Best Practice Project management for the Sustainable Regeneration of Holy Karbala Province in Iraq

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A dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Civil Engineering

The University of Bolton

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Bolton, England, United Kingdom

March 2017

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Abstract

Many Regional Development Projects (Reconstruction Program in the Provinces) in Iraq, especially in Holy Karbala Province, suffer from mismanagement despite being 11 years since the launch of the program, the ready availability of funds from Iraq's oil revenues and the urgent need for infrastructure and essential public services. Reconstruction projects experience a high failure rate due to immature and unprofessional development plans, a lack of properly qualified people and ongoing training, and problematic routine procedures.

In recent decades, there has been a boom in management science in developed countries, specifically regarding the application of project management. Sadly, this is not the case in Iraq where project management practices remained unchanged and therefore outdated. A lack of implementation of standard project management methods in the construction industry in Holy Karbala Province has resulted in reconstruction projects that suffer from poor performance, delays, cost overrun, quality failures, disputes and claims. In order to improve this situation, there is the need for in-depth research of the project management environment to establish a foundation for the design of a new framework for the development of best practice in this area.

In consequence, this study aimed to examine current organizational structures and processes and to carry out an analysis of the key issues and causal relationships in Regional Development Project Management in Holy Karbala Province. The factors affecting the outcomes of projects were identified and assessed from the point of view of the key stakeholders group: residents, clients, consultants and contractors. This research adopted a mixed-method (qualitative and quantitative) approach, making use of questionnaires and interviews designed to examine the main aims of this study.

The research started with qualitative interviews whereby thirty managers were interviewed to evaluate organisational structure and process, key problems and obstacles that

they faced. This was followed by the distribution of quantitative questionnaires to a representative sample of 541 citizens, 126 employees (consultants and clients) and 78 contractors, to identify the main issues affecting project management practice and project outcome in Holy Karbala Province. Finally, focus-group interviews (qualitative approach) were carried out with 50 experts to assess the negative impact of 61 key factors affecting the timing, cost and quality of projects in Karbala. Several types of internal and external secondary data were also collected and included. Statistical analysis was conducted using Microsoft Excel and Social Science Software Package (SPSS). Descriptions are used for frequencies, means, relative importance and other statistical calculations, presented in tables and graphs.

The results have revealed that political change, unqualified project leaders, financial and administrative corruption, regulatory changes, inappropriate organisational structure, lack of government legislation, lack of motivation and encouragement, and slow decision-making make the greatest negative impact on projects in Karbala. There is no significant difference in any of the participant groups' perceptions of these factors and their consequent negative impact on the work carried out. Following on from this, a conceptual framework for best practice project management for the sustainable regeneration of Holy Karbala Province in Iraq was proposed. It has adopted several strategies, based on the results from the research, which address the roots of problems identified including a lack of legislation, the limited capabilities of leaders, project teams and contractors, and organizational weaknesses.

Acknowledgements

I am extremely grateful to God, who has given us the power to think and to write and who has made me able to complete this PhD thesis after many long and stressful days and nights.

Appreciation also goes to my mother, my wife, my sons and my best friends for their endless love, unceasing support and inspiration.

I express my sincere thanks to my supervisor Doctor Margaret Nelson for her encouragement, guidance, supervision and valuable advice. Without her support, this research would not have been completed. I would also like to extend my appreciation to Dr Sravanthi Sashikumar and Dr Safa Al-Hakeem, my second supervisors, for their support and valued comments.

I am also grateful to my best friends' Dr Ammar Al-Mayahi, Hatef Al-Musawi, Haidar Al-Badran, Uday Al-Wasti, Anmar Al-Dulaimi, Kamal Alogla, Mohammad Al-Abadi, Iman Abdul Amir, Imad Jassim and Haj Salih. Thank you for your help when I needed it the most; without your support, it would have been difficult to complete this thesis. Words are not enough to show my indebtedness to you. My truthful thanks.

I also wish to thank all the practitioners who participated in the study. This research would not have been possible without the help of practitioners from the directorates, departments and companies in Holy Karbala Province who found time in their busy schedules to participate in the various stages of the research.

I will always be thankful to all of you.

Certificate of Originality

This is to certify that I am responsible for the work submitted in this thesis, and that neither the thesis nor the original work contained therein has been submitted in support of an application for another degree or qualification at this or any other university or other institution of learning.

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Chapter 1 : Introduction

1.1 Background

In the former regime under the rule of Saddam and under provincial Law No. 159 passed in 1969, projects were administered within a centralized management system. This law decreed that the governor held executive authority in the province, responsible for the implementation of central authority policy and monitoring the performance of the Local Administration who implemented policy according to Articles 17 and 28 of this Act.

The subsequent change in regime has led to changes in the mechanisms for central administration of the provinces and the distribution of power between central authority, regions and provinces. This new political reality included decentralization of the administration of the provinces.

Spring 2016, saw the 11-year anniversary of the launch of regional development plans (reconstruction program) in Iraq's provinces. However, this important practice was dilatory because of immature and unprofessional development plans, staff who lacked the necessary qualifications and training, and difficulties with routines procedures.

This situation caused the emergence of a pattern of political conflict between the ruling parties which spilled over into conflict between federal and local state institutions. The result of this was a deterioration of public services to the indignation of citizens. The government did nothing to address this situation. Promises to citizens have not been met, this raising serious concerns voiced by member of the public and politicians alike.

Karbala Province has complained, as have other provinces, of a lack of financial resource allocation and access to the powers necessary for the advancement of reconstruction and services. That said, the general federal budget allocated for the years 2006 – 2016 amounted to

approximately $1.5 billion for development works in the province. This makes the need for sound project management with administrative decentralization in Iraq a necessity.

Over the last decade, the majority of Federal Government (FG) directorates have been involved with Karbala's Local Government (KLG) in the planning, implementation and supervision of engineering projects specifically relating to infrastructure and service. The very nature of the organizational and administrative framework of state institutions is correlated with the management of development projects in the provinces, in particular the Holy City of Karbala. This has, and is still causing, a significant number of problems that have influenced the outcome of projects.

In 2013, the World Bank ranked Iraq 165 out of 185 countries in its overall "ease of doing business" category. At the same time, Transparency International ranked Iraq 169 out of 176 in its 2012 Corruption Perception Index (BEBA, 2013). This reflects the poor performance of public sector organisations who are responsible for the delivery of various services in Iraq. Examining the literature, it is clear that organisational culture, structures and processes have a significant impact on the performance of government organisations (Al-Tameemi and Alshawi, 2014; Stummer and Zuchi, 2010; Bohte and Meier, 2001).

Addressing issues around poor performance requires work in two main areas, the first to identify, classify and analyse the key internal and external factors that increase imbalances in program and project plans related to reconstruction in Karbala. The second is to develop a conceptual framework for good practice in project management for Holy Karbala Province. These approaches must be tackled together as it would otherwise be difficult to manage reconstruction projects in a sustainable manner, especially in Karbala city. This is because a) Karbala suffers from poor infrastructure and compromised basic services because of the failure of development plans including delay and cost overrun, poor quality of projects and the failure

of projects to meet social and environmental requirements, and b) not only is Karbala's normal population 1.2 million, but the city also needs to accommodate an estimated 20 million pilgrims annually (BBC, 2014; Al-Zubeidi, 2015).

Holy Karbala Province is different to other Iraqi cities in that it has two forms (morphologies). On the one hand, it is a medium-sized, newly developed city, similar to any other city in Iraq. However, it is famous for its religious significance. The old city, or city centre, houses the Shrine of Imam Hussein, the grandson of the holy Prophet of Islam, and is the third most important city in Islam. More pilgrims visit Karbala city in comparison to the first and second cities of Mecca and Madinah (both in Saudi Arabia). For example, in 2013, an estimated 9 million people visited Mecca and Madinah (Central Department of Statistics and Information, Saudi Arabia, 2013). About 20 million people visited the shrine of Imam Hussein in Karbala, Iraq during Arba'een's occasion in December 2013 (Karbala Council, 2013). In November 2016, Muslims gathered in Holy Karbala to participate in the world's largest pilgrimage (Christia et al., Washington Post, 2016)

1.2 Justification for the Research

Because of the impact of a steady increase in population, it has been difficult to keep up with the provision of basic necessities such as education, health, transportation, water and electricity. In order to meet these needs, professionals with the appropriate skills and experience to successfully manage construction projects, are required. In addition, project management needs to be developed as a discipline and be powerful and flexible enough to respond to fulfilling these needs (Altoryman, 2014).

