5.1.7. Selection Criteria of Project Managers

Table 6.10 lists the important selection criteria when choosing a project manager to achieve successful completion of a construction project are shown in the literature review.

Concerning the skills that should be taken into account when selecting managers in order to complete projects on time and without problems, the survey showed that 93.2% of respondents rated administrative and supervisory skills as important or very important for the success of a project, 90.7% personal abilities, 90.0% authority in controlling the project, 83.2% technical knowledge, 82.0% length of experience and 81.3% the length of relevant experience. The median scores were 5 for administrative and supervisory skills and authority in controlling the project. All the others had a median score of 4. Because of the distribution of responses personal abilities had a median rating of 4 but more respondents rated it important or very important than authority in controlling the project.

Table 6.10: Median and ANOVA Scores, Validity Analysis and Reliability of Scales for Selection Criteria of a Project Manager

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Administrative and supervisory skills	0	0.6	6.2	32.3	60.9	4.53	5	.937	P < 0.000	0.663
Authority in controlling the project	1.2	0.6	8.1	30.4	59.6	4.47	5	.426	P < 0.000	
Personal abilities	0	0	9.3	52.8	37.9	4.29	4	.786	P < 0.000	
Technical knowledge	0.6	0.6	15.5	44.1	39.1	4.24	4	.458	P < 0.000	
Period of experience	0	1.2	16.8	38.5	43.5	4.20	4	.466	P < 0.000	
A strong technical background	0	0	18.6	42.2	39.1	4.20	4	.262	P < 0.000	

The Chi-square test results (0.000) show that all the propositions are valid. In Table 6.10 the Cronbach's alpha is low (0.663) because of the small number of items on the list and thus is acceptable. In table 6.10a, the Cronbach's alpha remains low (0.697), but the Inter-item Correlation coefficients is higher than 0.2 so it can be inferred that the

four items in the scale are reliable. Table 6.10 shows the results of the ANOVA test for all items and confirms that there are no significant differences among the means (>0.05).

Table 6.10a: The Reliability Analysis for the Selection Criteria of a Project Manager

Propositions	Inter-item Correlation				Cronbach's Alpha
	A strong technical background	Technical knowledge	Personal abilities	Administrative and supervisory skills	
A strong technical background	1.000	.613	.279	.243	.697
Technical knowledge	.613	1.000	.345	.360	
Personal abilities	.279	.345	1.000	.317	
Administrative and supervisory skills	.243	.360	.317	1.000	

The results of the Descriptive analysis presented in Table 6.10 show that the highest mean scores were for administrative and supervisory skills and authority in controlling the project (4.53 and 4.47, respectively). Whereas, the lowest mean scores were for a strong technical background and technical knowledge at 4.20 each.

6.5.1.8. Findings from the Analysis of a Project Manager's Selection Criteria

As identified early in the literature review, the selection criteria for a project manager is considered a very sensitive issue. The selection of the wrong project manager will surely lead to projects failure. The questionnaire survey results show that the selection criteria must be adequately applied. In order to complete projects successfully, the organisations involved should ensure the selection of the right person; experienced and having adequate skills and knowledge. The result also shows that the respondents considered that for a project manager to be successful, a strong technical background was required. The mean scores, relative ranking and SSAI levels for the most essential

criteria for the selection of project managers are given in Table 6.11. All the criteria had a level H.

Table 6.11: Ranking of a Project Manager's Selection Criteria

The PM Selection Criteria	Mean Score	Rank	Levels
Administrative and Supervisory Skills	4.53	1	H
Authority in Controlling the Project	4.47	2	H
Personal Abilities	4.29	3	H
Period of Experience	4.24	4	H
A strong Technical Background	4.20	5	H
Technical Knowledge	4.20	5	H

6.5.2. SUCCESS FACTORS FOR CONSTRUCTION PROJECTS

This section analyses respondents' opinions concerning five factors that may affect the success of a construction project: Project-related, Procurement-related, Project management, Human-related, and External environment.

6.5.2.1. Project Related Factors

Table 6.12 lists the four propositions linked to Project related factors that might affect the success of the project. 59% of respondents agreed or strongly agreed that the size of the project was itself a factor in the likely successful outcome of that project, 55.9% of respondents agreed or strongly agreed that the life cycle of projects was a factor in the successful outcome of the project, corresponding figures for the nature and type of project were 51.6% and 49.1% respectively. The median score was 4 for all factors except for the type of project where it was 3. Interestingly, a significant proportion of respondents disagreed or strongly disagreed with the suggestion that these factors were relevant to the outcome of the project. In particular, about one quarter of the respondents felt this way regarding the type of project.

Table 6.12: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for the Project-Related Factors to the Project Success

Propositions	Response Scores %						Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree						
Size of project	3.7	13.7	23.6	33.5	25.5	3.34	4	.991	P < 0.000		0.816
Life cycle	4.3	6.8	32.9	31.1	24.8	3.51	4	.845	P < 0.000		
Nature of project	5.6	9.3	33.5	31.7	19.9	3.63	4	.803	P < 0.000		
Type of project	10.6	15.5	24.8	28.0	21.1	3.65	3	.387	P < 0.00387		

Table 6.12 shows that the Chi-square test results confirm the validity of the propositions except for the one proposition concerned with the type of project (0.003) (Chi-square is usually considered significant at values less than 0.05). All the scales are reliable with a high value for Cronbach's alpha (0.816). ANOVA test result (>0.05) between the respondents infers that there exists no significant differences between their perception in the Four propositions.

6.5.2.2. Procurement-Related Factors

Table 6.13 shows Procurement-related factors that may have an impact on construction project success. Most the respondents (86.9%) considered that the right selection of procurement method for any project is very important or important for successful completion; the median score was 5. 85.0% of respondents believed the tendering method to be very important or important in affecting the success of a project; the median score was 4.

Table 6.13: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for the Procurement-Related Factors to the Project Success

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Procurement method	0	0.6	12.4	36.6	50.3	4.37	5	.136	P < 0.000	0.551
Tendering method	0	1.9	11.2	41.0	46.0	4.31	4	.049	P < 0.000	

Table 6.13, shows that there is a significant differences in the mean scores between the groups for tendering method, ANOVA test (sig, 0.049). The ANOVA test for the other proposition shows there is no significant difference (sig, 0.136) in the mean scores value between respondents. The Chi-square test result (< 0.05) confirmed that all propositions are valid, though the Cronbach's alpha is low (0.551) for the items in the scale. The Inter-item Correlation in Table 6.13a shows the same value Cronbach's alpha but the Inter-item Correlation coefficients are higher than 0.2 so it can be inferred that the two items in the scale are reliable.

Table 6.13a: The Reliability Analysis of the Procurement-Related Factors to the Project Success

Propositions	Inter-item Correlation		Cronbach's Alpha
	Procurement method	Tendering method	
Procurement method	1.000	.380	0.551
Tendering method	.380	1.000	

Table 6.12 and 6.13 shows the result of Descriptive analysis for Project-Related factors and the Procurement-related factors that may affect the success of construction project. A large number of respondents agreed that the procurement method factor is considered highly important with mean score of 4.37; then the tendering method at 4.31; and the life cycle of a project with 3.65.

6.5.2.3. Finding from the Analysis (Project Related-Factors, Procurement Related-Factors)

Appropriate procurement and tendering methods are needed for successful construction projects. Lack of clarity in procurement and tendering methods is considered to be one of the main causes of project failure. The questionnaire survey result shows that for successful projects, the procurement and tendering methods should be clearly defined and should be understandable. The procurement and tendering methods should be updated from time to time in order to adapt to any changes in requirements of the construction sector. It is also clear from the analysis that there should be transparency for the tendering methods of selection of the implementation companies. There is a need to decide which procurement methods are suitable for the implementation of construction projects.

As identified in previous chapters (Literature review), the success and/or failure of any construction project depends on different factors e.g. the size, nature and the type of a project. Generally, from the analysis, to ensure that project is completed successfully there should be classification of projects: the size, natural and type, and an appropriate management methodology should be selected for the each project.

Table 6.14 shows the ranking of Project related factors and Procurement related factors for the success of construction projects. The rank is based on the mean score obtained from the respondents.

Table 6.14: Ranking of Project Related Factors and Procurement Factors

Construction Success Factors Project-Related Factors and Procurements Related factors	Mean Score	Rank	Levels
Procurement Method	4.37	1	H
Tendering Method	4.31	2	H
Life Cycle	3.65	3	M
Size of Project	3.63	4	M
Nature of Project	3.51	5	M
Type of Project	3.34	6	M

6.5.2.4. Project Management Factors

Table 6.15 provides the most important management factors that may and/or may not affect the success of the construction project. The Chi-square test results (0.000) and the Cronbach's alpha (0.824) confirm that the validity of the propositions. It concludes that the entire list of items in the scale is reliable. The table shows that (table 6.36) over 93% of respondents rated the defining the objectives of the project, decision making and following the schedule as either important or very important; and gave these three factors median scores of 5.

All the remaining project management factors had a median score of 4. However, in terms of the percentage of respondents who rated that project management factors as important or very important for construction projects to succeed the following rankings were found: adequate communication (82%), monitoring (88.2%), project organization structure (88.9), troubleshooting (82.6%), overall managerial actions (74.6%), implementing an appropriate safety program (75.1%), motivation (84.4%), top management support (84%), feedback capabilities (65.9%), risk management (77.6%), understanding of health and safety regulation (70.2%), control mechanisms (83.3%), and coordination effectiveness (86.3). There is, of course, some variation in the relative

proportions of respondents that rate the particulate attribute and skill as important or very important.

From the above table, it could be concluded that there are significant differences (ANOVA sig < 0.05) between the mean scores of two propositions of the scales the implementation appropriate safety program (sig. 0.004) and following the planning schedule (sig. 0.032). However, there are no significant differences between the mean scores of the respondents for the remaining items in the scales (ANOVA sig. > 0.05).

Table 6.15 examines the effectiveness of sixteen project management factors related to the success of a construction project. Decision making, defining the project objectives, and planning have the highest mean scores in the table (4.61, 4.56, 4.53, respectively). Implementation an appropriate safety program, understanding of health and safety regulation, and feedback capabilities have the lowest mean scores in the table (3.99, 3.98, 3.87, respectively).

Table 6.15: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for the Project Management Factors to the Project Success

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Defining project objectives	0	0	4.3	35.4	60.2	4.61	5	.260	P < 0.000	0.824
Decision making	0	0.6	5.6	25.5	68.3	4.56	5	.620	P < 0.000	
Following plan and schedule	0	0	6.2	34.8	59.0	4.53	5	.032	P < 0.000	
Adequate communication	0.6	0.6	16.8	47.2	34.8	4.35	4	.252	P < 0.000	
Monitoring	0	0.6	11.2	41.6	46.6	4.34	4	.714	P < 0.000	
Project organization and structure	0.6	1.2	9.3	39.8	49.1	4.27	4	.302	P < 0.000	
Troubleshooting	1.2	1.2	14.9	43.5	39.1	4.22	4	.079	P < 0.000	
Overall managerial actions	0	1.9	23.6	42.9	31.7	4.20	4	.300	P < 0.000	
Implementing an appropriate safety program	0	3.1	21.7	48.4	26.7	4.18	4	.004	P < 0.000	
Motivation	1.2	0.6	13.7	47.8	36.6	4.18	4	.144	P < 0.000	
Top management support	0.6	1.9	13.7	42.9	41.0	4.15	4	.647	P < 0.000	
Feedback capabilities	1.2	5.0	28.0	37.3	28.6	4.04	4	.239	P < 0.000	
Risk management	1.9	1.2	19.3	47.2	30.4	4.03	4	.280	P < 0.000	
Understanding of health and safety regulation	0	4.3	25.5	38.5	31.7	3.99	4	.228	P < 0.000	
Control mechanisms	1.2	0.6	14.9	43.5	39.8	3.98	4	.800	P < 0.000	
Coordination effectiveness	0	0.6	13.0	44.7	41.6	3.87	4	.930	P < 0.000	

6.5.2.5. Finding from the Analysis of Project Management Factors

It was identified early during the literature review that project management factors are very important for project success. These factors need to be taken into consideration at an early stage to ensure projects are successfully implemented and project goals achieved.

Project management factors according to the data analysis should be in place to ensure construction project success. It is necessary that adequate communication is established between all those people involved in a project; that proper control mechanisms, and suitable coordination and monitoring are applied in order for projects to attain success.

In addition, the questionnaire survey also shows that there should be a proper and clear plan with schedules to be followed to ensure a well implemented project. Project organisation structure and project objectives should be well defined in order to avoid problems.

Successfully project management needs support by the top management, with the ability of managers to make necessary decision. It is also identified that implementation of appropriate safety program and risk management should be establish and adhered to.

Table 6.16 sets out the ranking of project management factors based on the mean score.

Table 6.16: Ranking of the Project Management Factors

Construction Success Factors Project Management Factors	Mean Score	Rank	Levels
Decision Making	4.61	1	H
Defining of Project Objectives	4.56	2	H
Plan and Schedule Followed	4.53	3	H
Project Organization Structure	4.35	4	H
Monitoring	4.34	5	H
Coordination Effectiveness	4.27	6	H
Top Management Support	4.22	7	H
Control Mechanisms	4.20	8	H
Troubleshooting	4.18	9	H
Motivations	4.18	9	H
Adequate communication	4.15	10	H
Overall Managerial Actions	4.04	11	H
Risk management	4.03	12	H
Implementation an Appropriate Safety Program	3.99	13	M
Understanding of Health and Safety Regulation	3.98	14	M
Feedback capabilities	3.87	15	M

6.5.2.6. Human-Related Factors

Table 6.17 shows fourteen Human-related factors that can affect the success of a construction project. The Cronbach's alpha was (0.810) for the scale, and the Chi-square test results were (0.000) for all the propositions. These confirm the validity and reliability of the propositions regarding Human-related factors for project managers.

As shown in the table, respondents gave a median rating of 5 to five of the Human-related factors; leadership (rated as important or very important by 95.6% of respondents), committed project team (94.4%), project manager performance (95.7%),

project team leader's experience and skills (93.8%) and the leader's commitment to meet time, cost, and quality requirements (91.9%). A somewhat conflicting result was obtained for cost management. Although 90.0% of respondents considered this a necessary skill the median rank was 4 because of the distribution of responses.

The remaining nine human-related-factors listed all had a median score of 4. The percentages of respondents who considered these factors either important or very important were: project team members' knowledge and skills (91.3%), technical background of project team members (85.7%), the leader's adaptability and working relationships (83.8%), the leader's adaptability to changes in the project plan (79.5%), client's emphasis on high quality of construction (78.9%), client's emphasis in quick construction (64.6%), the client's contribution to the project (63.4%), client's emphasis on low construction cost (55.3 %), and the client's experience (52.8%)

Table 6.17 shows that between the respondents' group, ANOVA test result (sig: 0.043) show significant variation on the client's contribution to the project for the project management factors to the project success. However, there are no significant different views regarding the other propositions (sig: > 0.05) among the respondents.

Table 6.17 shows that, with mean scores of 4.63, 4.58 and 4.57 respectively, leadership, the project manger performance, and the leader's commitment to meet time, cost and quality were the top of Human-related factors, while the client's emphasis in low construction cost and the client's experience were well down of the list with mean scores of 3.50 and 3.48, respectively.

Table 6.17: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for the Human-Related factors to the Project Success

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Leadership	0.6	0	3.7	26.7	68.9	4.63	5	.652	P < 0.000	0.810
Committed project team	0	0.6	5.0	37.3	57.1	4.51	5	.518	P < 0.000	
Project manager performance	0	0.6	3.7	32.3	63.4	4.58	5	.426	P < 0.000	
Project team leader's experience & skills	0	0.6	5.6	35.4	58.4	4.52	5	.541	P < 0.000	
The leader's commitment to meet time, cost, and quality specifications	0	0	8.1	27.3	64.6	4.19	5	.136	P < 0.000	
Technical background of project team members	0	1.2	13.0	50.9	34.8	4.57	4	.969	P < 0.000	
Leader's adaptability and working relationships	0	0.6	16.1	51.6	31.7	4.14	4	.156	P < 0.000	
Leader's adaptability to changes in project plan	0	1.2	19.3	50.3	29.2	4.07	4	.064	P < 0.000	
The client's contribution to the project	1.2	7.5	28.0	44.1	19.3	3.73	4	.043	P < 0.000	
The client's experience	5.0	15.5	26.7	31.7	21.1	3.48	4	.530	P < 0.000	
Client's emphasis on low construction cost	5.6	13.7	25.5	36.0	19.3	3.50	4	.521	P < 0.000	
Client's emphasis on high quality of construction	0.6	5.6	14.9	46.0	32.9	4.05	4	.389	P < 0.000	
Clients emphasis on quick construction	3.1	8.1	24.2	40.4	24.2	3.75	4	.427	P < 0.000	
Project team member's knowledge and skills	0	0.6	8.1	49.7	41.6	4.32	4	.972	P < 0.000	

6.5.2.7. Finding from the analysis of Human Related Factors

As discussed earlier in the literature review, Human-related factors including leadership; commitment of the project team; project team members' knowledge and skills; project

leader's experience and skills; technical background of the project team; and the leader's commitment to achieve the project's goals are needed for a successful construction projects. The data analysis shows that a high level of commitment by the project team and project manager is necessary for project success. To complete projects successfully, knowledge, skills and technical background should be present in all team members. High levels of experience and skills by project leader are required to ensure that projects are implemented as planned. The analysis also shows that there is an absolute need for good relationships between project members to ensure that all project members are working hand-in-hand to complete the project successfully.

Table 6.18 ranks the perceived importance to the success of construction projects of the Human-related factors, based on the respondents' mean score.

Table 6.18: Ranking of Human-Related Factors

Construction Success Factors Human-Related Factors	Mean Score	Rank	Levels
Leadership	4.63	1	H
Project Manager Performance	4.58	2	H
Leader's Commitment to Meet Time, Cost and Quality Requirements	4.57	3	H
Project Team Leader's Experience and Skills	4.52	4	H
Committed Project Team	4.51	5	H
Project Team Member's knowledge and Skills	4.32	6	H
Technical Background of Project Team members	4.19	7	H
Leader's Adaptability and Working Relationships	4.14	8	H
Leader's Adaptability to Changes in the Project Plan	4.07	9	H
Client's Emphasis on High Quality of Construction	4.05	10	H
Client's Emphasis on Quick Construction	3.75	11	M
The Client's Contribution to the Project	3.73	12	M
Client's Emphasis on Low Construction Cost	3.50	13	M
The Client's Experience	3.48	14	M

6.5.2.8. External Environment Factors

This part of the survey asked the respondents to state which factors from the following external environment factors had an effect on the success and/or failure of construction projects. Table 6.19 lists four external environment factors that may have an impact on the success of a construction project. As can be seen all four factors had a median score of 4. 87% of respondents rated the economic environment as very important or important, and considered that the economical environment had a direct impact on the success of any project. 85.1% of respondents considered the use of advanced technology very important or important. More than 70.8% of the respondents considered the industrial relations environment as very important or important. But a relatively large proportion 24.8 % scored this factor as only moderately important. 57.2% of respondents scored the political environment as very important or important, but again a relatively large proportion, 27.3 %, were not so sure of the importance of the political environment on project success.

Table 6.19: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for the External Environment Factors to the Project Success

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Not Important	Fairly Important	Moderately Important	Important	Very Important					
Economical environment	1.9	1.2	9.9	40.4	46.6	4.29	4	.876	P < 0.000	0.577
Political environment	3.7	11.8	27.3	28.6	28.6	3.66	4	.045	P < 0.000	
Use of Advanced Technology	0.6	0	14.3	40.4	44.7	4.29	4	.100	P < 0.000	
Industrial relations environment	1.2	3.1	24.8	44.7	26.1	3.91	4	.987	P < 0.000	

The ANOVA test showed a significant difference (sig. <0.05) in the mean score only for Political environment (sig. 0.045). The Chi-square test results show values (< 0.05) for all the propositions shows that all the items in the scale are valid. The Cronbach's alpha is low (0.577) but this result is acceptable for a short list of items. The Corrected item-total correlation as shown in Table 6.19a implies the items on the scale are reliable (> 0.3).

Table 6.19a: Reliability Analysis of the External Environment Factors to Project Success

Item-Total Statistics					
Propositions	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Economic Environment	11.86	4.031	.309	.125	.543
Political Environment	12.48	2.926	.414	.200	.467
Advanced Technology	11.86	4.181	.334	.160	.528
Industrial Relations Environment	12.24	3.694	.405	.221	.471

Descriptive analysis, see Table 6.19, shows that the Economic environment and Advanced technology are considered importance external environment factors to project success, both with a mean score of 4.29, then comes industrial relation environment at 3.91, and the political environment at 3.66.

6.5.2.9. Finding from the analysis of External Environment Factors

This is one of the sensitive issues in the research. Generally, as apparent in the literature review, the external environment factors, especially the economic and political factors, are given as major obstacles hampering the success of construction projects. Economic factors according to the data analysis are very critical to the success of any construction

project. For a successful construction projects the economic factors must be considered before signing any contract. The picture should be clear for all parties to the project in relation to the responsibility of the effects of economic and political factors that may affect the success of construction projects. The roles and the contract procurers should be clear and well defined in order avoid any conflict. Also the analysis shows that advanced technology should be in place to ensure projects are accurately implemented.

Table 6.10 shows the ranking of external environment factors in relation to project success based on the mean score.

Table 6.20: Ranking of External Environment Factors

Construction Success Factors External Environment Factors	Mean Score	Rank	Levels
Economical Environment	4.29	1	H
Advanced Technology	4.29	2	H
Industrial Relations Environment	3.91	3	M
Political Environment	3.66	4	M

6.5.3. BARRIERS TO SUCCESS OF CONSTRUCTION PROJECTS

This section contains from one part with factors and possible rating options (Scale of 1 - 5) in order to evaluate the most effective barrier that may affect the success of the construction projects.

6.5.3.1. Barriers to Success of Construction Projects: The Effectiveness of the Following Barriers on Project Success.

Table 6.21 lists twenty four factors that may affect the success of a project and that should taken into account in order to complete construction projects successfully. The

survey listed nine factors with a median score of 5 that the respondents considered a possible barrier to success of a project. These were: wrong selection of a project manager (96.3% of respondents agreed or strongly agreed), lack of skills and knowledge (95%), lack of materials (93.8%), wrong selection of contractors (91.9%), adequate cash flow (91.3%), poor financial support (90%), poor leadership (88.2%), poor planning and control (88.2%), and poor top management support (82.6%).

All the remaining factors, save adverse weather, had median scores of 4. Adverse weather conditions had a median score of 3. In terms of the percentage of respondents who agreed or strongly agreed that these factors were barriers to the success of construction projects, the following ranking were obtained: wrong used of project methodology (89.4%), poor quality of materials (88.2%), inadequate technology (85.1%), misunderstanding of responsibilities (84.5%), inadequate of manpower (83.2%), increased cost of labour and materials (80.7%), instability of economy (79.5%), the fluctuation of prices (78.3%), poor definition of project objectives (76.4%), lack of communication (73.3%), poor risk management (71.4%), change of top management (66.4%) and lack of health and safety (64.0%). As previously, there is some variation in the relative proportions of respondents that agree or strongly agree.

The factor considered the least barrier to project success was the weather. Here only 49.1% of respondents agreed and strongly agreed.

The results of the Sig of Chi-square as shown in the above table were (0.000) for all the propositions, and Cronbach's alpha was (0.923). This confirms the validity of the propositions and the reliability of the scales used. The ANOVA test show that there are significant differences (sig. < 0.005) in the mean score values for poor definition of

project objectives (sig. 0.027), lack of health and safety (sig. 0.036), poor risk management (sig. 0.002) and misunderstanding of responsibilities (sig. 0.023). Other propositions showed no significant differences in their mean scores.