There are two main drives for this research project:

1. The significance of developing a conceptual framework which helps to improve project management practice, specifically focussed on Regional Development Projects (RDP)
2. The limited availability of research explaining how internal and external factors influence the practice of project management in RDP in Iraq.

Although the above arguments illustrate the importance for research about project management in Holy Karbala Province (HPK), it is important to develop a conceptual model which can improve project management per sae.

Decision-makers working in public sector projects need a structured approach for the planning and development of infrastructure projects; they require a new methodology to approach reconstruction projects. This may be achieved by examining studies and research about the current problems facing project management organization in Iraq, in addition to the transfer of knowledge and experience from developed countries such as the United Kingdom, United States and other neighbouring countries like United Arab Emirates and Islamic Republic of Iran. This is on the basis that these countries have experienced a period of sustained growth in their construction and development planning. However, the transfer of management ideas and methods can only be successful if effort is given to modify management tools and culture to create a system that meets the requirements of development plans and the expectations of citizens (Riley and Clare-Brown, 2001).

1.3 Research Questions

The research questions for this study are:

a) What are the current organizational structures and processes for Regional

Development Project Management in Holy Karbala Province?

b) What are the key issues of concern and causal relationships thereof in Karbala's Regional Development Projects Management in its current form?

c) What is the impact of these key issues on Karbala's Regional Development Project Management?

d) What constitutes best practice (structures and processes) for project management and where can this be applied in Iraq?

e) How can best practice for project management be developed for Holy Karbala Province?

1.4 Research Aim and Objectives

This research aims to develop best practice project management structures and processes to support the regeneration programme in Holy Karbala Province, Iraq.

The objectives are:

1) To critically examine current organizational structures and processes in engineering project management in Holy Karbala Province.
2) To critically analyse the key issues in Development Project Management in Karbala Province, and identify the causal relationships between these issues.
3) To evaluate the impact of these key issues on project management process and structures.
4) To critically analyse best practice (structures and processes) for project management and its potential application in Iraq.
5) To develop a conceptual framework for best practice for project management structure and processes for Holy Karbala Province.

1.5 The Scope of Study

This research focuses on engineering project management for regeneration projects in the Karbala Local Government area of Iraq. Its scope is limited to the following:

- Public sector projects in the Karbala local government area of Iraq.
- Project management organisational structures and processes.

1.6 Research Methodology

This study adopted a mixed-methods (qualitative and quantitative) approach. Participants representing key stakeholder groups were recruited to allow an integrated image of the existing problems as experienced by all parties. The research procedure consists of questionnaires and interviews. Preliminary data will be gathered through three phases of questionnaires (quantitative data) and two phases of interviews (qualitative data) related to the main purpose of this study. In addition, a range of internal and external secondary data will be collected. Statistical analyses will be conducted using Microsoft Excel and SPSS.

1.7 Contributions to Research Knowledge

The research reported in this thesis has made a significant number of contributions to knowledge in terms of:

1) A comparative analysis of PM practice in the Iraqi public sector, a clear illustration of the critical factors within reconstruction projects and identification of best practice for construction project management.

2) Introduction of PM knowledge taking full cognisance of both the methodologies and standards aspects of PM best practice which need to be implemented in construction projects.

3) Extended knowledge and identification of key factors affecting project success for existing construction from the literature.

4) The development of a conceptual framework that enables project managers and decision-makers to transform themselves into PM knowledge chains. This will add value to all phases of the project delivery process.

5) Integration of research and practice in project management within a single framework which covers all the recent trends in PM. This is where investigation into practice, the diagnoses of problems and the development of solutions should take place.

6) Creating an awareness in PM organisations about the value of sustainability requirements during the implementation of projects, particularly in Iraq.

1.8 Structure of the Thesis

The thesis is divided into nine chapters. The first chapter, the Introduction, discusses the nature of the research and introduces the aims and objectives. The next three chapters cover the literature review. Chapter two reviews the project management literature; Chapter three examines the literature on project management best practice, whilst Chapter four identifies the main factors affecting project success.

Chapter five presents an explanation of the research design and methodology. Chapter six discusses data collection methods and describes and justifies the techniques used in this research. Chapter seven reports the analysis of the quantitative data from the questionnaires completed by citizens, employees and contractors. Chapter eight presents the analysis of the

qualitative data from manager's personal interviews and the group interviews carried out with experts. Chapter nine reports the results and findings. Chapter ten presents a discussion and development of a conceptual framework for improvement. Finally, Chapter eleven contains the summary, conclusions, contributions, limitations of the research and recommendations

1.9 Summary

This chapter gives a brief description of the project management environment in Iraq, specifically in Karbala city, along with an overview of the status of the construction sector over the last 30 years. It also includes the justification for the research, research questions, research aim and objectives, research methodology, the scope of study, contributions of the research and structure of the thesis. The next chapter will review project management literature.

Chapter 2 : Project Management

2.1 Introduction

Project management is one of the key skills demanded by organisations around the world (Stellingwerf and Zandhuis, 2013). As such, it has become one of the fastest growing professions in the world (Prabhakar, 2008; APM, 2012; PMI, 2015). Increasingly, companies are clearly seeing the benefits to be gained from investing time, money and resources to build organisational project management expertise, such as lower costs, greater efficiencies, improved customer and stakeholder satisfaction, and greater competitive advantage (PMI, 2010). PMI research identifies the project management career as one of the fastest growing professions in the business world, noting that project managers are highly valued in virtually all sectors (PMI, 2015). This chapter presents a critical examination of current project management theories. It includes the understanding of what constitutes a project, and provides evidence from literature on project management, including its characteristics, processes, knowledge areas, and activities. Attention is paid to the attributes, skills and competencies of an effective project manager. The benefits of effective project management are also outlined.

2.2 What is a Project?

The origin of the word "project" (from the Latin "pro", meaning forward, and "jacere", meaning throw) is "late Middle English (in the sense 'preliminary design, tabulated statement') and from the Latin 'projectum', meaning something prominent" (Walding et al., 2004). "A project

is an individual or collaborative enterprise that is carefully planned to achieve a particular aim" (Oxford Dictionary, 1933).

Kozak-Holland (2011) goes on to explain that the word "project" originally meant something that comes before anything else is done. When the word was initially stated, it indicated to the plan to do something, not to the act of actually carrying out the plan. Something performed in accordance with a project was called an object. This meaning changed use in the 1950s, when several techniques and methods for project management were introduced; in this era, the word changed meaning slightly to include both projects and objects.

Many authors give guidelines for how to manage projects, yet they often lack precision with regard to what they consider a project (Munk-Madsen, 2005). They sometimes proffer the guideline as applying to a larger class of phenomena than just projects, and at other times, apply the term to a subclass of projects such as engineering projects (AIPM, 2008; APM, 2012; PMI, 2013).

There are several definitions of projects in academic literature. Gittinger (1972) defines projects as a whole complex of activities involved in using resources to gain benefits. In 1982, he added that projects form a clear and distinct portion of a larger or less precisely identified program. Tuman (1983) states: "a project is an organization of people dedicated to a specific purpose or objective. Projects generally involve large, expensive, unique, or high risk undertakings which have to be completed by a specific date, for a specific amount of money, with some expected level of performance. At a minimum, all projects need to have well defined objectives and sufficient resources to carry out all the required tasks" (p. 498).

Declerck et al. (1983, 1997) offer a generic definition of a project as “a whole (set) of actions limited in time and space, inserted in, and in interaction with a politico-socio-economic environment, aimed at and tended towards a goal progressively redefined by the dialectic between the thought (the project plan) and the reality”.

Turner (1999) noted that “a project is an endeavour in which human, financial and material resources are organized in a novel way to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives” (Turner, 1999, p.8). A Guide to the Project Management Body of Knowledge (PMI, 2013, p.2) defines it as: “a temporary endeavour undertaken to create a unique product, service or result”. It can therefore be said that a project is temporary, with a defined scope and resources. A project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal “.

In addition to the above statements, a project is typically an activity for which money will be spent in expectation of returns, and which logically seems to lend itself to planning, financing, and execution as a unit. It is a certain activity, with a starting point and a certain ending point, intended to achieve specific objectives (Prabhakar, 2008). Usually, it is a unique action noticeably different from previous, similar investments, and it is likely to be various from succeeding ones, not a routine segment of on-going processes (Gittinger, 1982). It works with a well-defined sequence of production and investment activities, and a specific group of advantages, that can be identified, quantified, and usually determine value for money. Often, a project will have a partially or wholly independent administrative structure and set of accounts that is funded through a specially defined financial package (Merrett, 2001).

The project statement should not be a gathering of technical information, but should define what is to be done, why it is to be done, and what business value it will provide to the state organisation when the project is completed (Fuchs, 2006). Components of the project statement are shown in the following figure.

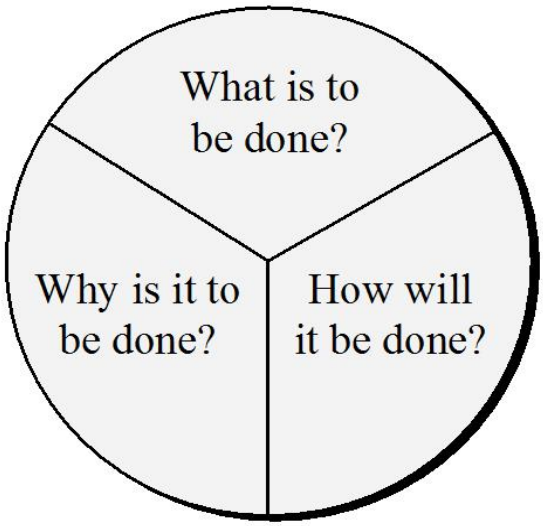


Figure 2.1 Key questions to be answered during the concept phase

As maintained by Nilsson and Söderholm (2005), planning is an intrinsic feature of projects. Plans are meant to build and guide the project team members as they work on realising the project goals that have been set out for them. From all these definitions, one can see that there are some specific attributes that define a project and separate it from most ordinary work:

- A project has a beginning and an end (Prabhakar, 2008; PMI, 2013).
- A project has limited resources (Turner, 1999; Prabhakar, 2008; Gasik, 2011).
- A project follows a planned, organised method to meet its objectives with specific goals of quality and performance (Prabhakar, 2008; PMI, 2013).

- Every project is unique (Turner, 1999).

A project manager is responsible for its outcomes (Nilsson and Söderholm, 2005; PMI, 2013).

2.3 What is Project Management?

Project management principles and techniques help to complete projects on time, within budget and to project specifications. At the same time, they help achieve the other goals of the organisation, such as productivity, quality, and cost-effectiveness. The objective of project management is to ensure completion of projects and to meet agreed goals of time, cost and scope (Richman, 2011). ISO 21500 (2013) defines project management as "the application of methods, tools, techniques and competences to a project. Project management includes the integration of the different stages of the project life cycle. Project management is accomplished through processes". The project management aspect is also defined by PRINCE2 (2009) as "a temporary organisation that is needed to produce a unique and predefined outcome or result in a pre-specified time using predetermined resources". Moreover, PMI, Project Management Institute (2013) defines project management "is therefore the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements''. Furthermore, IPMA, the International Project Management Association (2006), defines a project as "a time and cost constrained operation to realize a set of defined deliverables up to quality standards and requirements".

In other words, project management is the planning, execution and monitoring of project activities to meet project objectives, achieved by effectively controlling and balancing the constraints of scope, schedule and budget (Peng et al., 2007). The main purpose is to produce quality deliverables that meet or exceed the expectations of the project stakeholders. The

temporary nature of projects contrasts with processes, or operations, which are permanent or semi-permanent, and considered as on-going functional work to create the effective product or service.

2.4 Brief History of Project Management

In order to understand project management as a discipline, some attention needs to be given to its roots. Throughout history, many well-known complex projects were completed that are still in existence today, such as the Egyptian pyramids and the Great Wall of China (Shenhar, 2008; Burke, 2011). Project management has been practiced for thousands of years dating back to the old epoch. The project management knowledge base has developed and broadened over the years, and has evolved into modern project management using various tools, techniques and digital aids. Important developments influencing the practice of project management took place during the First World War and after World War II, most notably in the USA and the UK (Wirth, 1996; Burke, 2011), Although it was not until the mid-1950s that organisations began to apply formal project management tools and techniques to complex projects. Modern project management methodologies had their origins in two parallel but different problems of planning and control of projects in the United States.

According to Snyder and Kline (1987), the modern project management era began in 1958 with the development of CPM/PERT (Kwak et al., 2005), after which PERT and CPM increased their popularity within the private and public sectors. Defence departments of different countries, NASA, and large construction and engineering companies worldwide applied project management methodologies and tools and techniques to manage large-budget, schedule-driven projects. The popularity in the use of these project management tools during this period coincided with the

development of computers and the associated packages that specialised in project management (Camilleri, 2012).

Initially these computer packages were quite costly and were executed only on mainframe or minicomputers (Kwak et al., 2014). The use of project management techniques in the 1980s was facilitated by the advent of the personal computer and associated low-cost project management software. Hence, during this period, the manufacturing and software development sectors began to adopt and implement sophisticated project management practices as well. By the 1990s, project management theories, methodologies, tools and techniques were widely received by various industries and organisations (Kwak et al., 2005).

2.4.1 Five Periods in the Development of Modern Project Management

In an effort to capture the development of modern project management, Kwak et al. (2014) identified four periods in its history: prior to 1958, 1958–1979, 1980–1994 and 1995 to the present. With the introduction of Building Information Modelling (BIM) in 2011, however, there is now a fifth period in the development of project management. Numerous developments delineating these periods are shown in table 2.1. During these periods, project management transformed from a craft system to human relations administration, and is now moving towards collaborative partnerships.

- **First Period Prior to 1958**

In the period prior to 1958, improvements to transportation and telecommunication systems allowed for greater mobility and speedy communication. Gantt charts were also developed (in the second decade of the 20th century), and led to the development of job specifications, knowledge, skills and abilities deemed necessary for successful project management (Kwak et al., 2005; Shenhar, 2008; Seymour and Hussein, 2014).

In the USA, important projects of the pre-1958 period include the construction of Hoover Dam (1930s), the Manhattan Project (1940s), and the building of the Interstate Highway (1950s) (Hwang and Ng, 2013). Gantt charts were first used in the Hoover Dam project. These projects are important because they began the modern age of project management (Shenhar, 2008), with the Manhattan Project exhibiting "the principles of organization, planning, and direction that influenced the development of standard practices for managing projects" (Shenhar, 2008, p.1).

- **Second Period 1958-1979**

There were significant technological advancements between 1958 and 1979. In 1959, Xerox introduced the first automatic plain-paper copier. In the 1960s, many industries were influenced by the development of silicon chips and minicomputers (Franzen and Moriarty, 2008). In 1969, Bell Laboratories developed the programming language UNIX and the computer industry began to develop rapidly (Emmick, 2008). NASA's successful Apollo project earmarked a historic event of mankind. In 1971, Intel introduced 4004, a 4-bit microprocessor, which was the foundation of the evolution of Intel's 80386, 80486, and Pentium processors in the 1990s (Kwak et al., 2005). While many dedicated scientists developed ARPANET (Griffiths, 2002), in 1972 Ray Tomlinson introduced the first e-mail software (Showalter, 2007). In 1975, Bill Gates and Paul Allen founded Microsoft (Greene, 2011). Several project management software companies were developed during the 1970s, including Artemis (1977), Scitor Corporation (1979), and Oracle (1977) (Kwak et al., 2005; Camilleri, 2012).