As seen in Table 6.21, wrong selection of a project manager, lack of skills and knowledge by the project team, wrong selection of contractors, poor financial support and lack of materials have the highest mean scores and are considered the most effectiveness barriers to the success. Weather factors with mean score of 3.54, and the lack of health and safety with a mean score of 3.89 are considered to have least effect on project success.

Table 6.21: Scores, Median and ANOVA and Validity Analyses and Reliability of Scales for the External Environment Factors to the Project Success

Propositions	Response Scores %					Mean	Median	ANOVA (Sig)	Asymp. Sig	Cronbach's alpha
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree					
Wrong Selection of Project Manager	0.6	1.9	1.2	28.0	68.3	4.61	5	.689	P < 0.000	0.923
Poor Planning and Control	1.2	0.6	9.9	34.8	53.4	4.54	5	.155	P < 0.000	
Lack of Skills and Knowledge	0.6	1.9	2.5	32.9	62.1	4.54	5	.764	P < 0.000	
Poor Financial Support	0.6	1.9	7.5	24.2	65.8	4.53	5	.826	P < 0.000	
Poor Top Management Support	0.6	1.9	14.9	32.3	50.3	4.48	5	.630	P < 0.000	
Poor Leadership	0.6	1.9	9.3	37.9	50.3	4.43	5	.660	P < 0.000	
Adequate Cash Flow	0.6	1.2	6.8	37.3	54.0	4.39	5	.185	P < 0.000	
Lack of Materials	0.6	0.6	5.0	37.3	56.5	4.35	5	.585	P < 0.000	
Wrong Selection of Contractors	0.6	1.2	6.2	27.3	64.6	4.30	5	.406	P < 0.000	
Poor Risk Management	0.6	2.5	25.5	41.6	29.8	4.27	4	.002	P < 0.000	
Poor Definition of Project Objectives	1.2	1.2	20.5	32.3	44.1	4.26	4	.027	P < 0.000	
Unmotivated Team	1.2	1.9	8.7	47.8	40.4	4.25	4	.468	P < 0.000	
Lack of Communication	0.6	1.2	24.8	37.3	36.0	4.24	4	.303	P < 0.000	
Poor Quality of Materials	0.6	1.9	9.3	47.2	41.0	4.20	4	.150	P < 0.000	
The Fluctuation of Prices	0	5.0	16.8	52.8	25.5	4.18	4	.228	P < 0.000	
Instability of Economy	0.6	1.9	18.0	43.5	36.0	4.12	4	.171	P < 0.000	
Inadequate Manpower	0.6	1.2	14.9	44.1	39.1	4.12	4	.226	P < 0.000	
Increase in the Cost of Labour and Materials	0.6	1.9	16.8	53.4	27.3	4.07	4	.784	P < 0.000	
Lack of Health and Safety	0.6	3.1	32.3	34.8	29.2	4.05	4	.036	P < 0.000	
Change of Top Management	2.5	6.8	24.2	42.2	24.2	3.99	4	.625	P < 0.000	
Misunderstanding of Responsibilities	1.2	1.9	12.4	37.9	46.6	3.98	4	.023	P < 0.000	
Inadequate Technology	1.2	1.2	12.4	54.0	31.1	3.89	4	.121	P < 0.000	
Wrong Use of Project Methodology	0.6	1.9	8.1	50.9	38.5	3.79	4	.158	P < 0.000	
Weather Factors	2.5	9.3	39.1	29.8	19.3	3.54	3	.448	P < 0.000	

6.5.3.2. Finding from the Analysis of Barriers to Success of Construction Projects

To be successful a project must meet time, cost, quality and technical performance objectives, it must also satisfy the client. The survey results show that to ensure projects successfully are implemented and problems minimised: the project objectives should be clearly defined; adequate communication and proper planning and control need to be in place; a good project manager and project team needs to be appointed taking into account their skills, knowledge and experience. The data analysis also shows that health and safety management should be present and in place in order to avoid injury and/or loss of life. An adequate risk management methodology is also needed for successful projects as shown in the analysis. In order to ensure projects success, there should be early and careful selection of project managers and contractors taking into account their experiences and backgrounds. Contractors' profiles should be considered before selection.

Both financial and top management support should be available to ensure that projects are completed on time and to avoid conflict. For successful projects, the quality of materials should be identical with the specifications to ensure each task execution conforms to specification. It is necessary to ensure that adequate cash flow for projects is available in order to avoid delays in any one task that may feed through to delays in others and eventually delay the completion of the project. It is clear from the analysis that use of the right methodology is needed for construction project success. Moreover, adequate technology should be used to ensure that projects are well implemented. There is a need to maintain the motivation of the project team in order to encourage them to complete project tasks within time, to budget and with the right quality of product. The questionnaire analysis also shows that the change of the top management should not

affect project success; there should be roles and clear policies regardless of change management personnel. In order to avoid any conflict, it is necessary to ensure that the contractor is able to provide an adequate work force for project implementation. Finally, the responsibility for the fluctuation of prices including the rate of materials and labour cost should be clearly defined in the contract in order to avoid any deviations in the project plan.

Table 6.22 shows factors suggested as barriers are to project success. The rank of the factors is based on the mean score.

Table 6.22: Ranking of Barrier Factors to the Success of Construction Projects

	Mean Score	Rank	Levels
Wrong Selection of Project Manager	4.61	1	H
Lack of Skills and Knowledge by Project Team	4.54	2	H
Wrong Selection of Contractors	4.54	3	H
Poor Financial Support	4.53	4	H
Lack of Materials	4.48	5	H
Inadequate Money	4.43	6	H
Poor Planning and Control	4.39	7	H
Poor Leadership	4.35	8	H
Poor Top Management Support	4.30	9	H
Misunderstanding of Responsibilities	4.27	10	H
Poor Quality of Materials	4.26	11	H
Wrong Use of Project Methodology	4.25	12	H
Unmotivated Team	4.24	13	H
Inadequate of Manpower	4.20	14	H
Poor Definition of Project Objectives	4.18	15	H
Instability of Economy	4.12	16	H
Inadequate Technology	4.12	16	H
Lack of Communication	4.07	17	H
Increase Cost Rate of Labour and Materials	4.05	18	H
Fluctuation of Prices	3.99	19	M
Poor Risk Management	3.98	20	M
Lack of Health and Safety	3.89	21	M
Change of Top Management	3.79	22	M
Weather Factors	3.54	23	M

6.6. SUMMARY OF THE CHAPTER

The chapter presents the quantitative data collection and analysis (questionnaire) for this research project. This phase of the research is the first main source of primary data for the development of a successful construction project framework. The chapter provides the details of the questionnaire survey, and information concerning the respondents who participated in the survey including their length of relevant experience. Methods of data collection and data analysis were explained. The major part of the chapter presented the analysis of the questionnaire survey in order to identify, assess and define the factors that affect the success of construction projects in Libya. The analysis has confirmed the factors that need to be evaluated and improved for success of the construction project. The critical success factors and the management methodology required for project success were also confirmed. The survey analysis provided more clarification and further understanding. In the next chapter, the second phase: the collection and analysis of data from the interviews will be presented. Then, a framework for the successful construction projects is developed for construction projects in Libya, based on the literature review, and the analysis of quantitative and qualitative data.

Chapter 7

Qualitative Data Analysis

7.1. AIMS OF THIS CHAPTER

The previous chapter reported the first phase of data collection and analysis (Questionnaire Survey). This chapter presents the second phase: the collection and analysis of data from the interviews. The chapter begins with the selection criteria for interviewees, and profiles of the organisations which the interviewees worked for. Then the method used for the analysis of the interviews is presented. Finally, the chapter presents the results of the analysis of the interviews to identify, assess and define the factors that affect the success of construction projects.

7.2. METHODS OF DATA COLLECTION

Semi-structured interviews (typical formats are given in the Appendix C) were conducted with experienced personnel from seven organisations in the Libyan construction industry. Table 7.1 shows the profile of those interviewed (in terms of working experience). In all, ten persons were interviewed including Directors (The Head of National Office Advisory; Manager of Project Management Department; Director of Civil Engineering Department; Director of Technical Affaires and Supervision; Director of Technical Affaires and Projects) and five Project Managers, Consultants and/or Contractors.

7.2.1. Documents and Reports (project examples)

A number of project examples were also collected while interviewing. These examples were used to support what the interviewees said about the problems that occurred within Libyan construction projects.

7.3. PROFILES OF ORGANISATIONS

For qualitative research, seven organizations were selected from the list of the best and biggest Libyan construction and consulting organizations appearing in the Report of the General Union of Libyan Engineers, 2008 report. The selection of the organisations was also based on the management system, the success achieved by those organizations, and the qualified and experienced people working in those organisations. The selection of the interviewees took into consideration level of experience, qualification, and position. A brief description and profile of the organisations is presented in Table 7.2. Then, a short description of each organisation is given:

7.3.1. Organisation A

Interviewed Staff: Director of Technical Affairs and Supervision, and
Manager of Project Management Department - Tripoli

Operations:

The organisation executes wide range of public projects in the field of engineering and construction in all parts of the Great Jamahiriya. However, it concentrates on development of strategic and major infrastructural projects, for instance, construction of administrative and service centres, residential complexes and community projects, universities campuses and infrastructure projects.

7.3.2. Organisation B

Interviewed Staff: Project Manager who also acted as Consultant

Operations: Transfer of water for the population to use for agricultural, household, and industrial purposes.

7.3.3. Organisation C

Interviewed Staff: Project Manager who also acted as both Consultant and Contractor

Operations: Advisory and design work in various fields to provide expertise in engineering.

7.3.4. Organisation D

Interviewed Staff: Director of Technical Affairs and Projects

Operations: Urban development, and the preparation of housing plans to reduce the haphazard construction with its consequent difficulty of implementation of facilities.

7.3.5. Organisation E

Interviewed Staff: Director of Civil Engineering Department, and Construction Manager.

Operations: Design, consultation, supervision and control of housing and utilities

7.3.6. Organisation F

Interviewed Staff: The Head of National Office Advisory, and
Manager of Project Management Department

Operations: Advice, design, implementation and supervision of public buildings such as schools, hospitals and housing, and the necessary infrastructure

7.3.7. Organisation G

Interviewed Staff: Consultants

Operations: Advice on, and management of, housing and infrastructure projects.

Table 7.1: Interviewed Working Experience

Interviewed	Current working place	Period of experience years
Director of Technical Affairs and Supervision	Organisation A	> 20
Manager of Project Management Department - Tripoli	Organisation A	> 20
Project Manager, Consultant	Organisation B	> 20
Consultant, Project Manager, and Contractor	Organisation C	> 25
Director of Technical Affairs and Projects	Organisation D	> 15
Director of Civil Engineering Department	Organisation E	> 10
Project and Construction Manager	Organisation E	> 15
The Head of National Office Advisory	Organisation F	> 30
Manager of Project Management Department	Organisation F	> 15
Consultants	Organisation G	> 25

Table 7.2: Profile of the Organisations

Organisation ID	Number of interviewees	Activities
A	2	Design and build of administrative buildings, residential complexes, and infrastructure, building service projects (sports parks, hospitals, and universities, schools, and media centers). Also responsible for the renovation and refurbishment of historic buildings.
B	1	Extracting water from the aquifers in the South and conveying it to the Libyan coastal belt.
C	1	Advisory work and design. To provide expertise in the field of engineering and construction to bodies and institutions. Conducting surveys and preparation of the drawings, maps and engineering specifications and documents required.
D	1	To prepare studies and plans, and to implement the works required for assessing the basic infrastructure needs of areas targeted for urban water systems, sewer and electricity and telephone networks, gas and road networks and sidewalks, parks and amenities, commercial centers, etc..
E	2	Design, consultation, supervision and control of housing and utilities.
F	2	Design and build, consultation, supervision of public buildings such as schools, hospitals and housing, and the necessary infrastructure.
G	1	Leading Program Management Department for the Great Socialist People's Libyan Arab Jamahiriya Housing and Infrastructure Board (HIB).

7.4. METHODS OF DATA ANALYSIS

The data were collected from interviews of experienced people in the Libyan construction industry. The interviews were recorded in Arabic, loaded into a lap-top computer, and then transcribed into Microsoft Word format in both Arabic to English, translated by independent translator.

The interviews were formatted and coded to remove any names and reference to any specific person or organisation for ethical reasons. Then the data were analysed using

the qualitative research analysis software NVivo Version 8 (see screen display of primary nodes; Appendix E). The software identified themes from the interviews. Key words related to the aims and objectives of the study were imputed into the NVIVO as free nodes, and the software assisted by highlighting the key words in the qualitative data, the themes for in depth analysis were then formulated manually.

7.5. QUALITATIVE RESEARCH OUTPUT

This section presents the output, and the themes and patterns that have emerged from the interviews. The key areas addressed by the interviews were: the quality of the project manager and their influence on the success of the construction projects; the impact of economic and political factors on project success; the relationship between cost, time, quality, and management to success; and the most critical factors that could affect the success and/or failure of construction projects in Libya.

7.5.1. Perception of Success

Without doubt, as identified in the literature review, success means a project completed on time, within budget, to acceptable quality, and to the client's satisfaction. But, these are not always achievable for construction projects in Libya.

All the participants from the respondents organisations identified that the success of construction projects in Libya are affected by numerous factors. The impacts of the factors differ from one project to another and from one organisation to another. "A project is considered a success when it meets the requirements of the client, taking into account that it was implemented according to the standard specifications", said one Director. The majority of the participants assessed poor planning and weak management

system as the most important reasons for a project failure. In depth explanations of factors that affected the success of construction projects in Libya are presented below.

7.5.2. Overview on the Libyan Construction Sector

This section looks into the overall history of the construction sector in Libya, explaining the problems that have faced the sector since the 1970's; the urban development in Libya; the revival of the building sector; and the reasons behind delays. "In the period of seventies and eighties there was a remarkable progress in the construction sector, which improved the economic life in the country. At the end of 1980's and the beginning of 1990's the building sector witnessed several problems; those problems caused delays and failed projects, and the reason behind that was because of the lack of experience of the national and international companies that entered the market at that time", explained a Project Manager. In addition, the lack of experienced manpower affected build quality at that time.

Up to the end of 2009, there was strong growth in the building sector simply because tremendous funds were available for infrastructure projects. As for the defects in the quality of new building, they were due to technology, because the more advanced the technology used, the more defects will increase, said a Construction Manager. In fact, the workers are now more organised and more obliged to prove their qualifications and experience. One Consultant believed that the lack of experience of the national construction companies (joint stock companies) had a significant effect on the quality of building. In reality, some construction companies (especially the national companies) are undertaking projects without looking for quality, which affected the quality of the build.

Regarding the systems used in the construction sector and contracting, one of the Consultants, Project Managers and/or Contractors (CPMC) explained "the construction sector system did not upgrade or update except in the last period, when the private sector entered, because the public sector was not able to provide building requirements. The absence of the private sector for a long time has affected the construction sector". By this they meant that past projects were implemented by the public companies and that was the reason behind the slow growth of the construction sector in Libya.

Previously, the construction sector in Libya had been relatively inactive compared with other sectors. But, recently there has been a huge growth in building, countrywide. Currently, there are many new building projects which will lead to improvement in the construction sector in Libya. Furthermore, this will be chance for Libyan engineers to develop themselves practically, the MD explained.

One Director stated that, in the past the materials for building were confined to reinforcing steel (Misurata plant), and cement (from the factories at Souq Alkhomas, Zleiten, Benegazi, and Alfatayeh). Currently, the cement industry is being up-graded through adding new lines and new factories, and this year witness the emergence of new factories by Arab Union companies for construction.

7.5.3. Reasons behind Suspended Projects

The reasons behind suspended and failed projects are related to different issues, some of which have been mentioned above, and some are described below. But the lack of experience of contractors (new contractors, and even contractors who supplied no financial records or reports of previous relevant work); administrative corruption; and

payment procedures (delay of payment for the contractors) are the most common issues behind suspended projects within the construction sector in Libya, explained a Consultant and a Project Manager. In the words of a Project Manager, "I think the two most important reasons for the contractors to hand project in time are that the contractors need to have the necessary finances for the project in order to be able to avoid delay, and they should be paid on time so that cash flow does not hold up the schedule". An example related to the payment was provided by a Project Manager, "In case of a delay project, this means that there is a problem facing the contractor or employer, or there may be forces beyond their control. Sometimes, the financial position of the contractor is good, having enough experience, and excellent engineers, but due to arrears in payment (money due to contractor) the continuation of the project is affected. The contractor may wait for some time for the payment, but if payment takes too long the project will be affected." It was emphasised by some participants, the reasons behind project delays were: passing projects assigned to companies onto unqualified sub-contractors; delays in opening letters of credit causes delays in the delivery of raw materials, which in its turn affects the time schedule; delay in administrative procedures affects the quality of the delivered materials, and time of arrival to the project; inexperienced labour, and poor planning and control.

7.5.4. Evaluation of a Project Manager

As identified in the literature review, one of the fundamental reasons behind project success is the performance, experience, and the quality of a project manager. In fact, a project manager is considered the key man in ensuring the success of a project. The majority strongly agreed that the project manager is one of the most important people to

lead the project in the right way. In addition, the understanding of his/her role is very important for a project manager to complete projects without any problems. As a Civil Engineer put it, "The role of a project manager is important, because he/she is the central figure connecting the employer with other parties. The project manager should be project-oriented and have wide technical experience, for example, a civil engineering project should have a qualified civil engineer in order to be able to run the project properly". The efficiency of the project manager lies in his/her ability to manage available resources. The project manager is not a mere administrative, but is responsible for manpower, machinery and cash flow. Proper project managers should have enough experience to enable him/her to push the project ahead. Also, he/she must be aware of the nature of the work which he leads as well as the circumstances affecting human resources and machinery; a project manager should have knowledge of up-to-date technologies as well as the developments in the construction sector, outlined one of the Directors.

Supporting what was identified in the literature review, a Consultant added, "A project manager is a key factor for the success of any project. A successful project manager should be honest, experienced, reliable, and skilled in decision making". In order to control a project, the project manager must keep an eye on the strict application of specifications, and thoroughly understand possible risk, explained, a Project Manager. Job related education and training is not adequate in Libya, so the project manager should not be well versed in his/her speciality only, but should also be familiar with all other relevant matters necessary to implement the targets. Successfully project manager must be supported by a good work team as well as skilled engineers, who have enough experience in the field, outlined, one Director. A project manager is considered the

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backbone of any project; he/she should be responsible for the preparation of time schedule of the project along with following-up implementation, and taking necessary procedures to avoid delays; following-up the application of the budget allocated for the project (cost); follow-up the project in regard of quality (quality); and following-up the employer along with attending all meetings in regards of the impotent decisions to be taken for work progress in the project, explained, one Director.

7.5.4.1. Reasons behind Failed Project Managers

As confirmed in Chapter three, one of the most common reasons behind the failure of project managers is lack of experience. The majority of participants explained that the lack of experience of project managers, the lack of knowledge (e.g. culture and language), and appointing a project manager to manage projects with different background are considered the most common problems that affected the success of project managers within construction projects in Libya.

7.5.4.2. Project Manager Relationships

According to the participants, there should be a good professional relationship between a project manager and others involved in the project; this was also identified in the literature review. This relationship should extend to include consultants because team work is essential to the success of the project. "A successful project manager should have a strong relationship with relevant parties, especially with contractors and employees as well as the work team. Lack of good professional relationships might be among the reasons which have led to the failure of some projects in Libya" explained, one Director.

7.5.4.3. The Selection Criteria of a Project Manager

As mentioned in the literature review, personal attribute such as attitudes, traits, management skills, and knowledge are required when selecting a project manager help enable the project manager to complete projects successfully. "Unfortunately, in Libya a project manager is sometimes appointed without being qualified to do the job. A university degree alone is not enough; more important is a considerable period of field work" said one of the CPMCs. A graduate engineer should not be made responsible for a project immediately after graduation, but should learn the process step by step till he/she becomes able to lead a project. He/she should pass through different positions starting from assistant engineer, to site engineer responsible for a small work team, and then become a supervisor, added a Construction Manager and Consultant. Sometimes, the manager is highly qualified but lacks practical experience. That is why at least five years' experience is a must. About 90% of a project's success lies on the shoulders of the project manager, so their proper selection is essential, explained, one Director.

7.5.4.4. Classification and Importance of Project Managers

Project managers could be classified as employer's project manager (who is appointed by the client), and contractor's project manager (who is appointed by the contractor). Both should be co-operative and project-oriented. In Libya, usually small state projects are implemented without employing a consultant, and supervision is undertaken by a technician. "In some projects in Libya, problems can occur between the project manager who is appointed by the client and a project manager who is appointed by the contractor, which will be a reason for delay" explained, one Director. One of the important tasks for a project manager is to expect problems and have the skills to deal with them. The

problem for some state-owned companies is that sometimes they are asked to execute a new job while working on an existing project; this will affect the control and the performance of a project manager, as well as affecting the original project. "A project manager should recognise risks prior to their occurrence through his/her continuous monitoring of the project" outlined a Consultant and Director. In order to complete a project in time, a project manager must progress work according to the agreed time schedule both administratively and practically. The project manager should be responsible for monitoring work, ensuring the work is completed as per time schedule via proper co-ordination between the average daily performance, materials delivery program, productivity of labour force, and quality of work.

7.5.4.5. Project Examples

This section presents examples of projects that failed due to the inefficiency of a project manager; these examples were obtained during the interviews.

1. Residential project in Tripoli

The project is residential project located in Tripoli. The project was supposed to be completed within two years, but its initial manager achieved only 2% of the target project (the completion work was achieved in period that expected to achieve more than 2%). Once a new project manager was appointed, 20% completion was achieved in only five months. The greatest weaknesses of the first manager were: inability to make decisions and lack of sufficient authority due to the weakness of his personality. The company spent two years paying salaries, cost of machinery, work force and overhead costs without achieving the required work. Whereas, within a relatively short period, the

new manager (with the same capabilities) was able to convince the company's management to invest him with more powers. The project is real one and the delay was substantial, affecting the profit of the implementing company. The project was a residential one undertaken by a large foreign firm that was experiencing some financial problems which obliged it to employ a less experienced project manager for a lower salary (less experience = less salary). The company has come to understand the necessity for a more experienced project manager, even if such a manager is more costly. From this example, it is clear that the experience and management skills of a project manager are of fundamental importance to complete projects within time, cost, and quality.

2. Establishment of a water supply network in Tripoli

The project is the establishment of a water supply network in Tripoli. This job was given to five companies. In the beginning, work went well, but after some time, finance was reduced and accordingly the performance of the companies also reduced. Some of the companies lacked the experience to complete the job. Infrastructure work requires underground maps of existing work, but the engineers did not have these maps. The proposed duration of the project was three years, but there were no detailed plan for its implementation and, in addition, import of material was delayed. Moreover, the construction caused problems with telecommunication, traffic and transport in the city. All these problems combined to delay the project, with the contractor blamed for the delay because at that time most of the materials were supplied by the state. It was bad planning and lack of experience by the contractor which caused the delays and failure of the project. Clearly, if the senior project manager who was appointed by the contractors

had the necessary experience and authority, and was appointed early enough in the project, then the necessary preparations – obtaining essential plans and maps, liaising with the local transport authorities, etc. – would have been carried out and any unavoidable delays planned for. Also, it is possible that avoiding delays could have helped avoid the reduction in finance, and the delays in deliveries of materials could have been managed in such a way as to have had considerably less impact on the project. From this example, it is clear that one of the major problems in this project was the lack of experiences and authorities of project managers. To eliminate such problems project needs a project manager with same background, experience and ability to complete the project within plan and taken into account to monitor any deviations. A successful project manager should have managerial and technical skills as well as should be responsible to resolve any problems occur in the site.

3. Road building project in West Libya

The project is a road building project located in the West of Libya. In this example there was a shortage of bitumen, the main material in such projects. In such a case, a project manager has to find solutions to keep the average daily production of work going. Generally, the project manager must propose solutions for all on-site problems, which should be approved by the management of the company. In this case the manager could, for example, have proposed storage of the material before use or to import it from abroad. But, because of the lack of experience of the project manager, the project was delayed and went over budget. From this example, it is clear that the project manager should have technical experience in order to guarantee success and avoiding failure of projects.

7.5.5. Impacts of Economic and Political Factors on Projects Success

This was one of the controversial issues discussed with the interviewees. Generally, according to the participants both economic and political factors impact on the success of a construction project in Libya. One Director described "there is no doubt that the economy is the backbone of development, and without state support, projects will be abandoned. Libya has a robust economy, but more or less, it depends upon imports from abroad which in turn depend on state policies and which consequently affect building projects. Economic and political impacts have definitely affected the sector which must have a clear, fixed and continuous policy (the policy of a construction sector)". The change of administrative structure in any sector requires several procedures, in Libya for example; handing over responsibility to a new manager takes about 2-3 months, this is because the new manager has to study and visit previous projects and prepares new a demonstrative structure (change of personal positions, and change or adjustment of the structure of the organisation). Such transition periods affect the time schedules of projects which in turn negatively affect building projects in Libya, explained a CPMC. The stability of management therefore plays a role in project success, and project delay may be due to unexpected economic factors, for example when a given project is suspended for six months on account of a change in leadership of the project, or when prices of materials and labour increase. This will affect the budget of the project, because the contractor will suspend work and ask the employer to compensate for the said delay. In order to avoid any failure, there should be a long term policy plan which is updated and adjusted when needed. One Consultant stated that "Economic changes must, to a certain extent, be taken into consideration when deciding the budget of the project. Responsible changes can be anticipated, but not large-scale affected Libya

building projects. Therefore, stability and approving policy is a must for the construction sector, there should be a longer term plan to avoid postponing one project for the sake of another ".

A Project Manager and one Director added that these factors had something to do with the failure of some projects in Libya. For, example, delay in the payment of due amounts will certainly lead to delay in execution, and create critical problems especially for small and medium size companies. There is instability in the Libyan market as well as institutional instability in the construction sector. Jobs are given to small companies who do not have the experience to execute such projects. Also, local companies lack skills and are unqualified to complete projects. "The global crisis and of the fluctuations of prices has affected big projects which depend upon importation of materials from abroad. Also, a lack of planning plays a role in the failure of some projects simply because there are no fixed period plans for construction in Libya. As a result, there are a number of projects in Libya which are either pending or delayed due to the lack of planning time schedule and budgets" explained one Consultant.

In order to enhance the levels of success within construction projects there needs to be greater economic stability and clear policy of construction institutions, real desire for project implementation, the need to have mechanisms for implementing the plan in a sustainable manner, existence of skilled staff to implement project plans, transparency of policies for regulating the public sector (policies with fixed regulations), providing work loans to obtain ISO 9000 certificate, and simplification of taxes, one Consultant stated. As a result, 80% of projects are being implemented without studying the problems that have already affected the building sector in Libya. Projects are

implemented haphazardly without actually considering the needs of such projects, or the extent to which such projects are helpful to the state or its citizens.

7.5.5.1. Impacts of Prices Fluctuations on Construction Projects

According to the participants, prices change has its impact on the construction sector in Libya. "For example, a company signs a two year contract in 2006, 50% of the contract will be implemented in 2006, while the other 50% will be completed in 2007. Accordingly, price change will have an impact on the company even if they put in a risk ratio", an example given by a Project Manager. A Director explained "In Libyan legislation, the contract is binding for the two parties, and if the contract was signed by the two parties on the basis of a fixed price, the contractor will shoulder any increase in the cost of raw materials and labour unless otherwise provided in the contract. Usually, the contract includes the contract value as well as the duration (time schedule), and usually there will be no big change in the price in duration of small contracts (maximum three years), but the problem arises if there is a delay. In such a case the contractor will go to the employer asking for an extension on the basis of some contract prices. The delay is due to the contract so the contractor has to shoulder the increase (the risk)".

Another problem which often confronts construction companies are delays in payment of their due amounts upon which the companies depend to run their activities. Such delays create financial problems and affect their ability to fulfil their obligations. Moreover, the state imposed restrictions on workers along with fluctuation of prices affect the budget of the project and consequently its chances of success, a Consultant said. As for the rate of exchange of Libyan Dinar (LYD) against foreign currencies,

usually it is fixed in the contracts. But in case of a change in prices of materials or currencies, the contractor will take the risk.

7.5.5.2. Impacts of Economic and Political Factors, and Contracts System on Foreign Construction Companies

Foreign companies are always seeking an organised, regulated environment for their contracts. For these reasons, some companies have refused to come to Libya, even though others have already signed contracts in Libya. Most of the international companies have executed work in the Gulf area (Qatar, Dubai) where each state has its contracting system, outlined one Director. The majority of participants agreed that the Libyan construction management system needs to be improved and the persons responsible for preparation of such contracts should be better qualified. Such persons should be aware of the competition worldwide. Moreover, "available construction contracts in Libya need to be reviewed and reconsidered; otherwise we shall lose big international investors and consequently depend upon small local or foreign companies who lack enough experience for the required completion" added a CPMC. With regard to the selection criteria for construction companies, in the past the process of selecting companies was not clear, because there were no specified criteria for the selection. The situation is a little bit now better concerning this point, though, there is lack of transparency. In general, the company's capacity for execution and its previously completed projects should at least be known prior to selecting them, suggested one Director.

Certainly, the economic and contracting system impacts on the foreign construction companies. In order enhance and develop the construction sector in Libya through

giving jobs to the big successful international construction companies, there should be standard regulations, and fixed norms for the contracting system.

7.5.6. Relationships between Cost, Time, and Quality to Project Success

As identified in the literature review, and agreed by all participants, there is a close relationship between time, cost, quality and success: duration of a project affects cost, both time and cost affect the quality, and each of these three factors affects the success of the project. "There is a close relationship between cost and the time schedule because if work is completed within time schedule, cost will be achieved. And if the said completion was done according to specifications the quality will prevail" confirmed a Construction Manger. Quality is an important aspect that should be considered; the quality of works is always related with the quality of materials, and the time, two examples were provided by a CPMC: "If a specific component of a project requires time before starting on the next stage, and this time is not taken into consideration, it will definitely affect the quality. Concrete works needs 24-48 hours (period of curing time for concrete) before entry to the next stage. Another example; after plastering, walls need enough time to dry before paint can be applied. If these times were ignored, the quality of work would not be achieved, and this would affect the success of a project". There also is a relationship between cost and management, said a Project Manager. An example for this is "Cost estimation is required for a given project as well as a budget and primary study. Cost of one project is, say, 100,000 Libyan Dinar (LYD), the profit should be 20-30% (this might seem high compared with other countries), but if there no control on purchase of materials, there will be no profit. In order to avoid any negative effect on the profit, there should be control of cost from the beginning of every stage of

a project (once the project starts), there should also be control on purchases and labour force prices. Cost variation in the range $\pm 5-10\%$ is allowed in the project and should not affect the success of the projects (risk value, and always mentioned in the contract).

Implementation is supervised, and quality usually means more costs. The problem is how to have quality of implementation at reasonable cost, said a Construction Manager. An example was also given, "suppose that one project was proposed, and three tenders were submitted by three different companies. Naturally, the job will be given to the lowest tender regardless of any other circumstances (e.g. quality), the reason behind that is that the client is always looking for the lowest prices". Management should be open-minded as well as price-oriented when selecting the successful tender even if the cost is higher, or at least authorise a specialised firm or a consultant bureau to select the winner and to follow-up quality control. Large companies usually give higher quotes in their tenders, because they are considering the quality. "If you want quality, you should be careful about the specifications, and accordingly, sometimes you will have to pay extra for obtaining the quality" said, one of the Directors.

There are a number of projects where time was a factor and/or the project lacked quality although delivered on time. The outcome differs from one project to another because some delayed projects were affected by a combination of factors, e.g. poor choice of materials and methods of implementation, when even one of these factors is enough to affect a given project, explained a Project Manager. As mentioned above there is a close relationship between time, cost, and quality, and in Libya a company could face problem related to cost, time, and quality due to the instability of prices of materials in Libya. To counteract this foreign companies usually propose a high risk factor which

will increase the cost (the reason behind this is that the contractor wants to guarantee his investments). Also contractors usually propose a price which assumes that the given time schedule is not enough for completion as per specifications, and that some projects in Libya were completed within time but the quality of implementation was bad, explained a CPMC.

Clearly, there is a strong correlation between time, cost, and quality. In order to complete a project successfully (within budget, on time, and of acceptable quality), the client should be careful when estimating a project's cost and time schedule, as well as the selection of a suitable contractor to obtain good implementation with high quality.

7.5.7. Factors Affecting Construction Projects Success

The literature review identified factors affecting construction projects success, but there are too many factors that could affect the success of any project to discuss them all, and the effect of the factors differ different from project to another, and from one organisation to another (depending on circumstances). This section presents the most important factors that affect the success of construction projects in Libya.

7.5.7.1. Planning

Adequate planning is an essential factor for any project to succeed. The majority of participants concur that a lack of proper planning has affected the success of a number of construction projects in Libya. In order to complete a project without any problems, planning should be done in advance with regular follow ups (good planning - better results), identified one Director. Before starting any project, there should be proper planning carried out for each stage, as such plans will be used to achieve the project's

goals. One Consultant said, "Proper long-term planning at the design stage should take place before beginning work, especially in design and build contracts which are supposed to have a special strategy (because in design and build, plans are prepared, are phased)". A Project Manager also stated that, "If the implementation period for a project was relatively short and the project was longer, this will affect the cost. Therefore, good planning and proper designs are the key issues which should be kept in mind (accuracy of design affects project success)". Some projects have been implemented without a plan and without even looking for the benefits behind those projects.

7.5.7.2. The Implementation Company (The Contractor)

As a result, and as agreed by a number of the participants, some projects have failed because of bad implementation (lack of experienced of contractors). The experience and the background (previously implemented projects) of contractors are very important for project success. One Director said, "Proper choice of the implementation company is very important; there should be a mechanism for evaluating companies and a number of projects which they have previously executed. Giving jobs to unqualified companies will definitely lead to much delay". Another Director added; "Unqualified contractors who do not have enough experience and knowledge e.g. culture and language will affect the success of a construction project". The quality of a company's management could be known from the implementation program prior to the commencement of the project, or from the planning program in implementation works, explained a Project Manager. Selecting a contractor who has completed previous similar projects based on pre-evaluation of contractors and a contractor ability to work in different locations with

different weather conditions are a factor in the success and/or failure of construction projects.

7.5.7.3. The Management

As discussed earlier, the management system (within the Libyan construction sector) has affected the development of the sector. The majority of the interviewees described the management system as weak and has actually detrimentally affected the building sector. One Project Manager said, "Management is a very important factor for leading any project to success, as well as for the proper use of resources". Overall, the top management is responsible for updating the management system and management methodologies, as well for making the management system easy to use and understand.

7.5.7.4. The Project Manager

From the literature review, it is clear that the project manager is considered one of the most fundamental elements that could lead a project to success, depending upon his/her personal and managerial skills, knowledge, and experience. Supporting that, one Director and Consultant stated that the wrong choice of a project manager, who does not have the necessary experience, qualifications, ability to plan, ability to work in different weather condition e.g. hot weather, and make decisions (ability of the project manager to lead the project) is considered one of the most significant factors affecting the success of construction projects in Libya. According to a number of the participants, to run successful construction projects a project manager should be well qualified, experienced, knowledgeable (e.g. aware of culture) as well as be selected for the right project. (In-depth explanation for this factor was identified above, see Section 7.5.4).

7.5.7.5. Fluctuation of Prices

As discussed earlier, fluctuation of prices as a consequence of an inadequate contracting system (e.g. fluctuation in the prices of materials) is considered as a factor for failure. As a result, about 90% of the materials in the Libyan market are of foreign origin except cement and steel and, usually, there are delays and problems arise in the importation of materials relating to specifications, explained, a Project Manager. According to some interviewees, this problem has affected some projects in Libya, and the reason behind that is the management and contracting system, as well as economic factors. (For fuller explanation see above, Section 7.5.5.1)

7.5.7.6. The Contractual Procedures

The majority of participants acknowledged that the previous contract and tendering procedures have impacted the success of construction projects, but that nowadays the situation is a bit better, but still needs to be up-dated. One CPMC said "Contract procedure is out of date and might be one of the problems in the field". The design and build contract procedure is not generally practical and should be used only in specialised public projects. The Cost Puls method will reduces losses and is more appropriate, especially in a market with price fluctuations, and allow the company to render a higher quality service, suggested one Director. In order to obtain effective contractual procedures, and avoid failed projects due to the bad contractual procedures, it is very important to up-date the contract procedures from time to time, as well as identify and correct the weaknesses in the old contract procedures.

7.5.7.7. Cash Flow

Clearly, a problem due to the cash flow was one of the most problems that faced the majority of construction companies in Libya, and was a reason behind the failure of some projects in the field. This problem may be linked with two important elements; the financial strength of the company (some companies undertake jobs without adequate financial strength), and there may be delay in the payment required from the client. One Project Manager said, "Sometimes you find uncompleted, pending or even cancelled projects due to non-payment of amounts owed to the contractors; this is the weakest link in the system in Libya". Another Project Manager also stated that, "Delay in payment of due amounts affects some contractors who sometimes cannot continue with their work (no money = no work = no progress in work)". Thus, it is essential to provide the required cash-flow and payment of the amounts due to contractor and consultant on time. In addition, the financial strength of companies should be taken into account before selecting any company for a project.

7.5.7.8. Decision Making

As identified in the literature review, decision making is very important to success, and considered one of the most important managerial skills that project managers and top management should have. According to the participants, making decisions was a big problem for some managers (either an inability to make decisions, or making wrong decisions), which affected the success of some projects. One Consultant said, "Some officials are afraid of decision making (they might will not give the right decision, and they may give decision without achieving any result)". One of the Directors identified "Any project worldwide may confront some problems, but managers should be ready to

deal with such problems. Decisions makers should take the time to consult their advisers before making any decision". They should stop giving strategic or big projects to companies or contractors who lack implementation skills and experience, said, one Director. In addition, the ability to make decisions should be taken into account before selection of a project manager; he/she should be high qualified, experienced, and able to make the right decisions when problems occur, as proved by their track record in the industry.

7.5.7.9. Supervision

Generally, supervisions on construction work in Libya affected by inexperienced people. "A supervisory body in Libya needs skills and experienced consultants to supervise the projects" explained, one Director. In addition, engineers' organisations should be encouraged to supervise the projects instead of supervisory bodies, added, a Project Manager. In fact, lack of control was one of the most significant problems in the construction sector in Libya, affecting success of a large number of projects as well as some projects completed without the quality required.

7.5.7.10. Consultants

According to one of the Directors, consultants sometimes stand behind badly implemented projects (implementation without standard specifications, or completed projects without quality requirements), because they either make ill-informed decisions, or are afraid to make the right decisions to resolve problems. A consultant should be someone well-qualified as well as able to make decisions, knowledgeable e.g. culture knowledge and to resolve problems when they occur, stated one Director. There is a

new trend now to appoint a consultant, especially for major projects, who will supervise the implementation. Such consultants must be specialized, project-oriented and able to work in difficult project places. In cases where the employer does not appoint a consultant, his/her technical management should be experienced, one Director explained.

7.5.7.11. Health and Safety Management

The participants have the same opinion that health and safety management is a very important element in the construction sector, and health and safety regulations should be taken into consideration before starting any project. Also as identified in the literature review, health and safety management should be in place before starting any projects. However, according to the participants, health and safety management within Libyan construction projects is not well implemented, and is even neglected in some projects. As a solution to this problem, and also to avoid any failure, health and safety management should be the responsibility of top management and the project manager. As well as the health and safety regulations, CDM should be applied by all workers in the project. Furthermore, for any project there should be a person responsible for the implementation of health and safety regulation in the site.

7.5.7.12. Administrative Procedures

The majority of the interviewees stated that the administrative procedures due to the management system in the construction sector administrative procedures in general are complicated, but especially concerning payments and customs clearance. "Most projects have witnessed a delay in implementation" said one Director and gave an example, "The Wadi Al-Meginin project, there was a lack of coordination between relevant authorities

to put together a unified program to complete the project in time. The national work force should be trained to insure the works are correctly implemented, but some projects require a specialised labour force, invariably from abroad, and this is not accepted by the competent authority". And as a result, such procedures have affected the success of a project (too long a duration, as well as budget overshoot). To resolve such problem, there should be a proper implementation plan, and the administrative procedures should be flexible and easy to deal with.

7.5.7.13. Tendering Method

As discussed earlier, some projects have failed due to the lack of experience of the contracted companies carrying out the work, as well as the poor financial capacity of the companies. The reason is that during the tendering stage, the jobs were given to unqualified companies (e.g. works given to companies with no relevant background). In some projects in Libya, the contractor submits his document and starts work, but later on it is discovered that the contractor is unable to complete the project (this may be due to the lack of experience, and/or due to poor financial support), explained, one Director. There should be an accurate evaluation of tenders from both technical and financial points of view; the selected bidder should be financially robust, added, a Consultant. "After submitting tender documents and evaluation of contractors who will implement the works, some points should be considered, such as: stability of employer's management as a matter of extreme importance to the contractor because change (if any) will have a negative effect on the project; and the employer is the party who has the right to change a project manager simply because his/her job is a critical one", outlined one Project Manager. This factor has affected a number of projects in relation to time,

cost, and quality, and some projects have failed because of this factor. To resolve this problem, there should be transparency when selecting contractors, as well as an accurate evaluation of tenders from both technical and financial perspectives.

7.5.7.14. Use of Technology

The use of technology plays a big role in the success of modern construction projects; however, this technology is not widely-used within the construction sector in Libya. "The use of technology especially for large projects is needed, because in large projects the use of traditional techniques could affect project success (time)", explained, a Project Manager. Some national companies still use traditional techniques such as concrete mixing manually on the site and moving the concrete manually to the upper floors rather than use cranes. This will contribute to non-completion of projects on time, and will also affect the quality of the build. In order to resolve such problem, it is important to look into the company's ability for implementation and the company's profile (e.g. previous implemented jobs) before giving any work to the company.

7.5.7.15. Relationships

As identified in the literature review, good relationships are required between all parties involved in any project. One of the Directors stated: "It is important to specify accurately the nature of the relationship between project implementers (employer, consultant, and contractor), as well as their relationship with other relevant parties". One Director continued by explaining that, in order to minimise problems there should be a strong relationship between the project manager and others (e.g. top management, contractor, consultant, construction manager, and the contractor's project manager).

According to some participants, this relationship is lacking in some projects in Libya, which was a reason behind the delays in some projects. There should be a clear relationship between all implementers in the project in order to complete projects without any problems.

7.5.7.16. Consistent and Sustainable Policy in the Building Sector

For the success of any organisation in the construction sector, there should be a strong policy regarding consistency. According to the majority of the participants, the construction sector in Libya is suffering from this problem, because there is no culture and policy of consistency; directors of departments, managers and senior personnel are changed frequently sometimes every year or two, and each new director inevitably wants to adjust and change the sector's policy. In order to enhance and develop the sector there should be a consistent and sustainable policy (updated from time to time), and long-term plans which take assess the promised benefits of projects before implementation against those achieved after completion.

7.5.7.17. The Private Sector

This factor is also related to the policy of the construction sector. "In the past there was no involvement of the private sector in construction projects, which was a reason behind the slow growth of the sector. This involvement of the private sector in some projects will lead to its success, e.g. the budget of a given project should be distributed as following: 60% by the state and 40% by the private sector", one Director, explained. This will give more stability and enable the sector to grow and develop faster. Also this

will give the private sector a spirit of competition to invest their money, hence the sector will develop, grow and enhance faster.

7.5.7.18. Training

More training for site staff and in particular for site managers, workers, and sub-contractors is needed. It is recommended that site staff should have training courses, and workshops in the construction process. "The lack of training definitely affects the progress of work, and to resolve this problem there should be specialized training, workshops with a hands-on approach", a Project Manager explained.

7.5.7.19. Monitoring

As discussed in the literature review and agreed by some participants, in order to obtain successfully completed projects without any problems (e.g. delay) there should be monitoring of each stage in a project. Lack of monitoring by the employer until the completion of the project was significant reason behind delays, and the failure of some projects, a Consultant claimed.

7.5.7.20. Quality

Clearly, quality is considered one of the fundamentals for project success. As identified in the literature review and also agreed by the interviewees, poor quality has been identified as one of the causes behind failure projects. Using material inconsistent with specifications will certainly lead to the need to change them, which will increase cost. According to one of the Directors, the use of materials which are not consistent with specifications has caused a lot of problems in the past. In addition, some projects have

been completed but with inferior quality work, which caused problems between the clients and the contractors. This could be due to the lack of experience of project managers, as well as some the contractors (some contractors, especially new contractors in the field lack experience and have poor financial support), a Consultant, explained.

7.5.7.21. Transparency

Transparency is considered an essential element for any work to be successful. The transparency is necessary especially in the selection of contractors, project manager, consultants, and the management. Lack of transparency will lead to a negative effect on projects success, and reflect badly on the behaviour of people. More transparency within the construction sector is needed especially for the selection of implementation companies (contractors), project managers, and consultants as well as the top management.

7.5.7.22. Risk Management

Proper risk management, which includes consideration of any risk that affects the success of the construction project (e.g. something happening to the main plan, deviations from the time schedules etc.) is a factor that could influence the success of construction projects but which is not a priority in the Libyan construction sector, said one Director. It is clear from current literature that risk management can play a very important role in a project's success. "Risk management should not be neglected, and should be in place before starting any project", one Project Manager explained. It is one of the project manager's responsibilities to assess the risk, estimating the risk before it occurs, and dealing with the problems properly to meet the project's goals.

Health and Safety is a sub-set of risk management and to ensure that this risk is controlled there should be sessions and available information (e.g. signs) concerning risks for the site staff, and all the site staff should be aware of the health and safety regulations. A good Project Manager will actively manage to reduce such risks.

7.5.7.23. Communication

The majority of participants had the same opinion that inadequate communication causes delay and affects project objectives. For successful projects, effective communication should be in place, before and during the implementations processes. This will enable the participants to understand and achieve the project objectives. According to one Project Manager, "To make sure the project's objectives are achieved, an effective communication is needed in the project". In order to meet the project criteria, there should be lines of communication between all parties who are involved in a project, added one of the Directors.

7.5.7.24. Management System

As discussed earlier and also agreed by the majority of participants, the management system for the construction sector needs to be improved. As one Consultant said, "There should be good management practices and understanding of responsibilities and targets". Good management system will confer important advantages on the sector. Furthermore, the improvement of the project management system and the management methodologies for construction projects will enhance the level of success within construction projects.

7.5.7.25. Sub-Contractors

The lack of experience, knowledge, skills, and techniques of sub-contractors is one of the main hurdles to the successful implementation of projects. It is generally agreed that sub-contractors should be trained in different skills and techniques before selected to do any works. "In administrative contracts regulation, the contractor has no right to sub-contract for completion of a part of the job unless with the approval of the project manager. Such approval should be given to qualified sub-contractors only", one Project Manager, explained. In addition, the principle contractor sometimes feels let down because the lack of efficiency of the sub-contractors, which will cause problems between the client and the principle contractor. However, some contractors in Libya are giving jobs to unqualified sub-contractors (the cheapest) in order to obtain a larger profit. As a solution for this problem, there should be restrictions on the contractors about their sub-contractors. Such sub-contractors should have a high level of knowledge, skills and ability of finishing tasks under different circumstances e.g. weather conditions in order to enable them to complete jobs properly and on time.

7.5.7.26. Project example (Branch for the Central Bank of Libya)

This section presents an example of a project which failed due to unknown and mysterious factors (political issues); this example was given by one of the Directors during the interview.