Table.2.1 Five periods of project management (adapted from Kwak et al., 2005)

Period	Technology	Management Science	Project Management & Technology	Major Projects	Project Office	Standards	Guidance	Definitions
~ 1958	Telegraph Telephone First computer Automobile Aeroplane First database	Adam Smith Frederick W. Taylor Henry Fayor Henry Gantt A. McGregor's XY theory	Parametric Cost Estimation PERT/CPM Gantt Chart Monte Carlo Simulation Systematic Application	Inter-continental railroads Hoover Dam Polaris Manhattan Project Panama Canal	Focal point "Proximity" Traditional project office functions Navy Special Project Office (SPO)	ANSI		Project is a problem scheduled for solution (Juran, 1951)
1959 ~ 1979	IBM 7090 Xerox copier UNIX Microsoft Founded	ISO Total Quality Management Globalisation Quality Management	PMI Inventory Control Material requirement planning	Apollo 11 ARPANET	Project Supporting Office	BS 9000:1971 BS 5179: 1974 BS 5750: 1979		Complex of activities involved in using resources to gain benefits (Gittinger, 1972)
1980 ~ 1994	Personal Computer Wireless in-building network First Internet browser (MOSAIC)	Manufacturing resource planning Risk management	Matrix organisation PM Software for PC	Boeing 777 Challenger Space Shuttle The English-French Channel project	Project Headquarter War Room	BS 5750: 1979 ISO 9000:1987 ISO 9000:1994	Six Sigma:1980	A project is an organisation of people dedicated to a specific purpose or objective (Tuman, 1983)
1995 ~ 2011	Internet	Critical chain Enterprise Resource Planning	PMBOK (PMI)	Iridium Y2K project	Virtual Project Office Web-based Project Office	ASTM E 621: 1994 EN 13290-1:1999 BS 6079-3:2000 ISO 9001:2000 BS ISO 15188:2001 BS ISO 10006:2003 BS EN 9200:2004 GAPPS:2007 ISO 22263:2008 BS 6079-1:2010	PMBOK (PMI) PRINCE2 ISO 15188:2001 Six Sigma Scrum	An endeavour in which human, financial and material resources are organized in a novel way to undertake a unique scope of work (Turner, 1999)
2011 ~ Present	Collaborative working tools	Regeneration Sustainability Integration Maturity	Building Information Modelling (BIM)* PMBOK (PMI)	Build Qatar Live 2012 New Crossrail Station at Woolwich	3PM Digital & Network Office	ISO 21500:2012 BSR 08-002-2013 EN 16601-60:2014 PAS 1192-3:2014 EN 16601-10:2015 ASTM E 1369: 2015 ISO 9001:2015 BS ISO 21504:2015	ISO 21500:2012 PMBOK (PMI):2013 PRINCE2 Six Sigma Scrum	A temporary endeavour undertaken to create a unique product or service (PMI, 2013)

* (BIM Industry Working Group, 2011)

Between 1950 and 1979, various core project management tools including Critical Path Method (CPM), Programme Evaluation Review Technique (PERT), Material Requirement Planning (MRP) and others were introduced (Kwak et al., 2005). CPM/PERT was calculated in large computer systems, and specialised programmers operated the CPM/PERT mainly for government projects. Many organisations used the project office as "brokers of information" with a small number of skilled schedulers and estimators (Carayannis et al., 2005). The two major professional project management bodies Project Management Institute (PMI) and International Project Management Association (IPMA), one North American and the other European, were established in the 1960s, indicating the extent of the development of project management through the 1960s, primarily thanks to CPM, PERT and PDM (Stretton, 2007).

In relation to the expansion of project management application areas. Forty-five years ago, project management was confined to the construction companies and Department of Defense contractors. Today, the concepts behind project management have spread to virtually all industries, including construction, defence, chemicals, pharmaceuticals, law, accounting, banking, advertising, government agencies, and the United Nations (Kerzner, 1979). In the 1970s, writing on project management took two significant new directions. We might call this period one of 'applications' and 'professional recognition'. New names joined the list as a wide variety of applications surfaced (Snyder, 1987).

- **Third Period 1980 - 1994**

During the 1980s and early 1990s, the revolution in the IT/IS sector shifted people from using mainframe computers to multitasking personal computers highly efficient at managing and controlling complex project schedules (Kwak et al., 2005). In the mid-80s, the Internet served developers and researchers, and local area networks and Ethernet technology began to dominate network technology (Leiner et al., 2000).

During the 1950s through 1970s, most computer engineers were responsible for operating project management systems because the mainframe systems were not easy to use (Antich, 2013). Morris and Hough (1987) acknowledged the unfriendliness of the mainframe software. During the late 1970s and early 1980s, project management software for PCs were made widely available by a number of companies in the mid-1980s, which made project management techniques more easily accessible (Kerzner, 2004)

The Calgary Winter Olympic Games in 1988 applied project management to the field of event management. Its successful adoption of project management practices expanded to various event management practices (XV Olympic Winter Games Organizing Committee, 1988). Whereas, the 70s of the last century saw the spread of individual applications of project management, and many refinements and extensions of project management tools and techniques, the decade of the 80s was several attempts to integrate the emerging experience from the many various application areas into principles and practices that would be applicable in most projects in most application fields and areas (sometimes referred to as generic). (Stretton, 2007). The most conspicuous of these initiatives was the Project Management Institute's publications of its body of knowledge of project management, known as PMBOK (Ibid).

The 1980s and 1990s saw the project management professional associations begin formalising what they considered to be the intellectual "scope", or definition, of the subject in their "bodies of knowledge" (BoKs) (Peter, 2013). For APM, the 1980s were a decade of consolidation, change and growth as professional project management became increasingly recognised and required. A professional standards group was formed under the leadership of Eric Gabriel and set out the standards and codes of practice. Technology and professional printing began to enter help cope, but the dedicated input of hard work, skills, knowledge and

creativity (APM, 2010). The Project Manager had become a well-received quarterly publication and in 1983, led by APM, INTERNET (later IPMA) published the first issue of The International Journal of Project Management, printed in the UK under the control of an international board and edited by a succession of APM members, the last of whom, Professor Rodney Turner, is still the editor today (APM, 2010).

The first complete version of PMI's Project Management Body of Knowledge (PMBOK) appeared in the August 1986 edition of the Project Management Journal. This was an extraordinarily more developed version of the PMBOK than the 1983 ESA Report (Stretton, 2007; Cagle, 2005).

- **Fourth Period 1995 - 2011**

Projects have been undertaken for millennia, but it was only in the last decades of the 20th century that people started talking about 'project management' (Weaver, APM, 2006). The Internet started to change virtually every business practice in the mid-1990s (Turban et al., 2000; Wankel, 2007; Venkatachalam and Sellappan, 2010). It provided a fast, interactive, and customised new medium that allowed people to browse, purchase, and track products and services online instantly. As a result, the Internet permitted organisations to be more productive, more efficient, and more customer-oriented (Jyoti, 2010; Chui et al., 2012).

- **Fifth Period 2011 - Current Day**

In recent years, the effects of globalisation have had significant implications for information technology. Companies face the increasing needs of the market, and tend to change or update their business approaches in line with new trends (Surugiu et al., 2015). Project management research has shown increased focus on linking competencies and information technologies (Obradovic et al., 2014). From one point of view, the rapid development of mobile technology has an increasing influence on project management approaches (Chin, 2014). From

another perspective, more sophisticated IT tools help project managers to effectively capture information in a wide network around the world (Surugiu et al., 2015).

Web-based project management tools integrate knowledge management issues with collaboration tools, focusing on communication between project managers, different employees, stakeholders and top management (Obradovic et al., 2014). Furthermore, project manager assignment and sufficient resource allocation contribute to improved project performance, and management of the interrelationship between projects contributes to project manager development (Patanakul, 2013).

Nowadays, the desire to reduce operational and capital costs and relieve the impact of carbon from both the construction and operation of the built environment is a pivotal driver for change (Turner and Townsend, 2014). Building Information Modelling (BIM) has become a higher priority following its mandate by a number of governments and states (APM, 2014; Turner and Townsend, 2014). By 2016, United Kingdom (UK) Government Construction made BIM mandatory on all centrally procured government projects. The Government Construction Strategy also encouraged the use of information technology – most notably BIM – to facilitate integration, and support the design, construction and long-term operation and maintenance of its built assets (H M Government, 2015).

BIM is a set of digital tools that can assist in the effective management of construction projects (Kensek, 2015). It is a technology-guided process to manage construction projects (Azhar et al., 2012). It has also been described as a new approach to construction procurement and a new way of working for construction stakeholders facilitated through virtual technologies (Kehily and Underwood, 2015), representing a set of technological developments and processes that has transformed the ways in which infrastructure is designed, analysed, constructed and managed (Cho et al., 2011). BIM can enhance and improve the planning

process, design and construction of projects, providing an alternative approach to the traditional paper-based method of project design and management (Kehily and Underwood, 2015). The BIM concept was first introduced in 1970 by Professor Charles M. Eastman (Forbes and Ahmed, 2010; Eastman et al., 2011). AEC industries started to implement BIM in construction projects in the mid-2000s (Azhar et al., 2012). The United States of America (USA) was the first country to implement BIM (NIBS, 2007). Nowadays, BIM is implemented in many countries such as the United Kingdom (UK), Denmark, Australia, Hong Kong, Finland, Norway and Singapore (NIBS, 2007; Cheng et al., 2015).