The project is a new branch for the Central Bank of Libya. Initially preparation for the project was proceeding satisfactorily as designed by the National Consulting Bureau (NB). The chosen design was submitted to the Central Bank of Libya, and tendering

was entrusted on an executing company. A great deal of effort was put into the project, but it was not implemented. The proposed date of commencement was 1986; the proposed date of completion was 1986; and entrustment of the project was 1986. In spite of the large amounts paid for the design, this project has now been cancelled for unknown and mysterious factors. It is commonly believed in the industry that unknown factors such as these are political at root.

From this example it is clear that long-term policy, long-term plan and transparency are needed for the construction sector. As a result, amount of money has been spent for the project as well as conflicts between implemented company and the client have been occurred. In order to avoid such problems and develop the sector in the future, there should be studies and a clear awareness of the needs of the sector. The policy of the sector must be based on the needs and the benefits from projects that need to be implemented.

7.6. SUMMARY OF THE CHAPTER

The chapter presents the qualitative data collection and analysis of interviews within the research project. This phase of the research is the second main source of primary data for the development of the successful construction projects framework. The chapter started with a brief profile of the organisations, containing information about the size, operations, management system and activities of the organisation. The selection criteria for the organisations and the interviewed staff are presented as is information on the experience and the current positions of the staff interviewed. The chapter also described the tools and methods used for data analysis in addition to other documents and reports (project examples) collected from the interviewees while interviewing them. The

presentation of themes and patterns which emerged from the data analysis formed the major part of this chapter. Within the construction sector in Libya, there are many factors affecting the success of projects. The complicated administrative procedures, weak management system, old contractual system, lack of planning and wrong selection of the implementation companies and project managers were identified as the main causes for delay and failed some construction projects in Libya. Importantly, the economic and policy (weak policy for the construction sector) factors were identified as the reason for the delay of the construction development in Libya. The data analysis also confirmed that there are a number of critical success factors affecting the success of construction projects; and these factors have been identified from the quantitative analysis reported in Chapter 6. In order to ensure that projects success, these factors should be evaluated and improved. This chapter has also identified barriers which projects must overcome to reach success. Importantly, the barriers that have been identified will be used to improve and enhance management methodologies and ensure that construction projects are better implemented. In the following chapter, a framework for the successful construction projects in Libya will be developed based on the literature review, and the analysis of the questionnaires and interviews.

Chapter 8

The New Construction Projects' Framework Development

8.1. AIMS OF THE CHAPTER

In the previous two chapters the results of, and findings from, the analysis of the interviews and questionnaires were presented. This chapter presents the development of a framework for improving the success of Libyan construction projects based on the findings from the primary and secondary data, and so coordinates and integrates the issues raised in the literature review, interviews and questionnaire survey. The quantitative and qualitative chapters (Chapter Six and Chapter Seven) have identified several factors relating to the success of Libyan construction projects. In this chapter the relative importance of these factors is indicated by such phrases as “important”, “very important”, “most important”, “key factor for success” and “critical for success”. The sources of data for the framework development are given. The most significant factors that affecting the success of construction projects have been identified, and the appropriate solutions to problems clarified. Finally, the chapter concludes with a summary.

8.2. SOURCES OF DATA FOR THE FRAMEWORK

The research project employed both primary and secondary research methods for data collection. The secondary data were collected through an extensive literature review which identified possible causes for Libyan construction projects failing to be successful. From the issues identified by the literature review, a postal survey questionnaire was designed as the primary research method. This survey was conducted in four different organisational groups comprising contracting organisations, consulting firms, Government departments and Universities, in each of the geographic zones by

8.3. INTRODUCTION TO THE FRAMEWORK

Based on the findings from both analyses (quantitative and qualitative), introduction to the framework is illustrated as follows.

Currently in Libya, the role of a project manager is not a specific discipline, and is a role assured by different individuals within senior management when the need arises; project managers have no say in appointing the contractor, consultants and the design and plans for a project. Whenever, a problem arises with the contractor or other parties they are referred to different individuals within management. This is far from the ideal scenario, and often causes confusion as to who will resolve the problem, with consequent delays and increased cost being incurred. Presently there are no specific criteria for selecting a project manager and any individual experienced in project management, however limited, can be appointed as a project manager and projects can fail due the weaknesses of the project managers. Such selection, carried out without standard criteria, inevitably means there is no transparency in the selection process.

The selection of the contractor also does not follow set guidelines; it is usually done informally by committees. This informality means that contractors with a poor financial record, inadequate knowledge and lack of a relevant background will often be appointed responsible for construction projects which then fail due to delays and cost overruns. All too often the contractor's workforce lack the necessary knowledge and experience due to adequate training (this applies particularly to site managers), which is directly related to Government policy for the construction sector. There is no mandatory or specified training scheme for construction workforces to provide well-trained and qualified workers.

Regarding projects funds, the biggest public-funded projects are controlled by government agencies which have resulted in a slow growth of the construction sector. The absence of a private sector has been one reason for the slow growth and development of the sector, because of the lack of a spirit of competition.

Contractual methods and procedures tend to be old and have not been updated. Contractors suffer from delays in payment (their financial receivables) which causes delays in many projects (cash flow problem). International construction companies are refusing to tender because the types and terms of the contracts are not compatible with their needs, and process problematic.

The management methodology within construction organisations is unstable and complex. Changes in personnel negatively impact on the success of construction projects in terms of payment and administrative procedures. Although difficult to control because it goes back to personal circumstances, ethics and principles, it has to be said that bureaucracy and a lack of transparency, especially in the selection of project managers, consultants and contractors exists and heavily affects the development and improvement of the construction sector. Selection may be due more to social relationships and personal interests than the needs of the project. Communication processes and monitoring of projects are traditional with the absence of computerising system, which affects the development of the construction sector itself. With regard to the management methodology and communication within construction government departments, there is no computer system linking construction organisations, nor between construction organisations and projects.

Another aspect considered as a major problem within the construction sector in Libya is the lack of planning. There is no long-term plan nor is there a clear plan for the sector. Some projects are implemented without due regard for possible benefits and projects are implemented in the wrong locations.

Political and economic factors have introduced instabilities which hinder the success of construction projects, e.g. fluctuation of prices, an embargo in some past periods and the shortage of resources, restrictions on construction companies and restrictions on foreign workers. Such factors are also issues in the slow development of the construction sector generally in Libya.

There is a lack of the use of technology in both the construction organisations themselves and the implementation companies (i.e. both management and building technologies) and this has been another factor in the slow growth of the construction sector in Libya.

Inadequate top management support is considered an issue in the success of a large number of construction projects; such lack of support often means inadequate funding and delays in payment.

To complete projects successfully, project goals and objectives should be well defined. The lack of definition of goals and objectives by the top management or/and the project manager causes delays and problems in completing the projects as planned.

Lastly but also significant, there is inadequate monitoring of construction projects and the reason for failure of some projects to achieve the value for money triangle need. The

absence of monitoring and control in the construction sector causes problems in achieving time, cost and quality. Some projects are completed without achieving acceptable quality, others over-run, both of which could be alleviated with proper and adequate monitoring.

Table 8.1, shows the most important factors that affecting the success of construction projects in Libya as confirmed from the analysis outcomes.

Table 8.1: The Important Factors Affecting Construction Project Success in Libya

Number	Highly Significant Factors
1	The wrong selection of project managers;
2	The wrong selection of contractors and subcontractors;
3	The lack of planning and control;
4	The lack of knowledge and skills for project team;
5	Poor financial support;
6	Weak management methodologies and team;
7	Weak contractual system;
8	Payment problems during construction stage (delays of contractor's payments by client);
9	Weak policy for construction sector;
10	The economic and political factors (e.g. instability of economy, fluctuation of prices and lack of materials);
11	Poor top management support;
12	Absence of standards and criteria (e.g. selection criteria for project managers, contractors, consultants, and subcontractors);
13	Poor definition of goals and objectives;
14	Wrong use of management methodologies (management technologies);
15	Lack of health and safety management;
16	The impact of weather and culture.

From the primary and secondary data, the framework for enhancing and improving the success of construction projects in Libya recognises that:

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- a. Government construction departments are weak in terms of their capabilities in policy development, management methodologies, planning and monitoring, financial support, and contractual management and procedures.
 - b. There are no specific guidelines or standard criteria used for the selection of parties (consultants, contractors, subcontractors and project managers,). There is also a general misunderstanding of roles and responsibilities for project managers, and a lack of knowledge and experiences within the construction workforce.
 - c. This framework is a guide based on research conducted in the Libyan construction industry for improving and enhancing the level of success in Libyan construction projects, but is expected to be of use in any country.

8.4. CONSTRUCTION PROJECTS' IMPLEMENTATION FRAMEWORK STRUCTURE

The Framework for successful construction projects has been divided into the following parts, as shown in Figure 8.2, 8.2a, 8.2b, 8.2c and 8.2d:

1. Overcoming the External Factors within the Framework;
2. Achieving Success through Project Conceptualisation;
3. Project Staff Selection Criteria;

The linkages between the research and the developed framework are based on the literature review, questionnaire survey and interviews. Following the analysis of data, linked with the literature review, the framework was developed based on the themes and patterns that emerged from the analysis. The framework proposes solutions and

approaches that can be used to enhance the success of construction projects in Libya and improve the construction sector as confirmed from the data analysis.

Figure 8.2 presents the main picture of the framework; it consists of four stages including stages and components of the framework, overcoming the external factors within the framework, achieving success through project conceptualisation, and project staff selection criteria.

Figure 8.2a shows the stages and components of the framework; it consists of four parts with specific colour for each part in order to distinguish between the parts. The implementation of the first three parts will reflect on the enhancement of the construction projects and the development of the construction sector in Libya.

Figure 8.2b presents the external factors (economic and political) relating factors that needed to be taken into account to ensure that the success of construction projects and the development of the construction sector in Libya will be achieved.

Figure 8.2c illustrates the most important areas (Policy, planning, management and contractual management) and factors through project conceptualisations for achieving the success of construction projects in the Libyan construction industry. These points should be considered for the successful of construction projects and the improvement of the construction sector in Libya.

Figure 8.2d presents very important criteria and sub-criteria for the selection of the project team members (contractors, project managers, subcontracts and consultants) to ensure that the right people will be selected for the projects and this will reflect on the success of the construction projects.

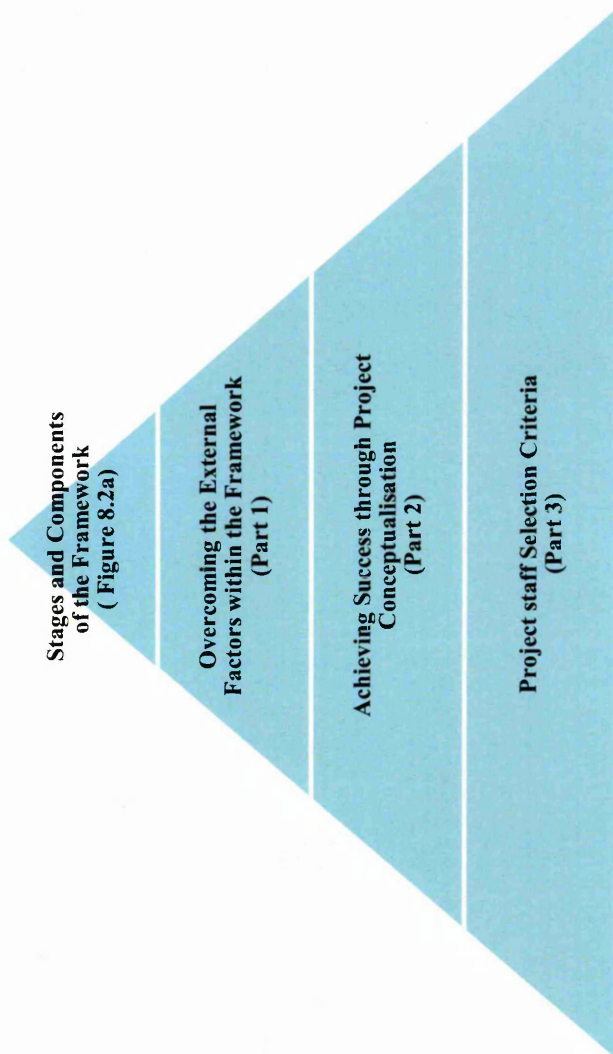


Figure 8.2: Hierarchical Composition for Improving the Success of Construction Projects in Libya