2.5 Engineering Project Management

Management has become an integral part of the duties of most professional engineers, and is included in the curriculum of most undergraduate engineering programmes in universities (Ward, 1991). ‘‘Nor was management alone in not yet being a subject of intellectual enquiry: the engineering of projects was also quite rule of thumb. Until the Enlightenment and really well into the 17th century, engineering was preeminently based on intuition and experience rather than science’’ (Peter, 2013). Despite the contributions of a few notable theoreticians such as Archimedes, Hero, Vitruvius and Frontinus, “the master builder remained a craftsman who, even in the design of important structures, was mainly guided by intuition” (Straub, 1952).

This is as true for the large irrigation projects and programs, for example of Iraq or Spain, as of the magnificent Roman aqueducts, roads and bridges, the vaulted buildings in Roman and Arabic architecture, or of the use of buttresses in Romanesque and Gothic architecture (Peter, 2013).

Sir Christopher Wren exemplified the changing role of knowledge, both in engineering and architecture and in management. A mathematician turned astronomer and architect/engineer, Wren was a founding Fellow of the British Royal Society ('for Improving Natural Knowledge', i.e. for Science) which was granted its Royal Charter in 1663 (Weaver, 2007). An outstanding example of Wren's project management skills was his role in responding to the catastrophic Great Fire of London of 1666, which reduced 13,000 houses, 90 churches and many other buildings, some quite magnificent, to ash and ruin. Wren and Robert Hooke, the Oxford physicist, another Royal Society member, were commissioned to survey the blasted site, plan the new city, design the churches, houses and other buildings, and oversee the rebuilding works, Wren being appointed chief architect to the Crown in 1669. So, great were the organisational challenges that Wren and Hooke abandoned the traditional approach to building – of craftsmen constructing the architect's design (Whinney, 1971).

The enormous amount of personnel and materials necessary called for careful control of costs and administration of the work. The beginnings of modern management of construction projects can be seen in the manner Wren's office was organized. The complimentary roles of engineer, architect, surveyor and contractor emerged (Cooper, 2003). So, for many hundreds of years, specialisation was by craft (hence the guilds) rather than by function (e.g. engineer). It was not until the 18th century that scientific theory began to be developed, enabling explanation and prediction, first, of the technical basis of project work, and later, more slowly and infinitely more tentatively, of some of their management needs and consequences.

According to Kocaoglu (1984), engineering management as formal academic degree has existed since the mid-1940s; whereas, that courses in business management and administration aspects of engineering have been taught since the early 1900s. For instance, Stevens Institute of Technology established a Department of Business Engineering in 1902

with the goal to teach and qualify students to become efficient and Effective managers (Clark, 2000). The Massachusetts Institute of Technology awarded a degree in industrial management around 1913 (Kocaoglu, 1989). Several Engineering Management (EM) or EM-type programmes grew out of the post-World War II industrial expansion. Such as the University of Washington (1947) and Michigan Technological University (1949) (Kotnour and Farr, 2005). The substantial growth occurred in the 1960 and 1970s. In 1967, the first department titled "Engineering Management" was established at the University of Missouri-Rolla (UMR) and awarded the first PhD in Engineering Management in 1984 (Murray and Raper, 1997). Nowadays, there are hundreds of universities offering undergraduate and graduate degrees in programmes named Engineering Management.

The most standard engineering management textbooks provide the skills needed for engineering managers rather than a definition of engineering management (Lannes, 2001). For example, Badawy talks about the skills mix needed by engineering project managers, which are defined by him as administrative and conceptual skills, technical skills and interpersonal skills (Badawy, 1995). Another older but still classic definition is offered by Kocaoglu: Engineering Management is the discipline addressed to making and implementing decisions for operational and strategic leadership in current and emerging technologies and their impacts on inter-related systems (Kocaoglu-IEEE, 1990). In Thamhain's book on engineering management, he also describes three very similar skill categories (Lannes, 2001): "leadership skills, technical skills, and administrative skills" (Thamhain, 1992, p. 8).

However, Morse and Babcock do attempt to provide an answer to the exact question, "What is engineering management?" in their book; their response is quoted below:

> ''Some writers would use a narrow definition of "engineering management," confining it to the direct supervision of engineers or of engineering

functions. This would include, for example, supervision of engineering research or design activities'' (Morse and Babcock, 2010, p. 14).

However, these narrow definitions fail to include the general management activities engineers actually perform in modern enterprises.

If engineering management is broadly defined to encompass the general management responsibilities engineers can assume, one might well ask how it differs from "ordinary" management. The engineering project manager is distinguished from other managers because he or she possesses both an ability to apply engineering principles and a skill in organising and directing project teams and managing projects. The engineering manager is therefore uniquely qualified for two types of jobs: the management of technical functions, such as design or implementation, in almost any enterprise, or the management of broader functions (such as marketing or top management) in a high-tech enterprise (Babcock and Morse, 1996).

In the last decade, William defined EM as the acquisition of the knowledge and skills required to be successful when an engineer reaches the supervisor or manager level. These skills are primarily integrative skills rather than the reductionist skills required in pure engineering (William, 2001).

In detailing the dimensions of the Engineering Management field, Kocaoglu said that: "EM included basic and applied research, developing, designing, and implementing the transfer of technology, as well as testing, marketing, and maintaining the technological life cycle, all of which seem to represent the engineering side of the EM house. A second area concerned the subsystems of people, projects, organizations, resources, innovation, and strategy, which seem to represent the managerial side of the EM house" (Kocaoglu, 1991, p. 80).

2.6 The Project Management Constraints

The moment an idea and its implementation are conceived, the first thing that comes to mind is how to execute the plan. To this end, numerous areas have to be addressed. The major factors are scope, schedule, cost and quality. More recently, the pillars of social and environmental sustainability have been added to this list. These are the constraints around which all new ventures and projects are built. According to the Project Management Body of Knowledge (PMBOK) Guide (5th Edition), a project constraint is a limiting factor that affects the implementation of a project, program, portfolio or a process (PMI, 2013). Another definition could be that project constraints are restrictions imposed by stakeholders or environmental factors that limit the project team's options (Grevelman and Kluiwstra, 2010). Project constraints are typically divided into several categories, as listed below.

2.6.1. Introducing the Triple Constraint

The Triple Constraint refer to the project management model based on the context of a "triangle" or "iron triangle". The triple triangle model applies to substantial scheduling, extension of scope, and cost constraints alongside the quest for quality (Marchewka, 2006). The "quality" factor of the model can be substituted for client satisfaction. These constraints are dependent on any alteration that affects the project; for instance, the project may cost more and the duration of the project increases its scope (Wyngaard, 2011). The triple constraint is considered beneficial for increasing the mechanisms and improving interactions that contribute to project completion. It can be useful for project managers who are not able to effectively prioritise and exploit the trade-offs. It is proposed as a system permitting thorough comprehension of the dynamics regarded as paramount for effective project management (Wyngaard et al., 2012).

A successful project can be defined as one that has been delivered under the designated budget and schedule in addition to meeting the stakeholders' requirements (Kuster, 2008). In reality, very few projects are able to actually meet all these goals; it is common for projects to be completed after the scheduled time, compounded by budgets that may prevent managers from meeting the beneficiaries' needs. Mastery of project management is becoming an essential skill for global success and achievement. What makes project delivery successful, however, is a topic of much academic debate, and varies by subjective opinion and the project in question (Morris and Hough, 1987).

It is generally noticed that to obtain outcomes that are more or less universally considered successful, a project must be fit for any particular purpose (i.e. it must add strategic value) and it must have met its delivery targets (Campbell and Baker, 2007). In reality, it is not always considered practical to deliver all the project targets exactly as planned. Trade-offs need to be considered and priorities must be set in order to realise strategic decisions (Barker and Cole, 2007). The PMBOK® endorses that every project is governed by the triple constraint, which reflects a framework for competing demands (Marchewka, 2006).

2.6.2 The Project Management Triangle

A project is a set of tasks undertaken to create a unique service within specified requirements. The process of project management possesses the following characteristics:

a) The first characteristic of a project is that it is temporary, in that it has a scheduled time to meet outcomes. The duration of a project may last from a couple of months to a couple of years and all projects must have an end.
b) The second characteristic is that a project uses its budget to acquire the necessary resources to conduct project work, including people, equipment, materials and any

other tools utilised to complete an activity, produce an output, and achieve an objective. The required work to accomplish the project activities is undertaken by the project team, who follow the details and plans.

c) The third characteristic is that a project will produce a unique service or product (the output), usually referred to as a "deliverable". The tangible and quantifiable conditions of deliverables are agreed by the beneficiaries and donors before the project starts.

All projects are carried out under certain constraints – traditionally, these are cost, time and scope. These three important factors (commonly called "the triple constraint") are often represented as a triangle (see Figure 2.2). Each constraint forms the vertices, with quality as the central theme:

- The project must be carried out within the limits of the specified cost.
- The project must be carried out within the scheduled time period (Haughey, 2011).
- The project must meet the expected scope, not more than or less than that which was originally planned.
- The project must encompass every need of the client, notably adhering to the desired quality.

Figure 2.2 Project Management Triangle

2.6.3 Project Management Diamond

Achieving excellence in project management states that the project manager's greatest challenge is effectively balancing the components of time, cost, scope, quality, and the expectations for each. Figure 2.3 shows the project diamond, which signifies this balance (Hamil, 2001; PMI, 2008; Hameed, 2012).

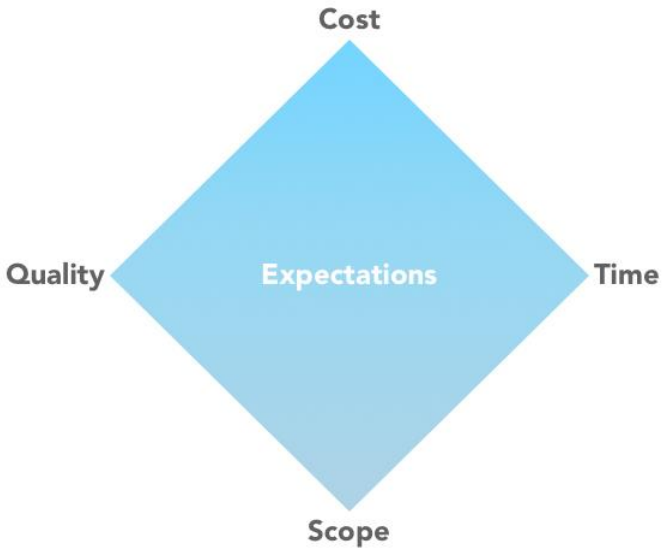


Figure 2.3 Project Management Diamond

The dimensions of the project diamond have a meaningful symbiotic relationship; for instance, when a user requests an additional report that was not agreed on in the requirement specifications, the scope and quality of the project change. This will change the other project components as well. As a result, the diamond shape will be skewed, graphically depicting a project out of control. The serious challenge is managing change while keeping the diamond's shape intact. Project planning identifies the diamond' elements, while effective and efficient change and expectation management allow for these elements to be managed throughout the project's life cycle (Hamil, 2001).

2.6.4 Project Management Star

As the engineering and construction industry is considered one of the main sources of global environmental pollution (Irizarry et al., 2012; Marcelino-Sádaba et al., 2015), sustainability has become recognised as one of the most important challenges faced by the industry at present (Silvius and Schipper, 2014). As a result, academics and practitioners have sought to redefine the criteria against which project success can be measured. One area that is gaining prominence within this field is project management, as there is an increasing understanding of the need to develop methodologies, tools and techniques to integrate sustainability criteria into the managing of projects (Ebbesen and Hope, 2013).

Transforming strategic sustainability objectives into specific actions for projects is a complicated process (Marcelino-Sádaba et al., 2015). The influence of the principles of sustainability on the project content will also need to be reflected in the project justification (Silvius and Schipper, 2012). The identification of costs, benefits and the business case of the project may need to be expanded to include non-financial factors that refer to, for instance, social or environmental aspects (Gareis et al., 2011; 2013).

The British Standards Institution (BSI) and the PMBOK Guide recognise ecological impacts and social needs as potential benefits of a project when the business case is discussed (PMI, 2013; BS 8903:2010). In PRINCE2, the business case addresses benefits in general, without specifically addressing potential environmental or social benefits (OGC, 2009). None of the standards mention the consideration of ecological or social costs. Considering the concept of sustainability in project management refers that the business case of a project addresses the triple bottom line of environmental, social and economic benefits. Investment evaluation is done based on a multi-criteria method of both qualitative and quantitative criteria (Silvius and Schipper, 2012).

Several authors conclude that integrating sustainability requires a scope shift in the managing of projects: from time management, budget and quality, to managing environmental, social and economic impact (Ebbesen and Hope, 2013; Haugan, 2012; Silvius et al., 2012). As a result of these new concerns, a new model or tool, the "Sustainable Project Management Star" (Figure 2.4), has been proposed. It is based on the Triple Bottom Line (the pillars for sustainability: economic, social, and environmental) and the Iron Triangle (for project management constraints: cost, time and quality). As Grevelman and Kluiwstra (2010) observe, the star shows that, to integrate sustainability criteria with project management traditional constraints, these two basic models can be combined into one, since there is a significant similarity between the factors 'cost' and 'economical', these two factors have been merged in to one point of the star. The choice for the factor 'economical' is made because it also includes the aspect 'cost'.

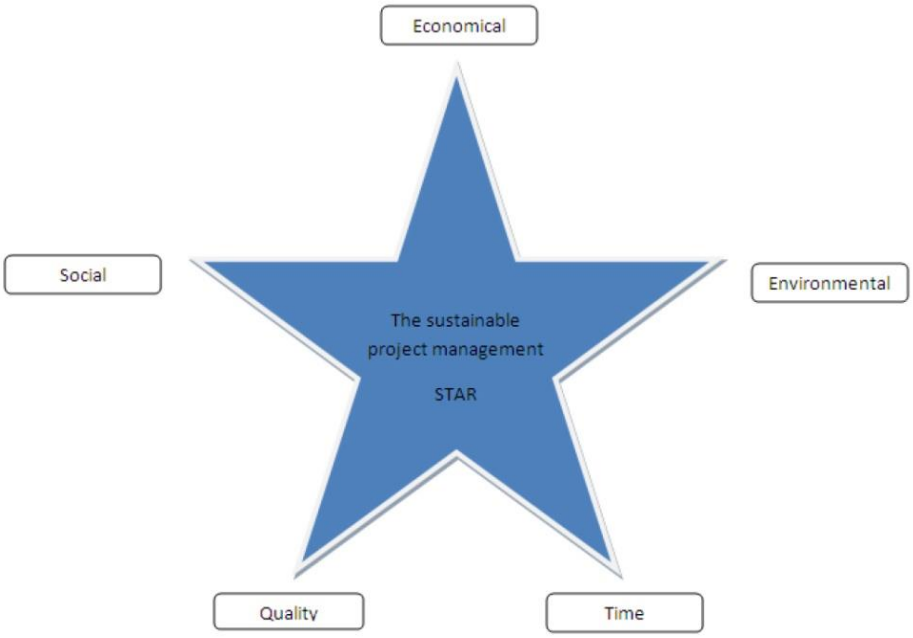


Figure 2.4 The sustainable project management star (Grevelman and Kluiwstra,2010)

2.6.5 Managing the Project Constraints

According to Griffith (2002), developing and implementing new innovative ways to procure, design, construct, use and maintain development are recognised as challenges for construction industry, especially in the field of sustainable construction. These innovative methods should meet an even more demanding range of expectations from clients, industry and society that focus on time, cost, quality, safety and environmental impact. Griffith states that the interaction between the traditionally separate processes and management functions is the much-needed change that can enhance the performance of the sustainable construction process. Every project has to manage basic constraints: scope, schedule, budget and quality (Grevelman and Kluiwstra, 2010). Project managers can play a major role in integrating sustainability into an engineering project during the design and construction process in order to deliver a successful sustainable building (Delnavaz, 2012). The success of a project therefore depends on the skills and knowledge of the project manager to take into consideration all these constraints and develop processes to keep them in balance (APM, 2006). Managing the four constraints also involves making trade-offs (Wyngaard et al., 2012).

2.7 Sources of Knowledge for Project Management

Knowledge of project management is a vital factor in the successful undertaking of projects (Sokhanvar et al., 2014). Due to the increasing importance of PM practices, PM methodologies and standards have been developed by academics and practitioners since the 1950s to assist organisations to improve their project performance (Kerzner, 2005; Office of Government Commerce, 2005; PMI, 2013). This field of expertise is in constant evolution through practices and research. Some of the most important bodies of knowledge in project management, which were published by professional associations for project management or standard institutes, are given below.