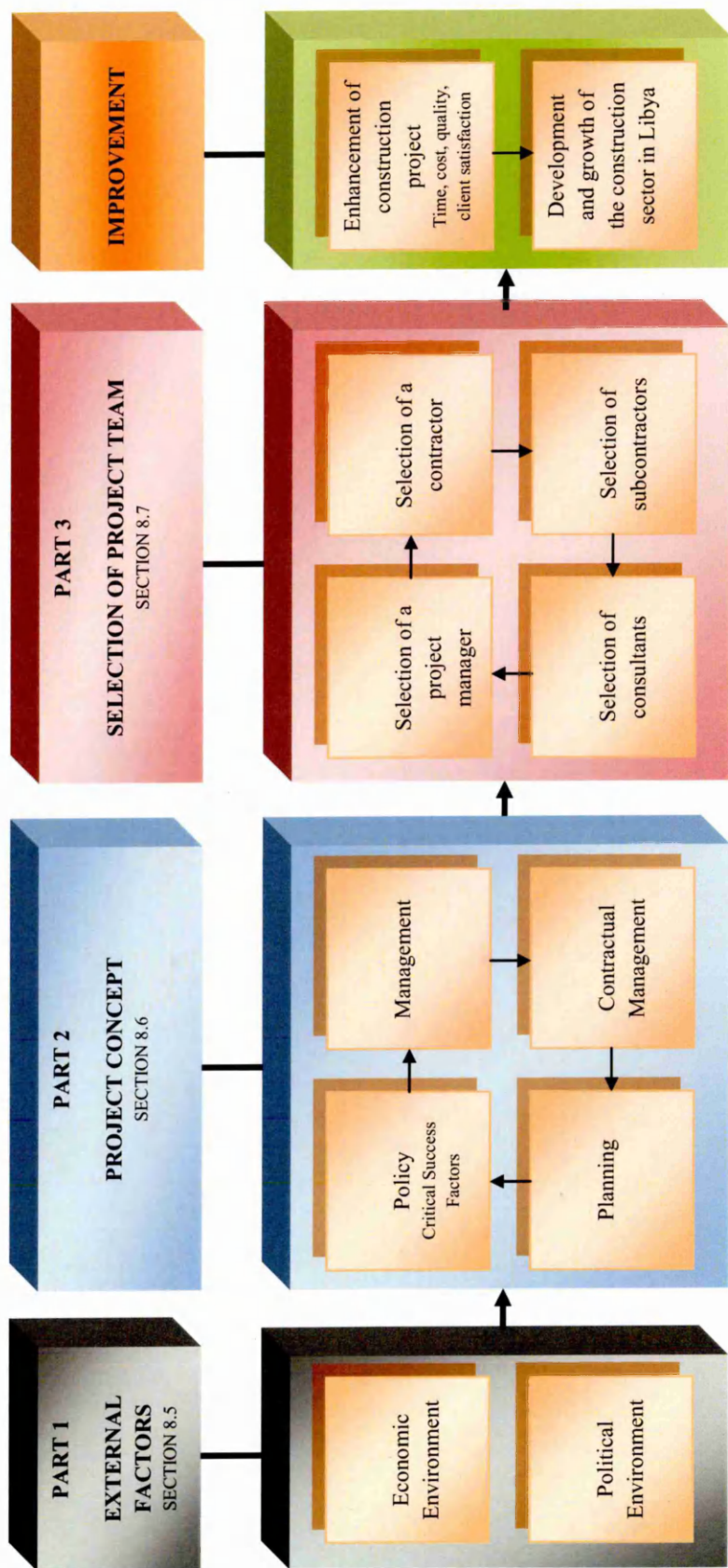


Figure 8.2a: Stages and Components of the Framework

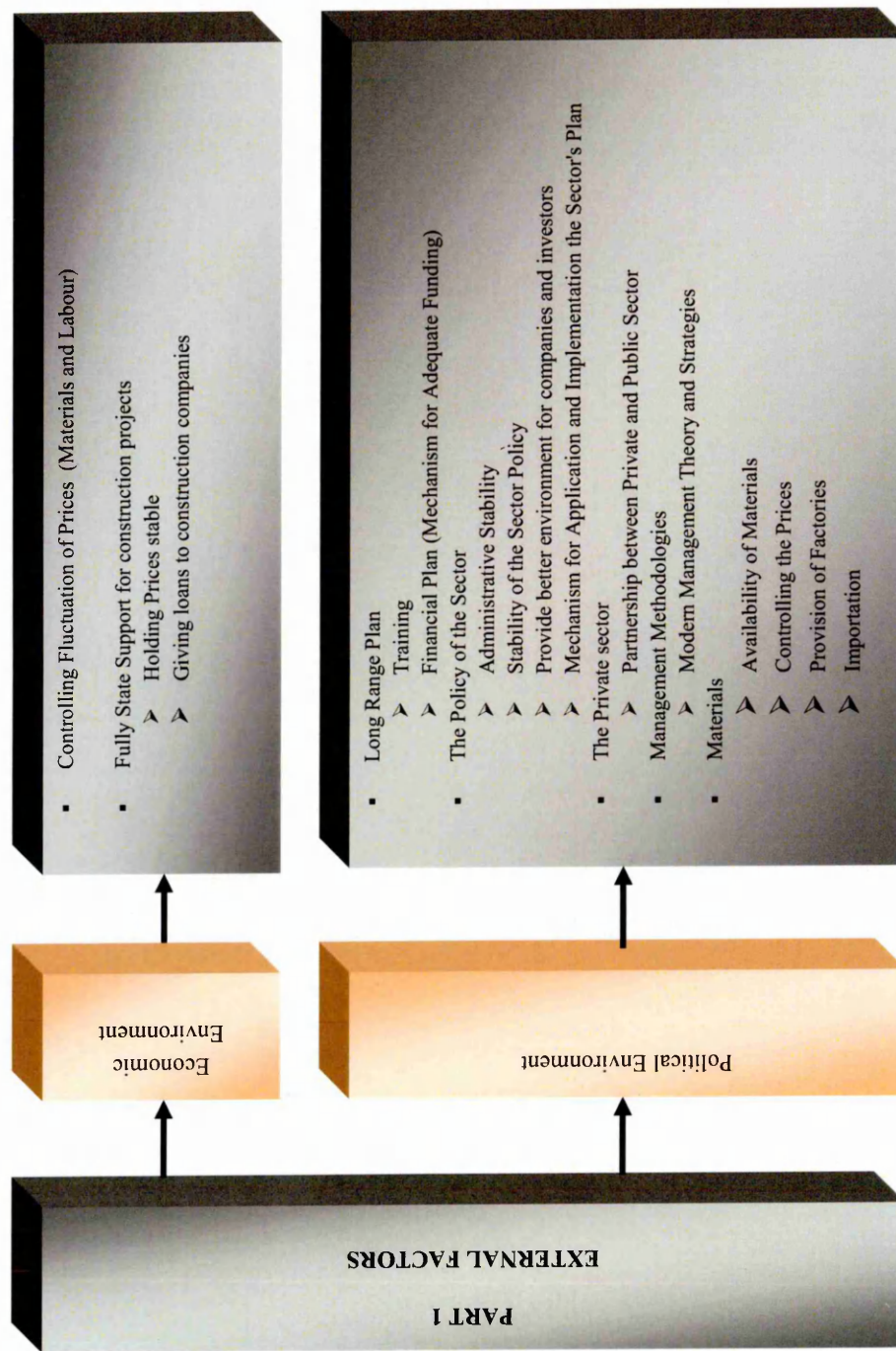


Figure 8.2b: Overcoming the External Factors within the Framework

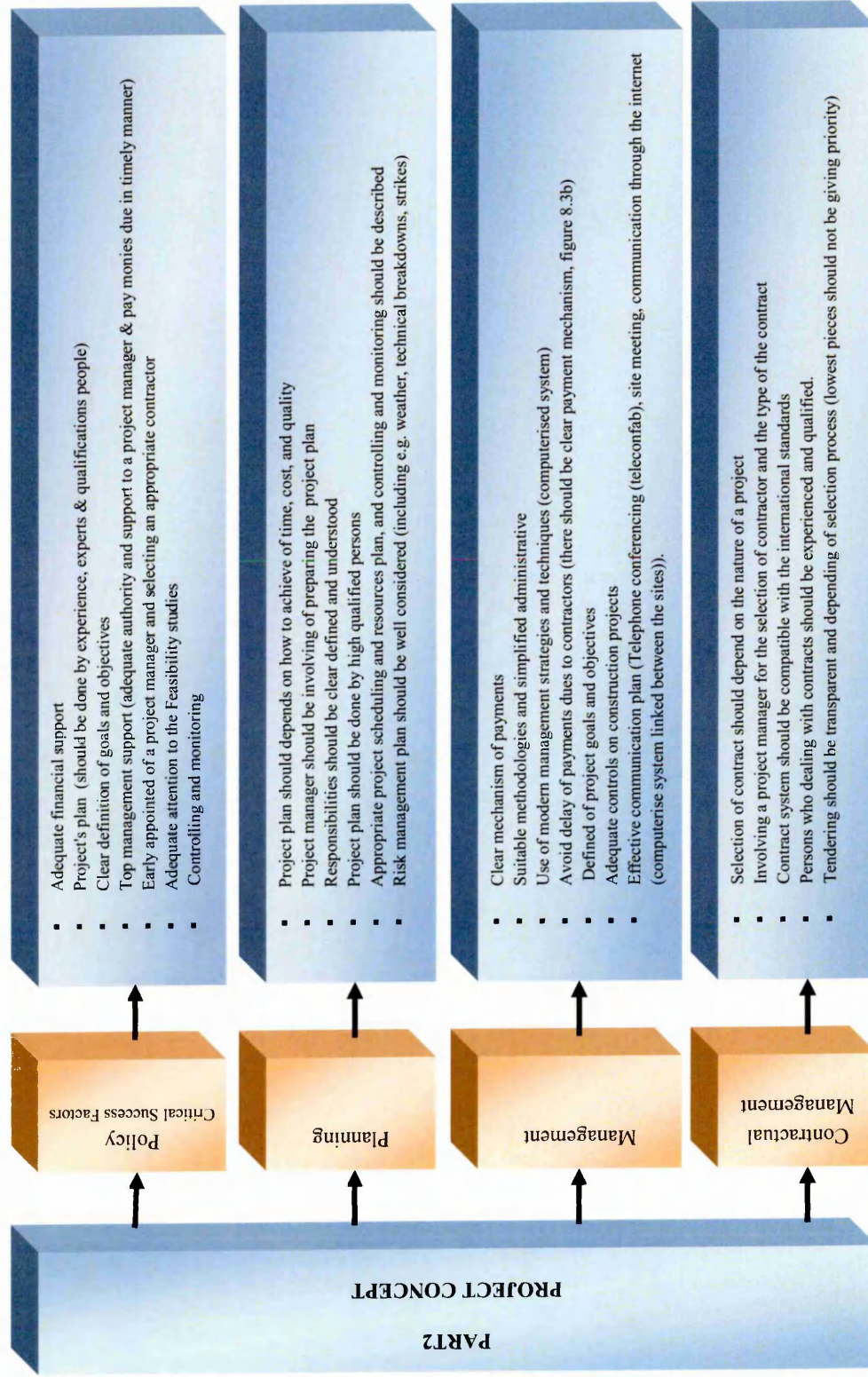


Figure 8.2c: Achieving Success through Project Conceptualisation

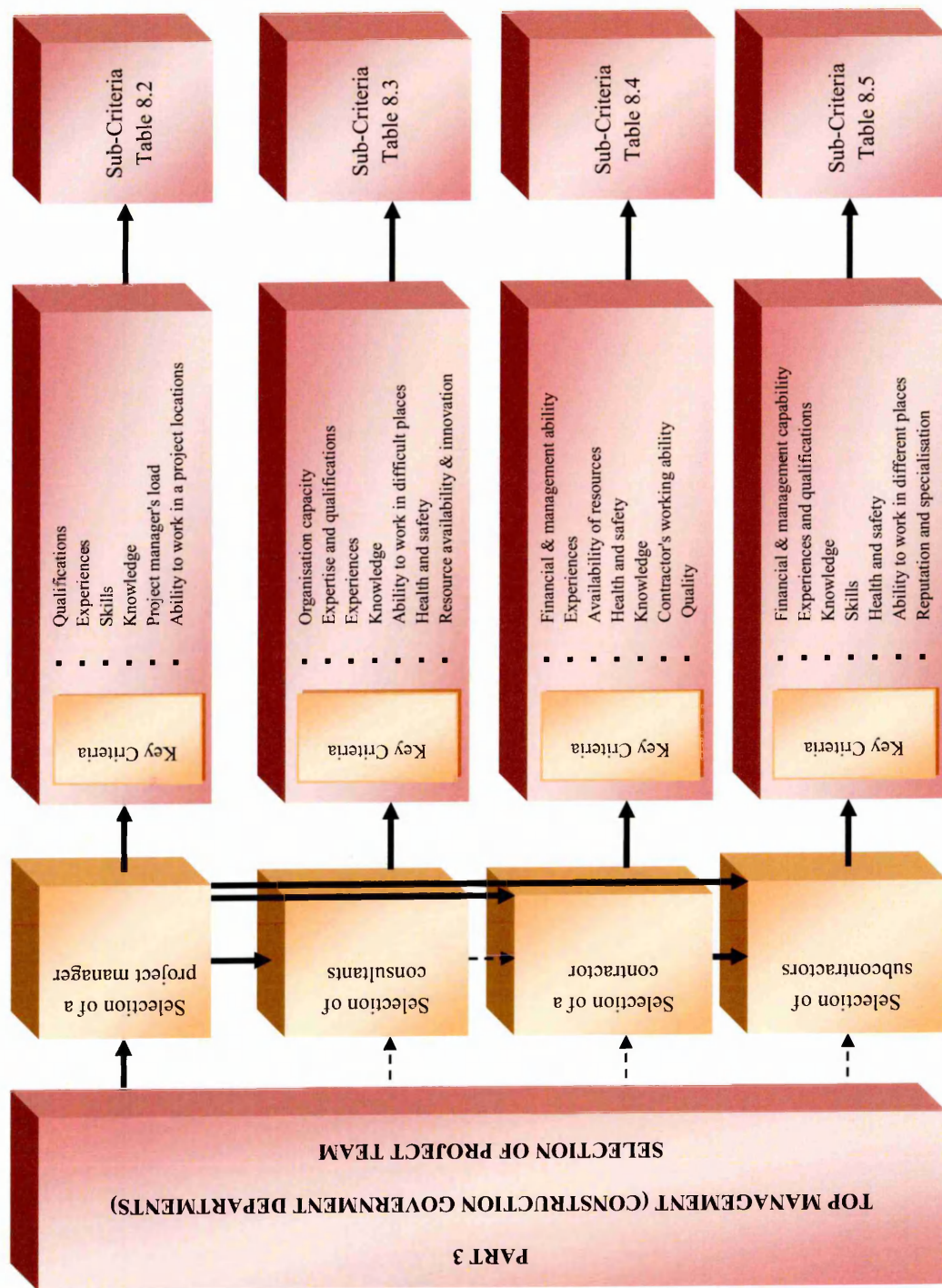


Figure 8.3d: Project Staff Selection Criteria

8.5. OVERCOMING THE EXTERNAL FACTORS WITHIN THE FRAMEWORK

Without a doubt there is a strong relationship between the external environment and the success of construction projects as confirmed by the respondents. This framework recognises that different components of the external environment, including the economic and the political environment will each have a distinct and different impact on the success of a construction project. The framework recommends the following external environment factors should be considered for successful completion of construction projects.

8.5.1. Economic Environment

Economic factors are very critical to the success of construction projects, and this framework recommends that economic factors should be clear defined in the contract(s). The responsibility of any economic change should be well understood by all parties before signing any contract. Also this framework suggests that fluctuations in prices, whether of materials or labour, should not affect any contract already signed, and this should be well described in the contract. In order to avoid any problems relating to delay or cost, any new economic factors should not be applied to projects already started.

Indeed as stated by a number of interviewees, there is a strong link between economic and the government policy particularly in the pricing of e.g. raw materials, food and rent and the fluctuation of those prices which can result in the stopping and/or suspension of construction projects because of lack of state support. When projects stop for a period of time this will reflect negatively on the project budget as prices of materials and labour will

change and disputes between the client and contractor will result. Hence, this framework recommends that the Government fully support construction projects by holding prices stable, and giving loans to construction companies (especially for median and small companies) is very important part that should be taken into account.

8.5.2. Political Environment

As the political environment factor considered one of the most significant factors that affecting the success of projects, this framework suggests that the guiding regulation and regulatory roles should be clearly defined. There should be a sustainable policy as defined in the literature review for the construction sector; and such a policy should be applied regardless any change of administration. The policy of the construction sector should be a policy which meets the demands and needs of people and society and these considerations should be assessed before implementation of any project. In order to develop and enhance the construction sector and improve the success of construction projects, the framework recommends that the following points should be taken into account.

8.5.2.1. Long Range Plans

A long-range plan is one of the most important factors for the improvement and development of the Libyan construction sector. Poor planning for the sector over the past years has narrowed the range of development of the sector through short plans carried out by individuals in the top management, and lack of planning that done by inexperienced people. Hence, this framework recommends plans/solutions for the construction sector to be developed and improved, including the following:

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1. Training

Invariably the majority of the workforce on a Libyan construction project will not have the knowledge or training to achieve good quality work, nor why and how to comply with health and safety requirements. Thus, for construction projects to be successful there is a need for adequate training of the project team members. Such training should be part of the sector's plan; hence, this framework recommends there should be training centres and departments supported by the Government. However, partnership agreements and development of training with more technologically advanced countries should be aimed at enhancing the efficiency of the project team. A construction skills certification may be necessary for project team members, especially the health and safety management. The training plan will benefit the sector and help to improve technical and management skills; help provide a trained and experienced workforce; ensure that project tasks can be properly completed; and enhance the level of quality of project implementation.

As lack of knowledge and skills was one of the most factors that affecting the success of construction projects in Libya, this framework strongly recommends that training should be considered in the sector's plan. The implementation of training will be as mentioned above through training departments and centres and with partnership with developed countries (transfer knowledge). Such training may be including culture, computing, and language lectures; the way that can obtain on knowledgeable people that can be able to communicate with other nationalities to work as one team without any problems of achieving projects' goals.

2. Financial Plan

Lack of financial support by the client (Government) is considered a serious problem that affects the success of construction projects in Libya as confirmed in the previous chapter. Failure to provide adequate funding resources to contractors for the work done makes it difficult for contractors to meet project objectives. Such lack of support is reflected in the development of the construction sector as the performance of implementation companies (contractors) will be affected. A mechanism of adequate funding for agreed projects should be properly planned. Hence, this framework recommends that a financial plan should be part of the sector's plan that ensures full funding of projects to be implemented in line with the agreed schedule. It has been known for new projects to be agreed at the expense of others already underway, and this certainly has a negative effect on the success of projects in Libya. To resolve this, the framework recommends that there should be priority funding which covered projects that already planned and agreed.

8.5.2.2. The Policy of the Sector

The general climate for the construction sector is one of the main reasons for the lack of success of construction projects in Libya. Poor planning, bureaucracy, fluctuations of prices, and unforeseen restrictions negatively affect the sector. Lack of administrative stability, instability in sector policy and the lack of standard prices are the most important factors that should be dealt with in order to enhance and develop the sector. Also, change of management personnel as the sector's policy and plan have been changed has been a reason

behind the slow development of the sector. To resolve this, the framework recommends the following points that should be taken into account in the sector policy:

1. Create and provide better environment for companies (e.g. foreign contractors) and investors in order to achieve the spirit of competition, and enhance and develop the construction sector. This will be through controlling the prices, stable policy and clear standards and roles.
2. There should be a mechanism for the application and implementation of the sector plan. This may be through committees consists of eminent persons with a high degree of experiences and expertise. These committees may be divided into sub-committees including financial, management and technical sub-committees which should be responsible for monitoring and implementing the sector's plans.

8.5.2.3. The Private Sector

Partnership between the private and public sector is one of the factors that contributes to the success of construction projects in Libya, and considered very important to the development of the sector. This will generate progress in the construction sector, create competition and that contractors and investors will feel comfortable implementing projects. Hence, this framework recommends involving the private sector in these projects, the idea being the private sector will bring enterprise which will contribute to the general growth of the construction industry.

8.5.2.4. Management Methodologies

The use of the correct management methodology is one method for improving the construction sector. Without doubt it will be the foundation for success. The traditional management methodologies using in Libyan construction departments reflect on the development of the sector (social relationship, exchange of interests, lack of legislation, lack of capability, and lack of funds). Hence, this framework recommends that the preparation of a structural system based on modern management theory and strategies, and the defining of responsibilities and tasks and should be put into practice in construction organisations.

8.5.2.5. Materials

Currently, the construction sector in Libya experiences shortages of necessary materials such as steel reinforcement and cements due to an artificial shortfall created by unlicensed suppliers. Steel reinforcement and cements are critical materials in any construction project and are a price-controlled item in Libya but often find their way onto the black market with the result that some of contractors have to wait months before getting a supply. This severely affects the progress of work. Fluctuation of prices not only affects the price of raw materials, but also affects the price of other materials and of labour. The price fluctuation in the Libyan construction sector may be due to demand exceeding supply, which creates scarcity of goods and hence increases in the prices of materials. The fluctuation of prices is different from one city to another and will depend on geographical location, due to the high transportation and distribution costs. Hence, this framework recommends that the

availability of materials for the construction projects should be part of the policy of the sector. This may be achieved by controlling prices, the provision of factories to meet the requirements of the construction sector, and imports from abroad if it necessary. Libya is a country rich in natural resources, and the policy of the sector should be assesses how to take advantages of these recourses in order to improve and enhance the sector.

8.6. ACHIEVING SUCCESS THROUGH PROJECT CONCEPTUALISATION

This framework has identified the following requirements that need to be in place before starting any project to ensure that projects will be successfully implemented:

8.6.1. Policy

The policy towards construction projects should be determined on how to achieve the foundation of success in terms of time, cost and quality. The policy should include planning, funding and implementation; all very important parts for project success.

Some of construction projects in Libya fail precisely due to poor planning, poor financial support and poor project team members. Selection of an inappropriate project manager and/or contractor were two of the most crucial important factors affect the success of construction projects in Libya as confirmed in the previous chapters. This is due the absence in Libya of selection criteria for the role of a project manager, and bureaucratic selection of the project team.

The policy of projects implementation is not applied on sound foundations, i.e. a project manager is usually appointed by traditional methods (e.g. social relationships and exchange

interests), and meaning that project manager is appointing in the last stage, and has no to say in the selection of the project team (contractors, consultants). Moreover, he/she is not involving in the project plan. A project manager is appointing when all key strategic decisions are complete, which causes problems in relation to the success of the projects. Hence, this framework recommends that:

1. Adequate financial support should be available for completion of the project.
2. The project plan should be prepared by people with sufficient experience, expertise and qualifications. Such a plan should include:
 - Accurate time scheduling, taking into account holidays, religious occasions and national holidays;
 - Determining the starting and finishing dates of the project. This is an issue for all contractors in Libya, often due to the lack of efficiency of the contractor and cash problems (non-payment of dues to contractors on time).
3. Definition of goals and objectives should be clear and understood by the entire project team. It is the responsibility of the top management to ensure that the goals and objectives are well explained and are specific, realistic and measurable.
4. Top management support is very important to project success, so it should be available for the whole way through for project implementation. The lack of support by the top management was one of the most significant problems affecting project success in Libya.

This is caused by lack of seriousness in the implementation and attention given to some projects at the expense of other project, hence:

- Give adequate authority and support to a e.g. project managers,
- Pay monies due in a timely manner, and provide adequate resources.

5. A project manager is one of the most important people who can lead the project to the success, he/she should be appointed from the beginning start of idea for the project, as is applied in many countries. A large number of projects have been delayed and/or failed because of selection of an inadequate project manager due to the absence of selection criteria, bureaucracy, and the poor efficiency of the project managers themselves. The selection of a poor project manager amongst was top of the factors affecting the success of construction projects in Libya. To achieve the project's goals (time, cost, quality) this framework puts the project manager at the heart of the construction project, he/she should be appointed as a first step (depending on specific criteria - see Section 8.7). As mentioned earlier in this chapter, misunderstanding of responsibilities causes problems in the project between the relevant parties so, the project manager should be the only line of communication between senior management and others involved in the project. Should any problem arise with any of the parties, their first of port of call should be the project manager. If the project manager cannot, himself, resolve the problem then he has duty to make senior management aware. This arrangement is very different from what is in place at the moment, where any problem is addressed to anyone deemed suitable to able to resolve it.

6. The feasibility study should be given more attention to ensure that the intended benefits of the project are known and achievable. As mentioned earlier, some projects in Libya are implemented without either properly examining their supposed benefits and/or they are implemented in the wrong locations. Thus, for any project to be successful there should be rigorous feasibility study that relates to the actual project location.

7. Control weaknesses in the construction sector have affected the development of the sector in negative ways. Control is an important means to avoid increase in costs by ensuring the application of plans in the manner agreed. Therefore, the policy of the sector should be to recognise that monitoring and controlling are very important aspects for the development of the sector, and success cannot be achieved without monitoring. This could be done through appropriate selection of project manager, as well as through committees that monitoring the progress of work to see it is progressing according to plan.

8. Selection of an appropriate contractor is considered very necessary and critical to projects success, thus should be fully considered by the top management. Many delayed and/or failed projects are because of improper selection of contractors; this was one of the most significant factors affecting the success of construction projects in Libya. This again is due to the absences of selection criteria (see Section 8.8), bureaucracy and weak construction companies (contractors). Hence, it is very important that the selection of contractors should depend on clear and known criteria and the selection should be a collective responsibility through a committee structure, not left to individuals no matter how experienced. Such committees should be having an understanding and experience in the field, the selection procedure should be transparent and seen to be fair.

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8.6.2. Project's Plan

Without doubt, planning is the backbone for the success of any project, and a project cannot succeed without a proper plan. This is one of the most common problems in the Libyan construction sector and resulted in the lack of efficiency in planning which has caused slow development of the sector, and directly affected the success of many construction projects. The absence of the use of technology (planning software) in making project plans had also played a role in impeding construction projects. As a result, there is a strong relationship between planning and success, and to make such relationship successful, project plan should be undertaken by experts and the planning should be based on the basis of clear criteria. In order to enhance the success of construction projects in Libya, this framework recommends that planning procedure should contain the following points.

1. First of all, a project plan should be based on a statement on how and when a project's time, cost, and quality performance targets are to be achieved.
2. The project manager should be one of the officials to prepare a project's plan because the project manager will be the key person who is responsible for the implementation of the project within the plan (project manager's role is explained in Section 3.5).
3. Responsibilities of all parties involving in preparing the project plan should be clearly defined and understood by everyone. This will enhance the plan's chances of success, because all parties participating in drawing up the plan will be clear on their areas of responsibility.

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4. Highly qualified persons should be responsible for the preparation of the technological aspects of the project's plan. Those responsible for the design of a project should be carefully selected with regard to set standards and criteria (see Section 8.9 for selection criteria for consultants).
 5. Project scheduling should be done appropriately taking into account any risk that might affect the schedules, including weather and local culture.
 6. Risk management plans to cover any potential problems should be considered in the main plan. These potential problems may include issues such as unexpected technical breakdowns, bad weather, strikes, tight deadlines and budget and subcontractor default.
 7. Resources plan, should include both capital and expense requirements as detailed by tasks considered in the project plan. Cost monitoring and controlling should be described in the plan.
 8. Personnel requirements for the project should be considered, what special skills, types of training and special experience are required should be noted in the project plan.

8.6.3. Management Methodologies

Certainly the use of suitable and correct management methodologies is evidence of the success of an organisation. In the construction field, the success of construction projects is directly linked to methodologies used by the top management and, as a result, this issue is one of the key problems for the success of construction projects in Libya. Included in the old management methodology are delays in payment of dues, change of management

personnel from time to time which causes problems in the management of construction's organisations, and lowers the rate of success of construction projects. Manipulation of project budgets by top managers and delays in payment of dues to contractors were two of the reasons given for failure and/or delay of construction projects in Libya, and caused slow development of the sector itself.

Hence, this framework recommends that the continuation of a project's implementation should be continued regardless of any management change, and there should be a clear mechanism of payments that enables projects to be completed successfully. The following points should be taken into account by top management for successful projects.

1. Development of management methodologies should be considered by top management, this may be achieved through cooperation with consulting organisations (organisations which help improve management). The use of suitable methodologies and simplified administrative procedures will play a very important role in the success of the construction sector, and this will reflect on the success of construction projects.
2. The use of modern management strategies and techniques is very important and should be applied by the top management for the enhancement of administrative procedures and for management development of the sector. This may be done by using management technology (computerised system) linking all departments in the organisation and with project sites.
3. There should be clear mechanism for payment of dues to contractors. Delay by contractors due to delays in payment is a critical problem affecting the success of

construction projects in Libya. This may be relating to complex administrative procedures, change of personnel (especially in top management), and bureaucracy. This is a particular problem for international companies, section 7.5.3 and 7.5.7.7 in chapter 7.

Currently the payment process is through a report signed by the project manager; which is completed and signed for every completed stage, describing the completion percentage and the remaining percentage. Then the report is passed to the top management where it will firstly be approved by the audit department, after which it will be passed to the financial department to process. This circulation might take months before payment is made to the contractors due to the lack of proper administrative procedures, the management methodologies used in the organisations, and to the bureaucracy in the departments. Figure 8.3a, illustrates the current payments process in use in construction organisations in Libya.

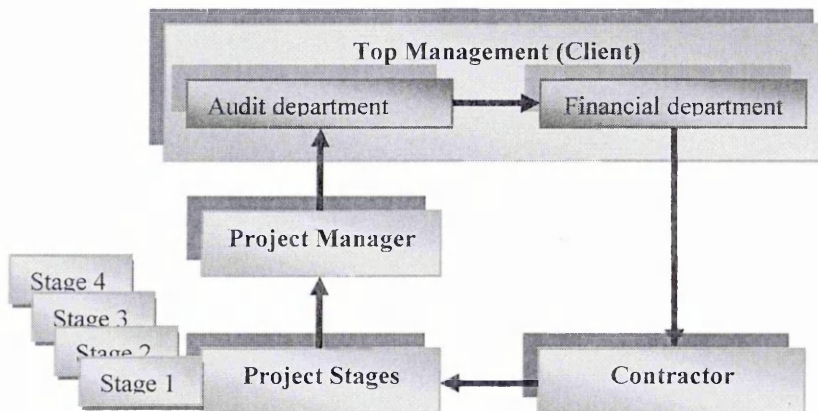


Figure 8.3a: Illustration of Payment Process for Contractors

From the above figure the picture seems clear and easy to deal with. But the situation is different; the contractors sometimes wait months before getting their due payment. Even after collecting the pay cheques, they have to deposit the cheque in the company's bank

account and this will take around 45 days to clear. In order to resolve such problem, there should be a clear and strong mechanism for payments processing. Such mechanism may be applied through an independent organisation (an independent organisation related the General People's Committee) that can facilitate the payment process and reduce bureaucracy, and also make the process transparent. In order to treat such a problem, the payment should be at a specific time (e.g. two to three weeks after submission of the report that signed by the project manager) and payment could be transferred directly to the contractor's account or having an agreement with the bank to facilitate the financial process. Figure 8.3b, illustrates the possible new payment process for contractors.

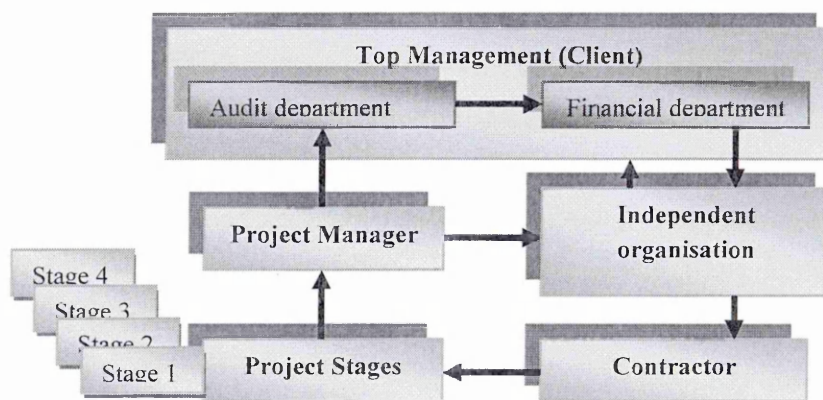


Figure 8.3b: Illustration of Proposed New Payment Process for Contractors

4. Adequate top management support needed for construction projects to be successful, but such support is not usually encouraged in Libya, as considered one of the most important factors to achieve the success. A number of failed and/or delayed projects were recorded because of the lack of top management support. Thus, this framework recommends that top management should be supportive of projects so that they can achieve their goals. Such

support will include providing adequate funding for projects; giving adequate authority and support to e.g. the project manager; and pay dues in a timely manner.

5. As lack of definition of goals and objectives was confirmed as one of the critical factors that affecting the success of projects in Libya, this framework recommends that top management should ensure that a project's goals and objectives are well defined for the entire project team. It is also important for the top management to make sure the goals and objectives should be specific, realistic and measurable.

6. The absence of adequate controls on construction projects is one of the causes for the slow development of the construction sector in Libya, and considered one of the most factors that affecting the success of construction projects. The project manager should be responsible for controlling and monitoring the project from inception to completion. But, the top management should put in place a plan for controlling and monitoring the workflow of the projects. Control management is required to ensure that the projects are completed within budget, to time and are of acceptable quality. Hence, control management should be in place, ensuring that projects are successfully implemented. This may be done through a committee which makes regular visits to the project site, and holds regular meetings with project parties (e.g. project manager, contractor, consultants, and suppliers). This will give more chance for the project to be successful as the top management can mitigate any risk before it has any further impact.

7. Unfortunately in Libya construction projects are implemented without having in place any plan for communication. Without doubt, effective communication is very important for

the successful implementation of construction projects (Dainty, *et al.* (2006) and (Dawood, *et al.* 2002). Libya occupies an area of approximately 1.775 million square kilometres, and some projects are implemented in the middle of the desert and in small villages which are a long way from cities. Without a proper communication plan for the project it will be difficult to communicate and the success of the project will be affected. Hence, an active communication plan should be considered before starting implementation of projects. This may be done by through the following solutions. Note that the mechanisms listed below are not currently in use in the Libyan construction industry, apart from face-to-face meetings carried out from time to time.

- Telephone Conferencing (Teleconfab), this will be a telephone meeting involving all parties in the project, this could be a regular meeting and/or when needed (e.g. problems raised and needing to be resolved),
- Site Meetings, will involve all parties, including management representatives, project manager, contractor, consultants, and suppliers (e.g. regular monthly meeting),
- Communicating through the internet, computers system linked between the site and top management informing of progress and workflow. This would be linked with the suppliers to ensure provision of materials in a timely manner.
- Sending a weekly report to the top management explaining the progress of work, and the remaining works to be done.

These are the main solutions for the communication issues helping ensure the success of construction projects in Libya. It is clear that communication is a very important factor and

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should be given much attention by the top management to ensure that construction projects will be implemented successfully.