2.7.1 Professional Institutions or Associations

A number of project management associations have formed chapters around the world to encourage the development of project management as a profession (Gvozdenovic et al., 2008). In more than fifty years, a considerable body of knowledge has built up around the world on project management tools, skills and techniques. The purpose of the body of knowledge is to identify and describe the best practices that are applicable to most projects most of the time (Burke, 2003). There is common approval amongst project management associations regarding their value and usefulness. In the following sections, some bodies of knowledge in the field of project management are briefly discussed (Gvozdenovic et al., 2008). The most important of these associations are reviewed.

2.7.1.1. International Project Management Association (IPMA)

The IPMA is the oldest project management institution in the world, established in 1965 by the Federation of Professional National Associations (Xue et al., 2014). The IPMA Competence Baseline version 3 (ICB3) is represented in the 46 competence elements shown in Figure 2.5. These elements are grouped into three ranges of related competence elements (IPMA, 2006), as follows:

- Technical competence contains 20 elements which deal with the project management matters on which the professionals are working;
- Behavioural competence includes 15 elements that deal with the personal relationships between the individuals and groups managed in the projects, programmes and portfolios;

- Contextual competence contains 11 elements which cover how project managers deal with the interaction of the project team within the context of the project and with the permanent organisation.

As defined by the ICB3 standard,

"a competence is a collection of knowledge, personal attitudes, skills and relevant experience needed to be successful in a certain function" (ibid, p. 9). The technical competences can be considered part of human resource management, including project organisation, teamwork, problem resolution, project structures, and resources. In a similar manner, technical competences are considered as forms of communication management that control and report information and documentation, and communication with interested parties (IPMA, 2006).

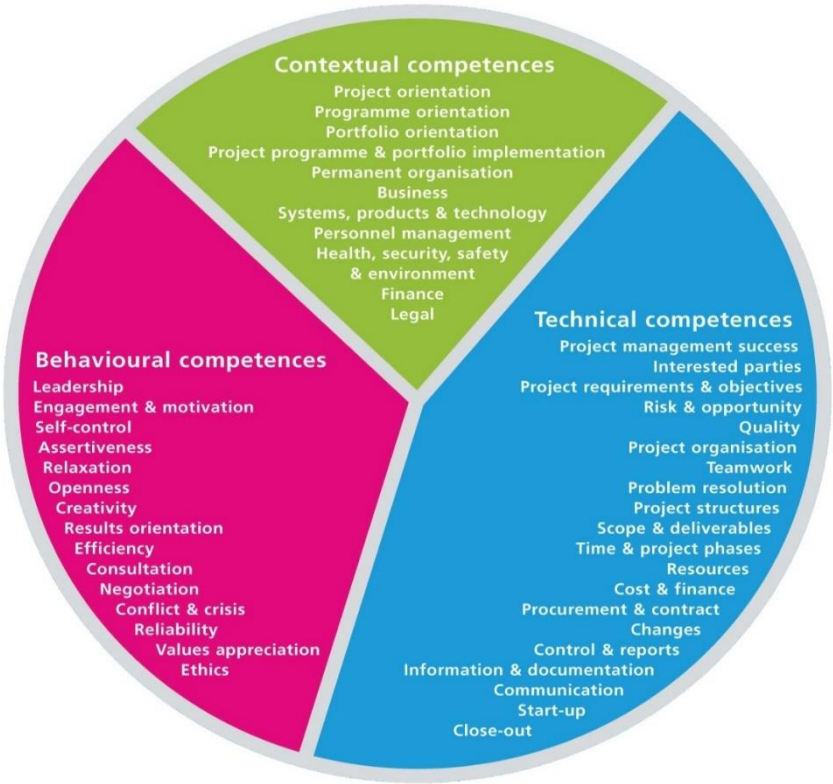


Figure 2.5 The Eye of Competence ICB3 (IPMA, 2006, p. 2)

The Eye of Competence represents the integration of all the components of project management as seen through the eyes of the project manager when assessing a specific situation. The eye represents clarity and vision (APM, 2006).

2.7.1.2 The Association of Project Management (APM, UK)

APM was founded 1972 in the UK, and was launched in 1988 by its chairman on BBC TV, who had launched a new television series on business matters, project management and APM (APM, 2010; Gvozdenovic et al., 2008). The APM published its first document on the body of knowledge of project management (APM-BoK) in 1992, which was compiled by practitioners, academics and authors from all areas of the economy in the UK (APM, 2012).

The APM-BoK incorporates not only inward-focused project management topics (such as planning and control techniques), but also wider topics in which the project is being managed, like social and ecological environment, as well as specific areas, such as economics, finance, technology, procurement, organisation and people, as well as general management (Burke, 2003). The APM-BoK includes knowledge and practices that "are applicable to most projects most of the time", with contextual topics discussed separately in its framework section. The APM-BoK is an inclusive guide that describes the sum of knowledge within the profession of project management. The document includes knowledge of innovative and advanced practices that are widely applied in all fields of project programs and portfolio management, now commonly referred to as P3 Management, as detailed in Figure 2.6 (APM, 2012; Morris and Pinto, 2010; Dinsmore and Cabanis-Brewin, 2006).

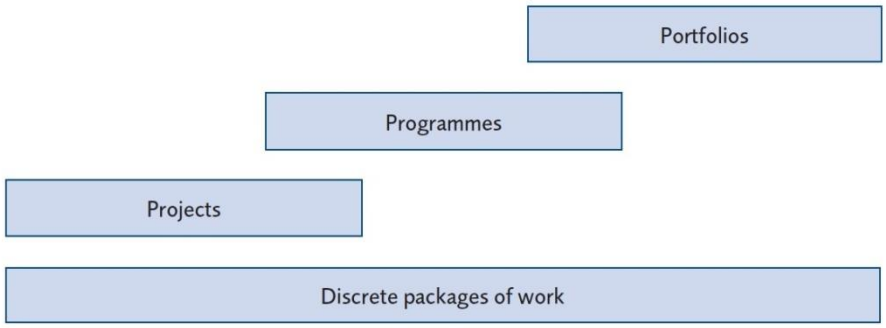


Figure 2.6 Scale of managing effort (APM, 2012, p. 21)

The sixth edition of the APM-BoK (2012) consists of four main sections: project management in context, people, delivery and techniques, which are divided into twelve sub-sections with fifty-three elements, giving it a total of 69 topics, as shown in Table 2.2.

Table 2.2 APM Body of Knowledge 6th edition

Project management in context		**People**		**Delivery**							**Interfaces**
Governance	Setting	Interpersonal skills	Professionalism	Integrative management	Scope management	Schedule management	Financial and cost management	Risk management	Quality management	Resource management	
Project management	Environment	Communication	Communities of practice	Business case	Benefits management	Resource scheduling	Budgeting and cost control	Risk context	P3 assurance	Contract	Accounting
Programme management	Operations management	Conflict management	Competence	Control	Change control	Time scheduling	Funding	Risk techniques	Reviews	Mobilisation	Health and safety
Portfolio management	Strategic management	Delegation	Ethics frameworks	Information management	Configuration management		Investment appraisal			Procurement	Human resource management
Infrastructure		Influencing	Learning and development	Organisation	Requirement management					Provider selection and management	Law
Knowledge management		Leadership		Planning	Change management						Security
Life cycle		Negotiation		Stakeholder management	Solution development						Sustainability
Success factors and maturity		Teamwork									
Sponsorship											

2.7.1.3 Project Management Institute (PMI, USA)

The PMI is a non-profit organisation founded in 1969 in Atlanta (USA). The Guide to the Project Management Body of Knowledge (PMBoK) was first published by PMI as a white paper in 1987. One of the key differences between the PMI and APM approaches is, in its own words, the PMBOK Guide's Knowledge areas. The PMBoK has been released many times from 1996; the fifth and latest edition was released in 2013. This guide is aimed at providing knowledge, processes, skills, tools and techniques that have a significant impact on project success (PMI, 2013). The first part of this guide offers the subset of the project management body of knowledge that is generally recognised as best practice. This PMBoK defines 47 processes in the first part of this guide, separating them into 10 Knowledge Areas about the professional field (Table 2.3), project management field or area of specialisation, such as project scope management and project cost management. In the second part, this guide re-groups the processes to form a project management standard. It defines five process groups based on the five stages of project implementation: initiating process groups, planning process groups, executing process groups, monitoring and controlling process groups, and closing process groups (PMI, 2013). It details the input, tools and techniques, output and the data flow diagram of each process in the ten Knowledge Areas. At each stage of the systems engineering, one can use all or part of the five process groups and any set can also be reused for any stage of systems engineering.