8.6.4. Contractual Management

Contractual management is one of the main components of the framework implementation, and considered very important to the success of construction projects. As mentioned earlier, the most common method used in contractual procedures in present use (whether the prices given and/or the types of contractual restrictions) are not acceptable to some international companies who refuse to tender for contracts which were then given to national small construction companies with little experience and no record of effective implementation. Presently one type of contract applies for all kinds of projects, without consideration of the suitability of the contract for the type of project. The project manager has no to say in the form of contract and selection of the contractor, he/she is appointed after these things have been decided. In addition, projects are giving to unqualified contractors even without tendering, and who meet no specific criteria for selection. This could be said to be a behind some failed and/or delayed construction projects in Libya. This is the real scenario in the construction sector in Libya. Hence, the framework strongly recommends that the selection of contract should depend on the natural of the project and the scope of the work.

Also this framework recommends that the project manager should be involved in the selection of the type of the contract and of the contractors. This is common practice in most developed countries, but is not in use in Libya and is considered a novel practice. The advantages of involving the project manager in the selection of the contractors are:

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1. Establishing relationships with people who play a crucial role in the project, ensures that any problems that arise are dealt with;
 2. Project manager ensures that the careful consideration is given to the importance of logistics and resources for the success of projects;
 3. provides good understanding between the project manager and the contractor, like good coordination, free flow of information, reduced disputes and friction;
 4. Helps the project to be completed within time, cost, and to an accepted quality;
 5. It also helps for team work between the project's stockholders.

The contract system should be compatible to international standards while sensitive to the requirements of local companies. Contractual methods and procedures should be examined and, where necessary, improved and updated before introducing any active contractual system. Furthermore, the framework recommends that, to avoid any disputes, those dealing with contracts should be experienced and qualified in this area of work.

As tendering is considered one of the most difficult points for the success of construction projects, the framework strongly recommends that there should be transparency in the tendering selection process, with clear criteria and standard laid down for contractors and subcontractors (see Section 8.8, contractors' selection criteria). The framework also recommends that firms tendering the lowest prices should not be automatically given priority in the selection process.

8.7. PROJECT STAFF SELECTION CRITERIA

8.7.1. SELECTION OF A PROJECT MANAGER

Success is very important to everyone in an organization and so all members should feel they have contributed to delivering a project which meets the client's expectations. Without doubt a project manager is considered the main key and the most significant factor for the success of any project, as he/she is considered directly responsible for the success and/or failure of the management of the project. It is therefore imperative that adequate care should be taken when selecting and appointing a project manager.

As emerged from the data analysis, the selection of a poor project manager came as the first factor that affected the success of construction projects in Libya, this due to the wrong selection of a project manager. Thus, this framework strongly recommends that there should be a set of criteria to be used as a guide when selecting and appointing the project manager, to enhance the level of success within construction projects in Libya.

A number of studies for the criteria for the selection of a project manager have been carried out by different authors. The authors come from Europe, the USA, Australasia and Africa and so use a variety of terms, but all had the primary concern of selecting the right project manager for the job. Each author gave a definition of an indicator or benchmark for their studies. These ranged from a fairly brief description of the indicator to more detailed expositions of its foundation and philosophical perspective. Table 2.9 in chapter 2 combining all criteria given by the authors for the selection of a project manager.

From existing studies the most important criteria to be considered in the selection of a project manager were technical skills, experience in project management and in similar project, personal and managerial skills, project management skills, conceptual and organisation skills, a strong technical background, knowledge of project management implementation processes, administrative and supervisory skills, health and safety, and ability of risk management assessment. All these factors are important for the selecting and appointing a project manager, and should be taken into account to ensure construction projects will be successfully implemented. Nevertheless, thus far, the importances of language, culture and ability to work in extreme physical conditions have not been considered in the criteria for the selection of a project manager in existing studies, however, these factors are very important for the selection of contractors, subcontractors and consultants. These latter factors are important for the selection especially for a country such as Libya with its special customs, traditions and culture, and the weather which is considered very hot in most months of the year. A project manager should work at optimum level regardless of climate.

Communication within a project team is essential; the ability of a project manager to communicate in both Arabic and the language of the contractor will greatly contribute to the success of a project. Currently in Libya there is no guarantee that a project manager can communicate confidently to others involved in the project. On occasions a project manager is appointed with limited English language skills meaning he/she requires an interpreter when communicating with the project team, introducing an additional link into the commendation chain which at times can fracture and cause unneeded problems. Often

project managers in Libya are appointed with little basic language skills, some of them cannot speak any other language than their own, which has that caused problems of a lack of communication and misunderstanding between the project manager and others (e.g. contractor, subcontractors, and project team members).

The project manager should also ensure that he is aware of the local cultural and networks of the local communities where the project is taking place. It is his/her responsibility to forward the nuisances of these cultural aspects to the contractor and general workforce, thus avoiding any conflicts with the local community with might destabilise the project. The understanding of culture is a really very sensitive issue, whether the culture of the Libyan communities or understanding the culture of the project team (people who are working in the project). A project manager should be fully aware and understand the cultures of the members of the project team and take these into account during the project. This will contribute the following benefits.

- Maintain the morale of the project team;
- Create a good relationship based on mutual respect;
- Encourage a project team to work as one;
- Ensure misunderstanding will be avoided;
- Give more chance for the project to be completed successfully;
- Enable the project manager to better control the project;
- Help ensure that any problems in this area will be resolving more easily.

The appointed project manager has a duty to fulfil his contract within the project and should not undertake any other work apart from that current role. This is to ensure that the project manager's focus is on only his current role; any other job will prove to be distraction which can adversely affect the project.

However, in Libya, it is common for the project manager to hold a number of other jobs simultaneously, which causes problems relating to the completion of projects as scheduled. A project manager overloaded with work cannot complete all tasks successfully; some tasks will be completed at the expense of others.

According to the above and as emerged from the data analysis, it is clear that technical skills, management and managerial skills, project management experience, background and experience in similar projects, knowledge (including language, culture, software), health and safety knowledge, ability to work in different climates weather and project manager's load are the most important criteria for selection of a project manager.

Table 8.2 provides a set of criteria as emerged from the primary and secondary data, which ensures that a project manager should be selected appropriately.

Table 8.2: Proposed list of Selection Criteria for Post of a Project Manager

Criteria	Sub-Criteria
Qualifications	Academic qualification; Project management qualifications.
Experience	Years of experience; Experience in similar project; Experience in project management; Ability of using project management software; Previous projects successful managed.
Technical skills	Strong technical background; Ability to use different technical skills.
Management Skills & Managerial Skills	Team leadership; Developing recourse plan; Planning and control; Supervision; Decision making; Time management; Motivation.
Knowledge	Project management knowledge; Knowledge of natural building code; Knowledge of project Meg implementation process; Dispute resolution knowledge; Cultural knowledge; <ul style="list-style-type: none"> ▪ Familiarity with local working culture; ▪ Familiarity with contractor's culture; ▪ Familiarity with workers culture; Language ability; <ul style="list-style-type: none"> ▪ The same language that contractor's & staff speak; ▪ The local language (Arabic).
Health and Safety Knowledge	Health & safety knowledge; Risk identification; Health & safety regulation; Health & safety training.
Personal Skills	Political sensitivity; Hard-nosed manager; Ability to keep project's team happy; Enthusiasm.
Conceptual and Organisational Skills	Planning; Organisation; Strong goals orientation.
Project Manager's Load	Number of projects supervised; Availability and ability to manage a project successfully.
Ability to Work in a Project Location	Ability to work in very hot weather; Ability to work in different and distant locations.

8.7.2. SELECTION OF CONSULTANTS

Selection of the most appropriate consultants for a construction project is very important and considered as a crucial decision for owners and project managers alike. In Libya, the process of selection is usually done in traditional ways (e.g. social relationships, and exchange interests); the consultants are selected by seemingly random methods without specific criteria and without involving the project manager in the selection. Selection of consultants for the design of large construction projects is sometimes through the selection of international organisations, but for medium and small projects and even for some large projects, the process still has some disadvantages. First, there are no specific criteria for the selection. Second, many problems occur during the construction stage because of mistakes in the design. Third, some projects fail because of selection of inappropriate consultants. This framework recommends that there should be specific criteria that can be used as a guide for the selecting of consultants in order to enhance the success of construction projects, and to eliminate problems relating to these kinds of issues.

Currently criteria in use for the selection of consultants from the Australian code of practice for the building and construction industry, from the south-western region of the United States (Arizona), from the Pakistan engineering council, and from the Indian consultants' pre-qualification manual, give a set of criteria to be used as a guide for selecting appropriate consultants; Table 2.12 in chapter 2 illustrates the criteria that are in use.

Indeed, to ensure that a project will be successful, all the existing criteria should be considered when selecting consultants. The Australian code of practice for the building and

construction industry is considered very suitable and may be used for the selection of consultants. However in addition, the organisation's reputation (consultants' reputation), awareness of local culture, and climatic conditions should be part of the criteria for the selection. The importance of adding these new factors to the existing Australian framework is twofold; first because the importance of reputation will better ensure the consultants are correctly selected, and second when selecting consultants their awareness of local culture and climate should be considered because the design of any buildings should be relating to the culture and climate of the place where that the project will be situated. A number of projects in Libya have failed because of design mistakes by the consultants relating to such these factors. For successful construction projects, the framework recommends these criteria should be taken into account together with the Australian criteria for selecting consultants. Table 8.3, gives a set of criteria that can be use for the consultants selection.

Table 8.3: Proposed list of Selection Criteria for Consultants

Criteria	Sub-criteria
Organization capacity	Financial capital; Management capability; Quality work.
Technical and professional expertise and qualifications	Academic qualification; Staff experience qualification; Professional & expertise qualification.
Previous experience	Experience in similar project; Years of experience in construction projects.
Innovative ability	Performance records; Overall competence; Ability to innovate.
Resource availability	Staff availability
health & safety management	Health and safety training qualifications; Health & safety knowledge.
Knowledge	Culture and Language Knowledge.
Ability to work in difficult places	The weather condition; The location of the project;
Reputation	Relationship; Successfully completed projects.

8.7.3. SELECTION OF CONTRACTORS

Selection of an appropriate contractor is one of the main elements of this framework, and considered one of the most important keys for projects success. The selection of the most suitable contractor to complete projects successfully is considered a crucial decision for a large number of projects in Libya. This factor was second in the list of the factors (Table 8.1), affecting the success of construction projects in Libya. The lack of contractors' efficiency is due to the present absence of selection criteria and the bureaucratic method of selection, which results in the failure of a large number of construction projects. This factor also affects the construction sector in relation to the improvement and development of the sector. It is therefore essential that adequate care should be taken when selecting and appointing a contractor. Hence, this framework is strongly recommends that there should be a set of criteria to be used as a guide when selecting and appointing contractors. An extensive literature review by the researcher, including the codes of practices used in some countries, has revealed that the most important selection criteria for contractors are financial stability, technical and management ability, performance of contractors, experiences of contractors, health and safety concerns, quality assurance, and availability of resources. Comprehensive selection criteria by different researchers are presented Table 2.10 in chapter 2.

All the existing criteria are important and must be taken into account to achieve success for a construction project. It is important to look at the ability of contractors to work in different climatic conditions (e.g. very hot weather in a country like Libya), the location of

the project (the contractor's ability to work in difficult locations), and the contractor's ability to communicate in the local language (Arabic) and English and awareness of local culture.

Contractors who are unable to work in different locations, whether because of geographical position and/or the local climate, are prone to face delays in completion of project tasks, cost-overruns, delay penalties and disputes with the client. It is for these reasons the contractor should be made aware of the local weather and the geographical location of a project as a part of the terms and conditions. As language is a key ingredient of all cultures, contractors who lack this attribute found it difficult to communicate and/or express needs, which will affect the success of a construction project. Also the development and the improvement of the sector will be affected. In a country like Libya where the people adhere to customs and traditions, awareness of that culture is important to communication. Therefore, this framework strongly recommends that there should be a guide which contains a set of criteria that can be used when selecting and appointing an appropriate contractor. Table 8.4, gives a set of criteria that can be use for the contractor selection. The advantages of these guide criteria are that they will help:

- Ensure that contractors will be appropriately selected;
- Ensure that contractors will be able to complete projects successfully;
- Enhance the success of projects in relation selecting the wrong contractors;
- Overcome the limitations apparent in the current situation (e.g. disputes).

It has also been found that foreign companies (contractors) have been given work without due regard as to the possibility of those companies successfully implementing the project. Some companies facing difficulties because while they have the financial resources, they come from a different background and lack relevant experience. Both considerations affect on the overall the success rate of construction projects; thus background should be given priority in the selection procedure.

It is therefore very important to look at the past experiences of a contractor in order to determine the ability to deliver a project successfully. Such consideration will assist in ensuring that a proper contractor will be selected (e.g. contractor able to implement infrastructure projects, able to implement building projects, and able to implement mechanical projects).

As a result of the literature review, the general contractors' selection criteria, which are used for standing list criteria (table 8.4), are confirmed as good for use in selecting contractors in Libya. These criteria were collected from the previous published works by different researchers. Other criteria found to be important were added to the pre-qualification process as shown in Table 8.5. The framework strongly recommends that the above criteria and sub-criteria should be used as a tool to select the most appropriate contractors, in order to overcome any problems that might affect the success of construction projects, and contribute to the improvement and enhancement of the construction sector.

Table 8.4: Merged list of Selection Criteria for Contractors

Criteria	Sub-criteria
Financial Capability	Company's capital; Cash flow.
Experience	Years of experience; Experience in similar project; Number of projects completed; Size of projects completed; Type of projects completed.
Management and Technical Ability	Management capability; Experience of staff; Staff qualifications; Quality performance; Methodology used; Innovation methods.
Availability of Resources	Equipment; Number of staff.
Quality	Quality assurance; Quality control; Quality policy.
Health and Safety	Safety performance; Health and safety procedures.
Historical Non-Performance	Number of failed projects; Claims and litigation; Company image.
Contractor's knowledge	Language <ul style="list-style-type: none"> ▪ Ability to communicate in the local language; ▪ Ability to communicate with project manager & staff; ▪ Ability to communicate with management and suppliers; Culture <ul style="list-style-type: none"> ▪ Familiarity with the local working culture ▪ Familiarity with workforce culture
Contractor's Working Abilities	Ability to work in different locations; Ability to work in hot weather.

8.7.4. SELECTION OF SUB-CONTRACTORS

The selection of sub-contractors is an issue which should be taken very seriously in order to complete a project successfully. Some construction projects in Libya were delayed and/or

failed because inadequate subcontractors were selected (lack of experience, knowledge and/or skills) as well as problems related to the relationship between the subcontractors and the main contractor. This may be related to the selection of subcontractors in the absence of agreed open selection criteria. As mentioned earlier, a project manager is not presently involved in the selection of subcontractors (or even the main contractor) because he/she is not appointed at that stage. The appointment of subcontractors is usually done by bureaucratic methods without considering any criteria for the selection; some subcontractors are appointing to do part of work without any of the necessary capabilities (e.g. resources, experience, background, knowledge, skills, and financial capability). Also, some works were given to lowest price of tender by subcontractors which caused cause unexpected problems later on. This has had negative impact on the success of projects and the improvement of the construction sector in Libya. Hence, to overcome such problem the subcontractors' selection should be undertaken carefully, and should depend on a set of criteria to ensure that subcontractors will be appropriately selected.

Current subcontractors' selection criteria revealed (as shown in table 2.11 in chapter 2) that the most important criterion for selecting an appropriate subcontractor is financial capability, quality record, experience, technical and managerial competence, health and safety records, and reputation. Table 2.11 in chapter 2 shows a comprehensive list of criteria for selection of subcontractors in current use.

All the above criteria for the selection of subcontractors are complementary to each other, and are considered very important to the success of construction projects. While it is very important to consider the majority of the above criteria when selecting the appropriate

contractor, other criteria should also be given weight. These criteria that should be included are the age of the subcontractors (years of experience), ability to communicate (subcontractor's language ability), the cultural background of the subcontractors, the subcontractor's ability to work where the project is taking place (weather conditions, distance to project), subcontractors specialized in the area and, most importantly, ensure the subcontractor has a sufficient workforce to complete the project, and does not depend on providing the workers from the employment market.

The selection should consider the actual workforce and take into account the workers' experience, qualifications, health and safety understanding, and the availability of the workers. Table 8.5 shows the criteria that should be used to select appropriate subcontractors, as recommended by the framework.

As a result, of the literature review and survey, the general criteria for selection of the subcontractors in table 8.5 are confirmed as good criteria for subcontractors' selection in Libya. Those criteria were collected from previously published works during the past years but other criteria which emerged from the data analysis as important to the selection of the subcontractors have been added to make Table 2.11. The framework strongly recommends that the criteria and sub-criteria in Table 2.11 should be used as a tool for selecting appropriate subcontractors, to overcome problems that might affect the success of construction projects and contribute of the improvement and enhancement of the construction sector.

Table 8.5: Proposed Selection Criteria for Subcontractors

Criteria	Sub-criteria
Financial Capability	Company's capital; Cash flow.
Experience	Experience in similar project; Years of experience in construction projects.
Management Capability	Performance records; Overall competence; Ability to innovate.
Health and Safety Records	Understanding of health & safety; Health & safety performance.
Technical Skills	Quality performance; Methodology used; Quality work.
Qualifications	Staff experience qualification; Health and safety training qualifications.
Specialisation	Specialized in the area
Knowledge	Local labour laws; Site conditions; Culture; Language
Ability to work in difficult places	The weather condition; The location of the project; Current workload and commitment.
Reputation	Relationship with the previous contractors; successfully completed projects.

The aim of adding these criteria to the current selection criteria comes from their particular importance to the success of construction projects in Libya and their direct relation to the appropriate choice of parties for the project.

1. The importance of considering the local climate as an important factor that should be taken into account when selecting the parties. This comes from the difficulties experienced when working in e.g. extremely hot weather and its effects on projects success.
2. Language is an essential communication tool between project parties; it facilitates understanding amongst the parties and enables the success of the communication process. It is also key to the resolution of problems and disputes if they occur.

3. Cultural awareness is an important criterion for selection. It contributes to the success of construction projects by enabling a project team to work as one and also helps enable the project team to deal with local external factors surrounding the project.

4. It is very important when selecting the sub-contractors to make sure they are specialists for the works that are selected to do. This will contribute to ensure that the work will be successful, because the selected company is specialized for the implementation in such kind of works.

5. It is important to consider the companies' workload (current projects/works that the company undertaking) before the selection decision. This will find out whether the company is able to complete a project successfully and without delay. It should also be a criterion when selecting a project manager.

8.8. SUMMARY OF THE CHAPTER

Chapter eight has presented the outcome of the research conducted in the Libyan construction sector employing both secondary (extensive literature review) and primary (interviews and questionnaire survey) methods of research. The chapter presents the framework developed for enhancing the success of construction projects in the Libyan construction industry. The chapter also presents the sources of data for the framework, and the framework is outlined. The framework was elaborated in: (1) construction projects and external environment; (2) construction project concept; (3) selection of project managers; selection of (4) consultants, (5) contractors and (6) subcontractors. Also the chapter has highlighted the issues that need to be in place to manage Libyan construction projects

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successfully. A set of criteria have been established for the selection of project managers, contractors and subcontractors to be used as a guide in their selection, that will substantially improve the likelihood that the construction projects will be success. The next chapter presents the validation of this framework by using experienced professionals in the Libya construction industry.

Chapter 9

Framework Validation

9.1. AIMS OF THE CHAPTER

A framework for improving and enhancing the success of construction projects was presented in the previous chapter. The validation of that framework is reported in this chapter. The chapter begins with an introduction which explains the objectives of the validation, validation process and the justification for promoting the framework. Information and profiles of the individuals who participated in the validation are outlined. The response received from industry practitioners is then presented. Feedback is followed by an analysis of the comments/suggestions made by the research participants. The chapter concludes with a chapter summary.

9.2. INTRODUCTION

The framework to be validated was based on the data sources from the Libyan construction industry. It was developed as a guide to action for the construction sector to ensure greater success in projects. The objectives of this exercise are: (i) To obtain expert validation and seek to optimise the effectiveness of the framework; (ii) To assess the practicality and applicability of the framework; (iii) To determine whether the framework needs any modification to promote improvement; and (iv) To assess the likely benefit of the framework to the enhanced success of Libyan construction projects.

9.3. CONSTRUCTION PROJECTS FRAMEWORK VALIDATION PROCESS

To validate the framework for the enhanced success of Libyan construction projects presented in the previous chapter, selected senior, experienced and independent individuals

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in the construction sector in Libya were approached (see table 9.1 for details). The option of external validation was regarded as inappropriate and outside the scope of the research work, as the framework has been developed specifically for the construction sector in Libya. In order to ensure that the validation will be sufficiently strong, the participants had to be (i) highly experienced and have worked for a long period in the construction industry in Libya; (ii) have a good knowledge of the Libyan construction sector; and (iii) be professionally qualified in construction management. These criteria were used to ensure that only experienced professionals in the Libyan construction sector were included in the validation of the framework. Seven individuals were selected to validate the framework. Six individuals returned the feedback with response rate of 85.7%, see Table 9.1. Each respondent was given a copy of the framework and six of them kindly provided their comments on it.

As mentioned in Chapter 5, the use of this method for validation of the framework was chosen because it is a widely used method among those researching into aspects of construction and/or project management, and has been found to provide good results (e.g. Obiajunwa, 2010; Bhutto, 2004; Fapohunda, 2009). It is also was recommended by Inglis (2008). This method avoids any bias which could be introduced if an interview approach was adopted. This method also allowed for considered answers as the respondents could consult their documents and/or colleagues while reviewing the framework. In addition, considering the busy schedules of the participants, this method allowed them to review the framework in their own time. As discussed in Chapter 5, another method for the validation of the framework could be used was to have organised a workshop or similar event, and

inviting professionals for discussions and feedback. However, this was seen to be time and cost inefficient and together with the difficulty of getting those professionals and experts together for a workshop, it was decided to use the adopted approach above for the validation (sending the framework to experienced individuals for detailed review).

Table 9.1: Details of Respondents who validated the Framework

Validation ID	Position	Details
I	Consultant	25 years experience
II	Director	15 years experience
III	Director	More than 20 years working in the construction industry
IV	Consultant	More than 20 years experience
V	Consultant	30 years experience in the construction industry
VI	Project Manager	More than 13 years experience

9.4. FEEDBACK AND ANALYSIS

The feedback received on the framework from expert validators was critical positive and encouraging. Nevertheless, some suggestions were made to further modify and improve the framework, and this was reflected according in the framework. The comments and suggestions from each participant and the follow up actions are presented below.

COMMENTS AND FEEDBACK FROM PARTICIPANT (I)

- For economic factors, I will suggest that instead of the government required to hold down prices of materials, an inflationary trend should be used. Here the project cost can be amended using the impact of inflation.

- Training. I agree the government should do something about training the workforce with the most current technologies in the industry, but what is the need for training a project team in a foreign culture and language? It's the foreign project team members that should learn the culture and Libyan language (Arabic language).
- Materials. I thought this issue has been dealt with in the economic factors, why bring it up here in the long range plan.
- Selection of criteria. Is there any need making reference to a particular code (like Australian or US). This should have been selected in the earlier chapters. What should appear here could have been the criteria for the Libyan construction industry.

Except for the above comments, I believe the framework covers the major area of concern in Libyan construction. This will really be very useful for all stakeholders in the construction industry in Libya.

FEEDBACK ANALYSIS FROM PARTICIPANT (I)

- The framework recommended that the government should control the prices of materials in order to ensure projects will be achieved within budget. This could be done through subsidies, controlling prices, controlling inflation, importation and development of local materials. It important to ensure balance of payment between Libya and other countries from which importation of materials is made. Inflation will be controlled and price will be held down.

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- The framework strongly recommended that training should be part of the government policy. This can be done through training departments and partnership with technologically advanced countries. The importance of training will contribute to obtaining well trained people, improving health and safety management and improving skills and knowledge (e.g. language and culture). Thus, foreign companies are responsible for their team members to learn local culture and language.
 - The framework recommended that there should be the provision of factories in order to overcome problems that facing the sector (shortage of materials). Libya is a country rich in natural resources and there should be good use for those resources in order to develop the construction sector and controlling the fluctuation of prices. Thus, the use of resources should be part of the sector's plan.
 - The framework was developed for enhancing the success of construction projects in Libya. Considering the importance of selection of criteria the framework strongly recommended that the selection project team members should be based on a defined and agreed set of criteria, in order to ensure that the right person is selected which enhances the success of construction projects. The framework shows the criteria that should be used for selecting a project manager, contractor, consultant, and subcontractor in Libya.

In summary the participant acknowledged that:

- The framework covers the major areas of concern

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- The framework will be very useful for all stakeholders in the construction industry in Libya.

COMMENTS AND FEEDBACK FROM PARTICIPANT (II)

- I observed that the framework is proposed in view of the factors identified as affecting construction projects success in Libya. The problems touch on very important issues such as stakeholders' participation, public procurement, construction risk, policy and practice, among others.
- The framework is proposed on the assumption that government has been, and will continue to be a major client of construction projects in Libya. As a result, most of the problems identified emanates from the interaction of government and the construction industry.
- I would suggest that the framework also recognise the existence of private clients. This could be a sort of a proactive measure in achieving success in construction projects, should there be a private client.
- The Libyan construction industry is heavily dependent on imported construction materials. The framework raised the issue of material shortages. I would suggest that the framework incorporates the need for research and development of alternative (local) materials in order to reduce the level of importation. This would also promote success of construction work in Libya.

The diagram of the framework is clear and communicating, and the problems for which solutions are proposed are well conceived. As there are no universal solutions to problems,

I feel the proposed framework, if articulated in the form of a construction and or public procurement policy and standard would appropriately address the problems. A public procurement policy would help achieve transparency while promoting accountability and success. A construction policy would define the relationships of stakeholders and standards could regulate practice.

FEEDBACK ANALYSIS FROM PARTICIPANT (II)

- The framework has been developed for improving the success of construction projects in Libya. The majority of the construction projects are funded by government and there is no significant contribution by the private sector. Hence, the framework strongly recommended involving the private sector in the development of the construction sector. The involvement of the private sector will contribute to the growth of the construction sector and achieving success of construction projects.
- The framework recommended that the use of local materials through taking advantages of using natural resources, and establishing of factories for production of construction materials. By using local materials levels of importation will be reduced, and then the fluctuation of prices can be controlled. Also this will contribute to promote the success of construction projects in Libya and improving the construction sector.

In summary the participant acknowledged that:

- The diagram of the framework is clear and communicating.

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- The solutions provided are well conceived.
 - If the framework is articulated in the form of construction and or public procurement policy and standards it would appropriately address known problems.
 - The framework achieves transparency while promoting accountability and success.
 - Construction policy would define the relationships of stakeholders and standards could regulate practice.

COMMENTS AND FEEDBACK FROM PARTICIPANT (III)

The suggested framework raised all the most important points to make the construction projects in Libya to be successful. The following is the feedback for the suggested framework:

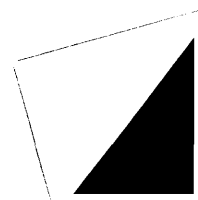
- After looking to the external factors for improving construction projects success, I note that the materials including availability and control of the prices should be listed under the economic environment.
- With regard to giving loans to construction companies, you should note that the guidelines of contract in Libya provide 15% of the total project cost to all contractors at the early stage of work. However, not all sectors and project managers follow the guidelines of project construction in Libya and the decision for gaining 15% of the project cost is individual without following, and reference to, contract guidelines. In addition, the construction company should have the financial ability to complete the project which was mentioned in Part 3 of suggested framework.

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- The prices of material fluctuate during the year. However, time scales of some projects exceed a year. Therefore, I would suggest taking price fluctuation into account before signing the contracts, which should be an obvious section in contracts.
 - Financial plans and funding for projects is provided by the government. However, the mechanism of payment is considered to be the main factor in project delays.
 - There are contractual guidelines for controlling construction. However, these guidelines should be improved and updated which has not happened since 1983. You suggest in the framework (Part 2 and 3) important points to improve the guidelines including management of projects and selection of contractors and consultants. In addition, you suggest an effective solution for the mechanism of payment which is the main concern in all contractors in Libya.

FEEDBACK ANALYSIS FROM PARTICIPANT (III)

- The framework strongly recommended that availability and control of material prices should be taken into account to help achieve success of construction projects. There is a strong relationship between economic and government policy in relation to construction materials. The framework suggested solutions and ways on how to avoid fluctuation of prices that affect the success of construction projects in Libya, and this was mentioned under the long-range plan section. Nonetheless, the importance of controlling materials prices and its relation to the success of construction projects and the development of the construction sector was also presented under economic environment section.

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- The framework recommended that loans should be given to construction companies especially small and medium companies in order to develop and improve their performance. This could include improving health and safety management, and skills and performance of the workforce. The 15% of the total project cost that is given to the contractors at early stage of work is to assist companies to implement the initial stage of initiation. Whereas, the 15% of the total project cost was just giving to some big companies who implementing big projects.
 - The framework suggested that the prices of materials should be controlled and any fluctuation of prices should not affect a contract already signed. The framework also recommended that there should be a section in the contract explaining who will be responsible if the cost of materials changed.
 - Projects delays related to the funding or process of payment is one of the major problems that affecting the success of construction projects in Libya. Thus, the framework strongly recommended that financial support should be made available in order to achieve success and enhance the construction sector in Libya. It is recommended that a project budget or/and funding should be available before signing the contract, and any payment due to the contractors should be paid on time. It also suggested that a clear mechanism should be used in order to avoid any delay in payments, as this is considering a main factor causing of project delay.
 - The framework strongly recommended that contract guidelines should be updated and improved. It is suggested that a contract system should be compatible with international standards. The selection of contract should depend on the nature of the



project. It is also recommended that the project manager should be involved in the selection of the contract as well as the selection of the contractors and consultants, depending on selection criteria. The framework recommended that the selection of a project manager should be made early in the project, and his/her selection should depend on an agreed and public set of criteria (as mentioned in the previous chapter).

In summary the participant acknowledged that:

- The framework raised all the most important points to make construction projects in Libya successful.
- Very important points were included in the framework to improve project success, such as management of a project and selection of contractors and consultants.
- Clear and good solutions were provided for payment mechanisms to improve project success.

COMMENTS AND FEEDBACK FROM PARTICIPANT (IV)

- I have read the chapter describing the development of a construction project framework for Libya, specifically, and possibly applicable to other countries of similar characteristics. The suggested framework is quite thorough and covers a wide range of issues that hinder the construction process in Libya. Inherent features specific to that part of the world have been identified such as culture, harsh weather and remote site location.

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- The framework appears to focus on government projects and although major projects in Libya are state funded the suggested recommendation should address the issues encountered by private projects. The framework also focuses on large companies where an owner, project manager, consultant, main contractor and sub contractor are present. In many situations this is not the case as small construction companies operate with small number of personnel and limited budget and will have to operate with cross-disciplinary roles and are therefore most likely to fall into difficulties and as such should be considered by the framework.
 - Figure 8.2a is misleading as it seems to indicate that the selection process is a cyclic one as suggested by the arrows.

The construction process is complex and conditions and circumstances surrounding most projects are far from perfect. The recommended framework would enhance delivery of construction projects. The framework is ideal and if decision makers responsible for and involved in the construction industry can provide support and industry infrastructure (e.g. resources, legal regulations, standards and guidance) then I have no doubt that this framework will have a significant improvement on the execution of construction schemes in Libya.

FEEDBACK ANALYSIS FROM PARTICIPANT (IV)

- The framework has been developed for the purpose of ensuring construction project success in Libya. It suggests many solutions that can be used to enhance the success of such construction projects. The framework is developed for the Libyan

construction industry, but it can be used in any other country with similar characteristics. The framework also recommended a list of criteria that should be used for the selection of the project team in order to ensure that right persons are selected, and for improving the success of construction projects.

- The framework has been developed to enhance the success of construction projects in Libya whether small, medium or big. The majority of the construction projects are funded by the government, whereas, the framework is for improving the success for construction projects in Libya whether private or public. The framework has been developed to improve the construction sector in Libya, and can be used by both the private and public sector.
- Figure 8.3a shows the process and factors that should be considered to ensure that the success of construction projects will be enhanced and the development and growth of the construction sector in Libya will be achieved. Explanations of Figure 8.2a are presented in 8.2b, 8.2c, 8.2d (Parts 1, 2, and 3).
- The framework has been developed to enhance the success of construction projects through providing solutions to existing problems that affect the success of construction projects. It is aimed to be used to ensure that projects will be successfully completed within time, cost and quality required.

In summary the participant acknowledged that:

- The framework is quite clear and covers wide range of issues affecting the success of projects.

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- Important selection criteria in relation to the selection of project team were mentioned.
 - The framework is ideal and is likely to be practically useful.

COMMENTS AND FEEDBACK FROM PARTICIPANT (V)

The framework looks comprehensive and well detailed; it seems to address the various factors that can determine the success or failure of construction projects; not only in Libya but in any country. If the various criteria highlighted and recommended for the selection of project manager and other construction stakeholders are well implemented, project failures will be drastically reduced and there will be growth in the Libyan construction sector. However, I am of the opinion that the introduction of an independent organization in Figure 8.3b - illustrating the proposed new payment process for contractors needs to be clarified and considered with caution. Will this not create an additional bottle-neck problem in addition to the existing identified bureaucratic problems?

FEEDBACK ANALYSIS FROM PARTICIPANT (V)

- The selection criteria for the project team are crucial to the success of construction projects. They are a major component for the success of projects in the Libyan construction sector. They are important for the selection a project manager, a contractor, a consultant and subcontractors as previously such criteria were not used, which caused problems in relation to the success of the construction projects. Overall the framework presents criteria for the selection of a project team to ensure that the

appropriate persons will be selected, and this will reflect favourably on the projects in terms of its enhanced chances of success.

- Delay of payment is considered one of the most important reasons behind delay and/or failure of construction projects in Libya. The framework recommended that there should be a clear mechanism to resolve payment problems facing contractors and affecting the success of projects. Figure 8.3 b, illustrates the payment process for contractors and is aimed to facilitate and accelerate the financial process. The framework suggests an independent organisation be used to monitor and control the payment process to ensure that payments due to the contractors will be on time. This will contribute to reducing the delay of payment and improve the success of the projects.

In summary the participant acknowledged that:

- The framework looks comprehensive and well detailed.
- It covers various factors that can determine the success of construction projects.
- The framework highlighted and recommended good selection criteria for project manager and other stakeholders.

COMMENTS AND FEEDBACK FROM PARTICIPANT (VI)

The aim for developing the framework has been clearly stated and most of the factors for the successful implementation of projects have been identified. However, the linkages

between the various parts are complicated and will have to be improved for ease of implementation.

- The headings of the 5 parts of the framework are not easy to understand and coordination between the headings can be improved.
- The ordering of the factors in the various parts of the framework will aid the easy implementation of the framework.
- It will be appropriate to consider social and technological factors as part of the external factors since these affect the success of construction projects.
- It is not clear whether the framework is to be used by the private or public sector since the operating environments are very different. It will be useful to define the roles of the sectors.

In summary the aim for the development of the framework is well articulated and the text is understandable. There is no doubt that the framework will be useful in guiding the successful implementation of construction projects in Libya. However the diagrams are complicated and the links between the various boxes are not clearly defined.

FEEDBACK ANALYSIS FROM PARTICIPANT (VI)

- The framework is a hierarchical composition divided into four parts. Figure 8.3 is a hierarchy which shows the heading of the parts. These are amended as follows: Figure 8.3a, stages and components of the framework; Figure 8.3b, overcoming external factors within the framework; Figure 8.3c, achieving success through project conceptualization; and Figure 8.3d, project staff selection criteria.

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- The framework recommended that appropriate technological innovations are important for the success of Libyan construction projects. It is also strongly recommended that the social factors are crucial for the selection of the project team members, which they should be considered in the selection stages.
 - The framework has been developed for enhancing the success of construction projects in Libya and improving the construction sector. As the majority of projects in Libya are funded by the government, the framework is more likely to be used by the public sector. However, as mentioned earlier in this chapter the framework can also be used by the private sector and in any other country that has the same characteristics.

In summary the participant acknowledged that:

- The framework is very clear.
- It identified many factors for the successful implementation of projects.
- It is well articulated and understandable.
- It is a good guide for improving the success of construction projects.

9.5. IMPACTS OF VALIDATION ON THE FRAMEWORK

The feedbacks identified by the validators have greatly impacted on the final draft of the framework; this was achieved through using the critical comments volunteered by the verifiers as to the framework. However, some of the feedbacks suggested by the validators were not reflected in the final version of the framework, because such comments were already integrated in the framework. Also, some feedbacks were not considered because they were not relevant to the framework, and explanations were given by the author.

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9.6. SUMMARY OF FINDINGS FROM THE VALIDATION PROCESS

Very positive and encouraging feedback has been received from experienced professionals in the construction industry in Libya. The feedback has confirmed that the framework and approaches proposed by the framework, if properly used, may not only bring about a remarkable improvement in the construction sector but may also ensure that construction projects are successful. These are exemplified by the following views:

"I believe the framework covers the major areas of concern in Libyan construction. This will really be very useful for all stakeholders in the construction industry in Libya".

(Validator 1)

"The diagram of the framework is clear and communicating, and the problems for which solutions are proposed are well conceived. As there are no universal solutions to problems, I feel the proposed framework, if articulated in the form of construction and or public procurement policy and standards would appropriately address the problems. A public procurement policy would help achieve transparency while promoting accountability and success. Construction policy would define the relationships of stakeholders and standards could regulate practice".

(Validator 2)

"The suggested framework raised all the most important points to make the construction projects in Libya successful".

(Validator 3)

"The suggested framework is quite thorough and covers a wide range of issues that hinder the construction process in Libya. The recommended framework should enhance project delivery in time, quality and budget. The framework is ideal and ... will have a significant improvement on the execution of construction schemes in Libya".

(Validator 4)

"The framework looks comprehensive and well detailed; it seems to address the various factors that can determine the success or failure of construction projects; not only in Libya but in any country. If the various criteria highlighted and recommended for the selection of project manager and other construction stakeholders are well implemented, project failures will be drastically reduced and there will be growth in the Libyan construction sector".

(Validator 5)

"The aim for developing the framework has been clearly stated. In summary the aim for the development of the framework is well articulated and the text is understandable. However the diagrams are complicated and the links between the various boxes are not clearly defined. There is no doubt that the framework will be useful in guiding the successful implementation of construction projects in Libya".

(Validator 6)

9.7. SUMMARY OF THE CHAPTER

This chapter reported the industry validation of the framework for enhancing the success of construction projects in Libya. In the beginning of the chapter, the process adopted for the validation and justification of chosen option was described. External validation outside the construction industry was not relevant owing to the focus of the framework on the success of construction projects. Nevertheless, this chapter reports how professional and experienced persons within the Libyan construction industry were approached to validate the framework. In the feedback section, the outcome of the validation process was described. Overall, the framework returned a very positive and encouraging feedback. Details of suggestions made and follow up analysis of each suggestion has been provided. Finally, from the findings of the validations it is clear that the framework if applied and used correctly the success of construction projects in Libya will be enhanced and the construction sector will grow and develop.

Chapter 10

Conclusions

10.1. AIMS OF THE CHAPTER

This is the final chapter of the thesis which presents the conclusions that are drawn from this research work. The conclusions cover the main research process including the literature review, questionnaires, interviews and validation process. The chapter presents a summary of the conclusions, and the research findings. The chapter also outlines the preliminary findings and the outcome from the research which shows the achievement of the research aims and objectives. The originality of the research outcomes and its contribution to the body of knowledge are confirmed. Then the limitations of this research work are explained. The chapter also identifies the areas for successful construction projects framework, where future research is recommended. Finally, the chapter concludes with a chapter summary.

10.2. MAIN CONCLUSIONS

This research aimed to evaluate and explore factors that influence the success of a construction project, and develop a framework to enhance the success of construction projects in Libya. These aims were achieved by employing three main data sources.

1. Literature Review

A comprehensive literature review was carried out (given in chapters one to four) and considered as a primary source of secondary data. Based on the analysis of the literature review, a pilot study was carried out. This was conducted through random interviews with some professionals working in the field of construction in Libya. The pilot study provided

the guide lines for the first source of primary data collection, which suggested a mixed method (quantitative and qualitative) was the most suitable approach for this research.

2. Quantitative Method

As a first source of primary data, a questionnaire survey was conducted in four different organisational groups in Libya, comprising contracting organisations, universities, government departments and consulting firms (a total 400 questionnaires were sent out). Quantitative data was analysed using SPSS 17 (given in chapter 6).

3. Qualitative Method

As explained in chapter 7, this is considered the second source of primary data. In-depth interviews were conducted in seven organizations to find out the most significant factors affecting the success of construction projects in Libya. Documents and reports (project examples) were also collected (details given in chapter 7).

Based on the findings of the literature review, questionnaire survey and interviews, a framework for successful construction projects was developed (details given in chapter 8). The framework was developed then validated using experienced professionals and experts in the Libyan construction sector. The main conclusions of the research are outlined as follows:

- The construction industry plays an important role in the development and growth of the country. However, the construction sector in Libya is not very impressive in terms of its success. Construction projects still do not achieve the triangle of success (time, cost,

and quality). It is identified that there are a large number of construction projects that are delayed and/or failed as a result of various factors.

- The improvement of the construction sector and the success of construction projects have affected in recent years as a result of different factors including e.g. the management methodologies, economic and political environments, and the contractual system that are in current use.
- Construction organisations are still struggling on how to manage their projects successfully as they still manage these projects using old management methodologies, old contracts system, and inappropriate selection of the project team members, e.g. the wrong selection of contractors and project managers.
- Problems associated with delay and/or failure of construction projects were also identified as construction organisations and/or government departments are having problems in relation to payment (delay of the payment process). Such delay to the due payment, for example to the contractors, is considered as one of the most important factors affecting the success of construction projects in Libya. This also affects the development and growth of the construction sector.
- Lack of monitoring and control from concerned parties (e.g. client and project manager) and unrealistic project schedules hamper the success of projects.
- No standards guidelines are available for the selection of project managers, contractors, consultants and subcontractors. Different approaches and methods are being adopted for

the selections and without even considering the main selection criteria e.g. experience, knowledge, capabilities etc.

- Non-user-friendly bureaucratic documentation, the complexity of administrative procedures, shortage of materials, insufficient training, weak policy and planning and lack of top management support are among the main factors that affected the success of construction projects and the development of the construction sector in Libya.
- The current health and safety management on sites is somewhat weak. Health and safety regulations should be well known in order to help staff in the better management of health and safety.
- Lack of financial support from the project owner (the client) had a major impact on the success of construction projects, and then has reflected on the growth of the construction sector.
- The knowledge and skills of the project team members are crucial in relation to finishing projects successfully. Lack of knowledge and skills have a direct impact on the quality of work, and this will then be reflected in the time and cost of the project.

10.3. SUMMARY OF THE CONCLUSION

The developed framework presented in chapter 8 has been validated by the industry participants (details are provided in chapter 9). In order to meet the aims of this research as set in chapter 1, the objectives set by the research were achieved as follows.

A Framework for Enhancing the Success of Construction Projects Undertaken in Libya

1. Determine the problem areas associated with construction project management.

Three areas were identified and established as being critical to the success of construction projects. These areas are the external environment, project conceptualization, and the selection of the project team (see figure 8.2a in chapter 8). The areas identified include issues and/or factors that need to be in place to ensure that projects will be successfully implemented. As this research has shown the success and/or failures are dependent on many factors, and it is different from one project to another. It is clear that for projects to be successful top management and project manager have to ensure the successful delivery of their responsibilities.

2. Determine the importance of project managers' roles and duties to the success of projects.

It was identified that a project manager is one of the main keys in ensuring the success of projects. Project managers' roles, duties, skills, responsibilities, knowledge and experience are considered very crucial to ensure that they are able to deliver projects successfully.

A project manager is considered successful if the success criteria of cost, time, quality and client satisfaction are achieved. A construction project is considered a success if the resulting benefits of the project are achieved (acceptable quality, within cost, and within time schedule).

In relation to the selection of a project manager, the findings confirmed that the wrong choice of project manager certainly has a significant impact on the success of projects. A

project manager is considered successfully selected if the selection criteria that are presented in chapter 8 are appropriately used.

3. Determine the barriers that influence the success of construction projects.

As shown in chapter 4, there are many factors and/or issues that can be barriers to the success of construction projects. The following are considered to be the main barriers affecting project success.

- The wrong selection of project team members.
- Lack of knowledge and skills in the project team.
- The impact of economic and political factors.
- Poor planning and control.
- Lack of health and safety management.
- Financial problems (poor financial support)
- Weak management methodologies and policies.
- Poor definition of goals and objectives.
- Poor top management support.

4. Determine the factors that contribute to the success of the construction projects.

Considering the important factors that were identified in chapter 8 of this research study, it is clear that there are a large number of factors that can contribute to the success of construction projects in Libya. The factors identified include economic environment, political environment, policy (critical success factors), planning, management, and

contractual management, selection of a project manager, selection of a contractor, selection of consultants, and selection of subcontractors. These are the main factors and under each factor there are sub-factors that if taken into consideration and account the success of construction projects in Libya will be improved.

5. Development and validation an operational framework to promote the success of construction projects.

The development of an original knowledge-based framework to enhance the success of construction projects in Libya was the main aim of this research. This framework was based on data collected from the literature review, questionnaire survey and interviews (secondary and primary data) for the successful implementation of construction projects. The framework was elaborated in three detailed areas including overcoming the external environment, achieving success through project conceptualization and project staff selection criteria. This framework which is presented in chapter 8 has been validated by experienced professional persons (details are provided in chapter 9).

10.4. SIGNIFICANCE OF THE RESEARCH AND CONTRIBUTION TO KNOWLEDGE

This research study developed and validated a framework which if adapted and adopted will ensure successful implementation of construction projects. The importance of the knowledge-based framework and the contribution to the body of knowledge is summarised as follows.

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- This study is the first of its kind to take place in Libya, comprehensively researching the factors that affect the success of construction projects in the construction sector. Past studies concentrated on specific factors of influence and were very limited in the range of study.
 - This research study has contributed to providing a database for other researchers in this field, deepening the understanding of what factors affect the success of construction projects in Libya and the development of the construction sector.
 - This research project will contribute to opening the horizons of knowledge in this field and encourage Libyan researchers to enter the field and study more deeply specific dimensions of the framework.
 - This study has identified factors that affect the success of construction projects in Libya (as listed in Table 8.1), and grouped these into factor-related-categories, ranking identified and selected factors according to their criticality and degree of importance. It is most important that these factors are considered in the selection process for project managers and contractors to ensure an optimum selection. The study also contributes to finding solutions to these factors through the creation of a framework to be used as a guide and tool to achieve success.
 - This study contributes to creating a strategy that can be used to improve and develop the Libyan construction sector, and hence will reflect a positive image on

the success of construction projects and help overcome the most important problems that face the development of the construction sector.

- The proposed selection criteria for project managers identified by the framework will contribute to enabling construction projects in Libya to be completed more successfully. These criteria include: management and technical skills, experience, personal attributes and knowledge and new criteria which were found important to manage construction projects successfully. These criteria are listed in Table 8.2 in Section 8.7.
- This study also identified a set of selection criteria for consultants, contractors and subcontractors needed not only to ensure that a suitable organisation will be selected but, importantly, to ensure construction projects are successful. These criteria are listed in Sections 8.8, 8.9 and 8.10.

10.5. LIMITATIONS OF THE RESEARCH

Some limitations applicable to this research work are as follows.

- The study is confined to the Libyan construction industry, the framework can be used in both public and private sector, the most important point for using the framework is to enhance the level of success in the Libyan construction project and improving the construction sector

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- The construction industry is considered one of the largest industries in Libya. The organisations approached for this study during the interviews and questionnaire surveys form just a representative sample.
 - 400 questionnaires were sent to a selection of different categories of respondents including: project managers, construction managers, consultants, contractors, clients/top management, academic lecturers, and others working in the field. Seven organizations were selected from the list of the best and biggest Libyan construction and consulting organizations, ten persons were interviewed including directors, project managers, consultants and/or contractors.

10.6. APPLICATION OF THE FRAMEWORK

This framework is intended to improve the rate of success for construction projects and, in that way, improve the construction sector in Libya. Its acceptance, adoption and application are proposed as a course of action by the highest authorities in the construction sector (government departments).

The following points explain the methods that will be employed when disseminating the framework:

- Presenting the framework to competent authorities and decision-makers in the construction sector in Libya;
- Presenting this framework through participation in conferences and scientific seminars in Libya;

- Explaining the benefits of using the framework and publicising it in the media (websites, Libyan construction press, and peer reviewed construction and engineering journals);
- Presenting this framework to the National Planning Centre and explaining the advantages of using the framework and how it will reflect on the success of construction projects and enhance the development of the construction sector.
- Presenting the framework to the National Economic Development Board (NEDB), and the National Research Centre and again explaining its advantages, how it will improve the success of construction projects and enhance the development of the construction sector.

10.7. RECOMMENDATIONS FOR FURTHER RESEARCH

As mentioned in the previous chapters, there are many factors that may affect the success of construction projects. The limited scope of the research project could not entirely cover all factors. However, the most significant factors affecting project successes are covered. Hence, for further research the following areas are suggested.

- A study into the different areas related to the success and/or failure of construction projects in the construction sector in Libya is needed (e.g. the supply chain management).

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- A best practice IT-based management system for successful construction project implementation is needed.
 - A case study to discover more factors relating to success may need to be used in further research.
 - Further research may be done as a comparison between two countries e.g. one of the advanced countries and Libya to compare the success factors.

10.8. SUMMARY OF THE CHAPTER

This chapter concludes the thesis. At the beginning the main conclusions from the research project were presented. It is worth mentioning that the analysis of the literature review; questionnaire survey and interviews provide the research findings in details at each phase, which formed the basis for the framework development. The summary of the conclusion subsequently followed. The findings from the conclusion provided the need for the framework that has been developed. The section summarised with the research findings. It explained the need for this research study, and the achievement of the research aims and objectives. The novelty of the work, the contribution this research makes to the body of knowledge, and its benefits for construction projects and the development and growth of the construction sector are outlined. The limitations of this research and the application of the framework were highlighted. Finally, the areas for further research work were also identified.

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Appendix A

Questionnaire Survey Sample

Unit 9 Science Park

Sheffield Hallam University

Sheffield, UK

S1 1AY

June 11, 2008

QUESTIONNAIRE ON CONSTRUCTION PROJECTS

The Built Environment Division of Sheffield Hallam University is currently carrying out a research on a major factors affecting success of the construction projects. This research project aims to evaluate and explore factors that influence the success of a construction project, and develop a framework to enhance the success of construction projects in Libya.

We are currently seeking key data from construction projects in Libya. We are pleased to invite you to support this research project by taking a few minutes to answer some questions. We would appreciate if you could answer and return this questionnaire by.....

We assure you that this study is completely confidential and no person responding to this questionnaire will be referred to by name. If you are interested to know more about the project or it's finding please do not hesitate to contact us.

We thank you in advance for your valuable support

Yours truly

Mahdi Ali

Email: Mahdi.Abulsamad-Ali@student.shu.ac.uk, mm80aa@hotmail.com

Tel: ++ (44) 7770911187, ++ (218)923067290.

SECTION ONE

(Please tick as appropriate)

1. Your current position in your organisation.

Kindly specify

2. Your firm employs.

- 1 . Less than 50
- 2 . Between 51 - 100
- 3 . Between 101 - 499
- 4 . More than 500

3. Years of experience in engineering construction/project management.

- 1 . Less than 5 years
- 2 . Between 6 - 10 years
- 3 . Between 11 - 15 years
- 4 . More than 15 years

4. How many years have you been involved in construction projects as:

a. Construction Team Member:

- 1 . 0 - 5 Years
- 2 . 6 - 10 Years
- 3 . More than 10 Years

b. Construction/Project Manager:

- 1 . 0 - 5 Years
- 2 . 6 - 10 Years
- 3 . More than 10 Years

c. A Consultant/Contractor:

- 1 . 0 - 5 Years
- 2 . 6 - 10 Years
- 3 . More than 10 Years

d. A Client/Top Management:

- 1 . 0 - 5 Years
- 2 . 6 - 10 Years
- 3 . More than 10 Years

5. Years of experience as an academic lecturer in Eng Construction/Project Mgt.

- 1 . Less than 5 years
- 2 . Between 6 - 10 years
- 3 . Between 11 - 15 years
- 4 . More than 15 years

SECTION TWO

Evaluation of Project Managers

(Please indicate your opinion about evaluation of project manager roles by circling the number that match closest to your opinion on the scale of 1-5*)

2.1 The importance of the following personal attitude, attributes and traits towards managing construction projects successfully.

	<u>Not Important</u>			<u>Very Important</u>	
1. Delegate	1	2	3	4	5
2. Make decisions	1	2	3	4	5
3. Problem solving	1	2	3	4	5
4. Team building	1	2	3	4	5
5. Good communicator	1	2	3	4	5
6. Motivator	1	2	3	4	5
7. Shared vision	1	2	3	4	5
8. Leading the project	1	2	3	4	5
9. Adapt	1	2	3	4	5
10. Good organiser	1	2	3	4	5
11. Negotiations	1	2	3	4	5

2.2 The following Management skills are essential in managing construction projects successfully.

	<u>Strongly Disagree</u>			<u>Strongly Agree</u>	
1. Resource allocation	1	2	3	4	5
2. planning and control	1	2	3	4	5
3. Adaptability	1	2	3	4	5
4. Leadership	1	2	3	4	5
5. Communication	1	2	3	4	5
6. Motivation	1	2	3	4	5
7. Organisational abilities	1	2	3	4	5
8. Negotiating skills	1	2	3	4	5
9. Time Management	1	2	3	4	5
10. Quality Management	1	2	3	4	5
11. Risk Management	1	2	3	4	5
12. Cost Management	1	2	3	4	5
13. Supervision	1	2	3	4	5

2.3 The Importance a reas of these Knowledge of the Project Manger towards Ensuring Construction Projects Success.

	<u>Not Important</u>			<u>Very Important</u>	
1. Health and Safety Regulations	1	2	3	4	5
2. Technical Knowledge	1	2	3	4	5
3. Tendering and procurement Strategies	1	2	3	4	5
4. Project Management Techniques	1	2	3	4	5
5. Communication Systems	1	2	3	4	5
6. Risk Identification	1	2	3	4	5

2.4 The Importance of the following selection Criteria of a Project Manager towards achieving successful construction projects.

	<u>Not Important</u>			<u>Very Important</u>	
1. Period of Experience	1	2	3	4	5
2. A strong Technical Background	1	2	3	4	5
3. Authority in controlling the Project	1	2	3	4	5
4. Technical Knowledge	1	2	3	4	5
5. Personal Abilities	1	2	3	4	5
6. Administrative and Supervisory Skills	1	2	3	4	5

SECTION THREE

Construction Project Success Factors

(Please indicate your opinion on the following about factors that can affect the projects success by circling the number that match closest to your opinion on the scale of 1-5*)

3.1 Project-Related Factors

The following affects the success of a project.

	<u>Strongly Disagree</u>			<u>Strongly Agree</u>	
1. Type of Project	1	2	3	4	5
2. Nature of Project	1	2	3	4	5
3. Size of project	1	2	3	4	5
4. Life Cycle	1	2	3	4	5

3.2 Procurement-Related Factors

The importance of these to the construction project success.

	<u>Not Important</u>			<u>Very Important</u>	
1. Procurement Method: (Selection of the organization for the design and construction of a project)	1	2	3	4	5
2. Tendering Method: (Procedures adopted for the selection of the project team and in particular the main contractor)	1	2	3	4	5

3.3 Project Management Factors

The importance of these to the construction project success.

	<u>Not Important</u>			<u>Very Important</u>	
1. Adequate Communication	1	2	3	4	5
2. Control Mechanisms	1	2	3	4	5
3. Coordination effectiveness	1	2	3	4	5
4. Decision making	1	2	3	4	5
5. Monitoring	1	2	3	4	5
6. Project Organization structure	1	2	3	4	5
7. Troubleshooting	1	2	3	4	5
8. Overall Managerial actions	1	2	3	4	5
9. Implementation an appropriate safety program	1	2	3	4	5
10. Motivations	1	2	3	4	5
11. Top Management support	1	2	3	4	5
12. Feedback capabilities	1	2	3	4	5
13. Risk Management	1	2	3	4	5
14. Understanding of health and safety regulation	1	2	3	4	5
15. Defining of project objectives	1	2	3	4	5
16. Plan and schedule followed	1	2	3	4	5

3.4 Human-related Factors

The following affects the success of a project.

	<u>Not Important</u>			<u>Very Important</u>	
1. Leadership	1	2	3	4	5
2. Committed project team	1	2	3	4	5
3. Project manager performance	1	2	3	4	5
4. Project team leader's experience and skills	1	2	3	4	5
5. Technical background of project team members	1	2	3	4	5
6. The leader's commitment to meet time, cost, and quality	1	2	3	4	5
7. The leader's adaptability and working relationship	1	2	3	4	5
8. The leader's adaptability to changes in the project plan	1	2	3	4	5
9. The client's contribution to the project	1	2	3	4	5
10. The client's experience	1	2	3	4	5
11. Client's emphasis on low construction cost	1	2	3	4	5
12. Client's emphasis on high quality of construction	1	2	3	4	5
13. Client's emphasis in quick construction	1	2	3	4	5
14. Project team member's knowledge and skills	1	2	3	4	5

3.5 External Environment Factors

The importance of these to the construction project success.

	<u>Not Important</u>			<u>Not Important</u>	
1. Economical environment	1	2	3	4	5
2. Political environment	1	2	3	4	5
3. Technology advanced	1	2	3	4	5
4. Industrial relation environment	1	2	3	4	5

SECTION FOUR

Barriers to success of construction projects

(Please indicate your opinion on the following about barriers to success of construction projects by circling the number that match closest to your opinion on the scale of 1-5*)

	<u>Strongly Disagree</u>			<u>Very Important</u>	
1. Poor definition of a project objectives	1	2	3	4	5
2. Poor planning and control	1	2	3	4	5
3. Lack of communication	1	2	3	4	5
4. Lack of health and safety	1	2	3	4	5
5. Poor risk management	1	2	3	4	5
6. Misunderstanding of responsibilities	1	2	3	4	5
7. Wrong selection of a project manager	1	2	3	4	5
8. Lack of skills & Knowledge (project manager & project team)	1	2	3	4	5
9. Poor financial support	1	2	3	4	5
10. Poor top management support	1	2	3	4	5
11. Poor leadership	1	2	3	4	5
12. Unmotivated team	1	2	3	4	5
13. Inadequate of money (cash flow)	1	2	3	4	5
14. Poor quality of materials	1	2	3	4	5
15. The fluctuation of prices	1	2	3	4	5
16. Instability of economy	1	2	3	4	5
17. Inadequate of manpower	1	2	3	4	5
18. Increase the rate of labour and materials cost	1	2	3	4	5
19. The weather factors	1	2	3	4	5
20. Change of top management	1	2	3	4	5

21. Lack of materials	1	2	3	4	5
22. Wrong selection of contractors	1	2	3	4	5
23. wrong used of project methodology	1	2	3	4	5
24. Inadequate Technology	1	2	3	4	5

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE

We further assure you that this study is completely confidential and no person responding to this questionnaire will be referred to by name. If you would like to have further involvement in this research or want the results of the research please indicate below your preferred method of communication. (Please choose)

- 1 . Letter
- 2 . E-mail
- 3 . No further contact

Name:.....
Organization:.....
Address:
.....
Telephone:
E-mail:

THANK YOU FOR YOUR HELP

Please kindly return the questionnaires before

Appendix B

Code Book (SPSS)

CODEBOOK

ITEM NO	FULL VARIABLE NAME	SPSS VARIABLE NAME	CODING INSTRUCTIONS
1.	Respondent Current Position	Position	1= Project Manager 2= Construction Manager 3= Academic Lecturer 4= Contractors 5= Consultant 6= Client/Top Meg 7= Others
2.	Number of Employees	Employees	1= < 50; 2= 51-100; 3= 101-499; 4= >500
3.	Years of Experience in Eng Cons/Pro Mgt	YECPM	1= <5 2= 6-10 3= 11- 15 4= >15
4.	Years of Experience in Cons Projects as a Construction Team Member	YCPCT Member	1= 0-5 2= 6-10 3= >10
5.	Years of Experience in Cons Projects as a Const/Project Manager	YCPCP Manager	1= 0-5 2= 6-10 3= >10
6.	Years of Experience in Cons Projects as a Consultant/Contractor	YCP Consultant/Contractor	1= 0-5 2= 6-10 3= >10
7.	Years of Experience in Cons Projects as a Client/Top Meg	YCPC Top Meg	1= 0-5 2= 6-10 3= >10
8.	Years of Experience in Eng Const/Project Meg as Academic Lecturer	YECMA Lecturer	1= < 5 2= 6-10 3= 11-15 4= >15
9.	Importance of attitude, attributes and traits towards Cons Project Successful	IAATCPS 1 to 11	1= Not Important 5= Very Important
10.	Essential Management Skills in Managing Cons Project Successfully	EMSMCPS 1 to 13	1= Strongly Disagree 5= Strongly Agree
11.	Importance Areas of Knowledge of Pro Manger towards ensuring Cons Pro	IAKPMCPS 1 to 13	1= Not Important 5= Very Important

	Success		
12.	Importance Selection Criteria of a Pro Manger achieving Successful Const Pro	ISCPMASCP 1 to 6	1= Not Important 5= Very Important
13.	Project-Related Factors	PRF 1 to 4	1= Strongly Disagree 5= Strongly Agree
14.	Procurement-Related Factors	PRRF 1 to 2	1= Not Important 5= Very Important
15.	Project Management Factors	PMF 1 to 16	1= Not Important 5= Very Important
16.	Human-Related Factors	HRF 1 to 14	1= Not Important 5= Very Important
17.	External Environment Factors	EEF 1 to 4	1= Not Important 5= Very Important
18.	Barriers to success of Construction Projects	BSCP 1 to 24	1= Strongly Disagree 5= Strongly Agree

SCALES

IMPORTANCE SCALE	AGREEMENT SCALE
1= Not Important 2= Fairly Important 3= Moderately Important 4= Important 5= Very Important	1= Strongly disagree 2= Disagree 3= Natural 4= Agree 5= Strongly Agree

Appendix C

Interviews Questions

RE-SURVEY ON CONSTRUCTION PROJECTS

Further to our questionnaire on the above subject, we wish to request for a discussion session with you. Preliminary analyses of the data we obtained from the survey show some trends which need clarification. We hope to share your experience and knowledge in understanding and explanation of these trends. We are soliciting for your support by taking few minutes of your time to discuss these issues.

We hope to carry out these discussions between Kindly feel free to choose date, time and venue for this discussion within the above time frame.

We assure you that this study is completely confidential and no person participating in this discussion will be referred to by name or his/her place of work mentioned in any of the findings at the completion of the research if needed.

While waiting for your reply, we thank you in advance for your valuable support

Yours truly

Mahdi Ali

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MAIN DISCUSSION POINTS OF THE INTERVIEWS

- The impression of the interviewee about the construction industry in Libya
- The quality of a project manager as a factor affect construction project success, and his relationship to the success of any construction project
- The impact of the economy change and government policy on the success of the construction projects
- The relationship between cost construction, management construction and quality construction
- The most critical factors that could affect the success or/and failure of construction projects in Libya

Appendix D

Research Programme

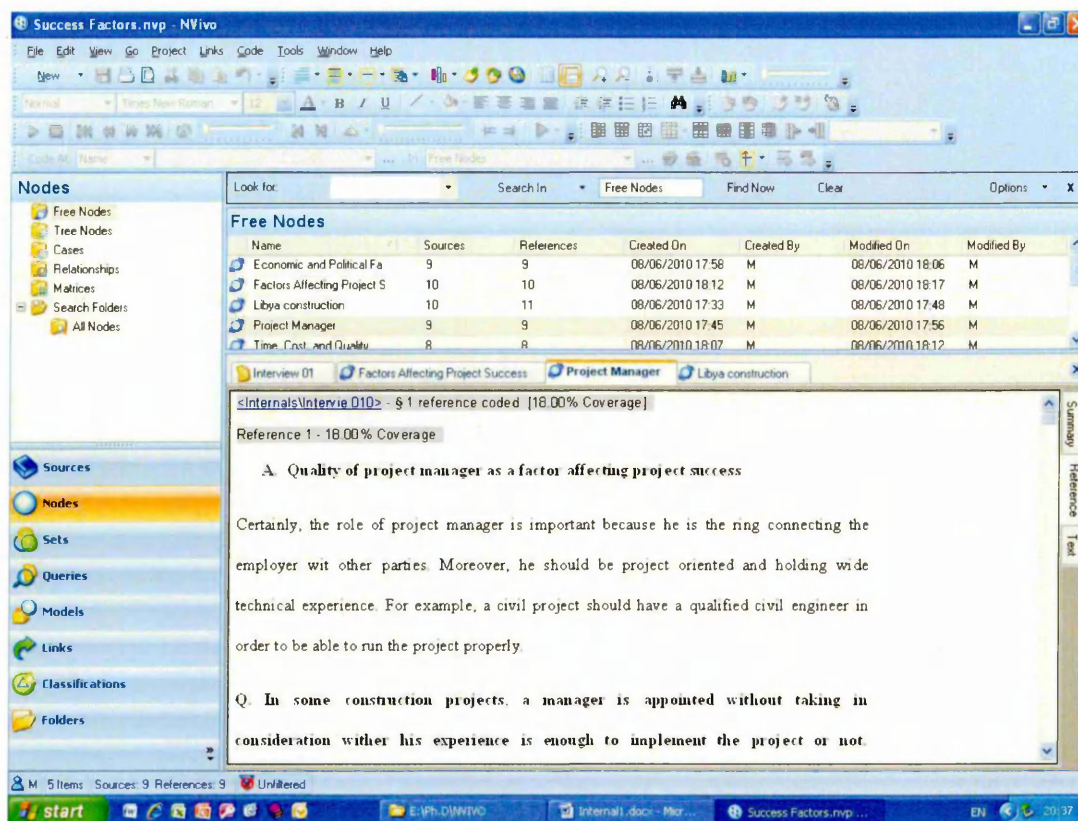
RESEARCH PROGRAM

RESEARCH TOPIC: 'A Framework for Enhancing the Success of Construction Projects' Undertaken in Libya'

No	Activities	Days	YEAR 2008												YEAR 2009												YEAR 2010												2011		
			DATA FORMATION												DATA COLLECTION / VALIDITY												DATA ANALYSIS & FINDINGS														
			Marsh	April	May	June	July	August	September	October	November	December	January	February	Marsh	April	May	June	July	August	September	October	November	December	January	February	Marsh	April	May	June	July	August	September	October	November	December	January	February	Marsh		
1	Proposal & RFI Presentation	90	■	■																																					
2	Literature Review	360	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
3	Field Survey/Exploration	120			■	■	■																																		
4	Research Design	120						■	■				■																												
5	Questionnaires Drafting	60											■	■																											
6	Validity/Reliability Testing - Pilot Study	60												■	■																										
7	Questionnaires Distributions	120																																							
8	Questionnaires Collection	180																																							
9	Pilot Study	90																																							
10	Interviews Research	90																																							
11	RE-Visitation of Chapters	90																																							
12	Presentation of Chapters	60																																							
13	Data Gathering (Questionnaires & Interviews	90																																							
14	Analyses of Data	90																																							
15	Findings & Reports Presentation	60																																							
16	Developing & Validation of SCP Framework	90																																							
17	Conclusion, Recommendation & Presentation	150																																							
18	Writing UP	840																																							
19	Checking, Corrections & Binding	60																																							
20	Final presentation & VIVA	60																																							

Appendix E

Nodes Screen Display (NVivo)



The above screen shows how the interviews were coded and classified. The screen is divided into three windows including navigation view (Nodes), list view and detail view. The Nodes is used to code and gather materials by topic, for example, you can gather all the content relating to a project manager. There are several types of Nodes, these include - Free Node: Nodes that store 'loose' ideas which are not related to other nodes; Tree Nodes: Nodes that are used to categorise project which are logically related; Cases: Nodes that represent entities within the research e.g. people, schools; Matrices: Nodes that are used to show how the contents of different nodes relates to each other; and Relationships: Nodes that represent what is known or discovered about relations between items in the project. The list view window shows a list of the areas that were discussed the interviews including the impact of the economic, political factors, and factors affecting projects success; Libyan construction industry, the Project manager and relationship between cost, time and quality to projects success. The detail view window shows details about the topics as discussed with the interviewees, for example; all sentences and paragraphs are related to a project manager and his impact on construction projects success are shown on the screen. Key words were entered and then the software collects all the paragraphs and sentences which were related to the words.

Appendix F

Publications Abstracts

**TITLE: THE INFLUENCE OF THE PROJECT MANAGER ON THE SUCCESS
OF THE CONSTRUCTION PROJECTS**

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The success and failure of any project depends upon many factors, the Project Manager is considered to be the key contributor to the success of any project, as well as a guide to the team members to achieve the client satisfaction (Cost, Time and Quality). Therefore the main aim of this paper is to provide a practical approach for understanding the importance of the Project Manager and his effectiveness to the success of the construction projects. In addition, the Project Manager's roles, responsibilities and duties have direct impact to the success of the construction projects. In order to identify the thoughts and opinion of the construction industry on this particular assertion, a quantitative study was carried out within the UK construction industry. The result of the study shows that there is an extremely strong correlation between the Project Manager and the success of the construction projects. In construction projects the Project Manager is considered to be one of the most important people who can lead and drive the projects in the right direction and conclude construction projects successfully. Moreover, these can play the most important role regarding the improvement of the organization's performance, the organization's profitability and the client's satisfaction. The research confirmed that the Project Manager is a very essential element to the success of the construction project and have an impact at every stage of the construction project. So it concluded that selection of a Project Manager should be carefully done with regard to experience, knowledge, power/authority and good understanding to the kind of the project.

Keywords: Project Management, Construction Management, Project Success Factors.

**CULTURAL INFLUENCES ON THE SUCCESS OF PROJECTS IN THE
LIBYAN CONSTRUCTION INDUSTRY**

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The Success and/or failure of any project depends upon many factors, it is different from project to another. The effectiveness of culture to the success of construction projects is considered crucial in relation of completing projects within time scale, estimated cost, acceptable quality and client satisfaction. Therefore, the main aim of this study is to provide a practical approach for understanding the importance of culture in construction and its effectiveness to the success of the construction projects. In order to identify the thoughts and opinion of the construction industry on this particular assertion, qualitative and quantitative methods were carried out in the Libyan construction industry. The result of the study shows that there is a relationship between culture and the success of construction projects, especially for the selection of the project team. Considering culture as one of the criteria for selecting the project team is considered very important to the successfully completion of projects. The research confirms that culture is very essential element to the success of the construction projects, and should be carefully done specially when selecting the project team members.

Keywords: Project Management, Construction Management, Project Success factors, Selection of Project Team, Culture Factor.