Table 2.3 Project Management Process Groups and Knowledge Area Mapping (PMI, 2013, p. 60)

Project Management Process Group and Knowledge Area Mapping

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work	4.4 Monitor and Control Project Work 4.5 Perform Integrated Change Control	4.6 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Time Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Durations 6.6 Develop Schedule		6.7 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Perform Quality Assurance	8.3 Control Quality	
9. Project Human Resource Management		9.1 Plan Human Resource Management	9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team		
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Control Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses		11.6 Control Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	12.4 Close Procurements
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management	13.3 Manage Stakeholder Engagement	13.4 Control Stakeholder Engagement	

2.7.2 Standards and Guidance

Standards play an important role in everyday life; they may establish the size, shape or capacity of a product, process, or system. They can specify the performance of products or personnel. They can also define terms so that there is no misunderstanding among those using the standard (Cox and Radwan., 2015). According to the British Standard Institute (BSI), a standard is an agreed manner of doing something. It could be about managing a process, making a product, supplying materials or delivering a service, standards can cover an enormous range of activities undertaken by organisations and utilized by their customers (BSI, 2015). The International Organization for Standardization (ISO) defines a standard as: a document founded by a consensus of subject matter experts and approved by a recognized organization that offers guidance on the design, use or performance of services, materials, products, processes, systems or persons (ISO and IEC, 2004).

The PMI defines a standard thus: A standard is a document, established by consensus and approved by a recognized body, which provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. Developed under a process based on the concepts of consensus, openness, due process, and balance, standards provide guidelines for achieving specific project, program and portfolio management results (PMI, 2013).

Standards cover a wide range of subjects for instance: construction, nanotechnology, energy management, health and safety. They can be very specific, such as to a particular kind of product, or general, like management practices. The target readership for project management standards is: developers of national standards, project sponsors, senior managers, project management teams, project managers and project team members (ISO, 2012). Some standards provide guidelines, rules and characteristics for project, program and portfolio

management, such as BS 6079-1:2010, ISO 21500:2012 and PMI PMBOK-2013. This section will review the most important standards institutions by the chronology of their foundation:

2.7.2.1 British Standards Institution (BSI): (www.bsigroup.com)

BSI is the business standards corporation that supports organisations in all countries of the world. For more than a century it has been strived to help embed excellence into the way individuals, organizations and products work. BSI is showing businesses how to reduce risk, improve performance and achieve sustainable growth and development. As a global leader in helping organizations improve, BSI's clients from various companies in 182 countries worldwide.

As the BSI website recognises, “formed in 1901 by Sir John Wolfe-Barry - the man who designed London’s Tower Bridge - BSI was the world’s first National Standards Body” (BSI, 2017). During the 1920s, standardization spread to Canada, Australia, South Africa and New Zealand. Interest was also developing in the USA and Germany. During period from 1975 to 2000, BSI helped developed numerous of the world’s management systems standards, three of them have been widely adopted in other countries that relate to quality, the environment, health and safety (ibid).

In 1946, saw the first ever Commonwealth Standards Conference, held in London and organized by BSI, which led to the establishment of the International Organization for Standardization (ISO). In 1979, the BSI published the UK's first management systems quality standard, BS 5750, which led to the ISO 9000 series of international standards (ibid). The BSI reports that “ISO 9001 has benefited millions of individuals and organizations globally, with users reporting increased growth and productivity and significantly higher customer satisfaction and retention” (ibid). The BSI lists a number of standards of project management:

- BS ISO 21500:2012. Guidance on project management.
- BS 6079-1:2010. Project Management. Principles and guidelines for the management of projects.
- BS EN 9200:2004. Programme management. Guidelines for project management specification.
- BS ISO 15188:2001. Project management guidelines for terminology standardization.
- BS 6079-3:2000. Project management. Guide to the management of business related project risk.
- BS ISO 21504:2015. Project, programme and portfolio management. Guidance on portfolio management.
- BS ISO 22263:2008. Organization of information about construction works. Framework for management of project information.
- BS ISO 10006:2003. Quality management systems. Guidelines for quality management in projects.
- BS 8895-2:2015. Designing for material efficiency in building projects. Code of practice for Concept Design and Developed Design.
- BS EN 62198:2014. Managing risk in projects. Application guidelines.
- BS 8895-1:2013. Designing for material efficiency in building projects. Code of practice for Strategic Definition and Preparation and Brief.
- BS EN ISO 16484-1. 2010. Building automation and control systems (BACS). Project specification and implementation.
- BS EN 62402:2007. Obsolescence management. Application guide.
- BS ISO 10845-1:2010. Construction procurement. Processes, methods and procedures.
- BS 10175:2011+A1:2013. Investigation of potentially contaminated sites. Code of practice.

2.7.2.2 The American National Standards Institute (ANSI)

Another important industrial body for standardisation is the ANSI. As their website describes, the ANSI has served in its capacity as coordinator and administrator of the United States private sector voluntary standardization system for nearly a century. Established in 1918 by three government agencies and five engineering societies, the institute remains a private, non-profits membership organization supported by a various constituency of public and private sector organizations (Gross and Roppel, 2012). In 1916, the American Institute of Electrical Engineers (now called IEEE) invited the American Society for Testing Materials (now called ASTM International), the American Institute of Mining and Metallurgical Engineers (AIME), the American Society of Civil Engineers (ASCE) and the American Society of Mechanical Engineers (ASME) to participate in formation an impartial national body to coordinate standard-setting, approve national consensus standards, and halt user confusion on acceptability (ANSI, 2016).

ANSI was originally founded as the American Engineering Standards Committee (AESC), A year after AESC was established, it developed its first standard on pipe threads. Its next pioneer project was undertaken in 1920 when AESC began the coordination of national safety codes to replace the several recommended practices and laws that which were hindering the prevention of accidents. In 1921, The first version of American Standard Safety Code was approved and covered the protection of the eyes and heads of industrial workers. In its first decade, AESC also developed national standards in the fields of construction, highway traffic, electrical and mechanical engineering. AESC was very active in early attempts to strengthen international cooperation. In 1926, it hosted the conference that established the International Standards Association (ISA), an association that would remain active until the second world war and that would finally become the International Organization for Standardization (ISO) (Ibid).

2.7.2.3 International Organization for Standardization (ISO)

In recent years, ISO has become the world's largest developer and publisher of voluntary international standards (Stellingwerf and Zandhuis, 2013), which began in 1926 as the International Federation of the National Standardizing Associations (ISA) (Kutz, 2015). This organization focused heavily on mechanical engineering. It was disbanded in 1942 during the Second World War but was re-organized under the current name, ISO, in 1946. Since then, it ISO published over 21000 international standards, that covering almost all aspects of business and technology, and that helping to make industry more effective and efficient (Stellingwerf and Zandhuis, 2013).

ISO 21500 has several sources of its development and a broad target audience that uses different sources for project management. Hence, the support for the guideline (initially by its developers and later by its users) had to be the core of project management community that is relevant for everybody. All participants, individuals or institutions, had the opportunity to bring in relevant sources of project management as input for the guideline at the begin of its development in 2007. They proposed several national standards, as following (ISO, 2012):

1. A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Third Edition, Chapter 3 and Glossary, PMI Inc., 2004, the American ANSI standard (Ibid);
2. DIN 69901 Project Management: Project Management Systems, DIN, 2007, the German DIN standard (Ibid);
3. BS 6079 and BS ISO 15188:2001, Project management, BSI, 2001 – the English BSI standard (Ibid).

In the course of the ISO 21500 development other standards and existing ISO standards were used as reference materials (Ibid):

1. ICB version 4.0 (IPMA Competence Baseline); developed by International Project Management Association;
2. PRINCE2 (PRojects IN Controlled Environments); developed by Cabinet Office, previously OGC;
3. ISO 10006; Quality management systems - Guidelines for quality management in projects;
4. ISO 9001; Quality management systems.
5. ISO 31000; Risk management – Principles and guidelines.

BSI: 6079 is a good example to analyse, as the global project management standards industry is working intensively to address measures of quality (Rehacek, 2014). The ISO 21500 was initiated in 2006 by a member organisation of ISO in the British Standards Institute (Rehacek, 2014). The ISO has endorsed the initiative and allocated work item ISO/PC 236 to help prepare the ISO 21500 standard on project management. There were 31 countries engaged in this work and other countries are watching the progress and improvement in this field (Stellingwerf and Zandhuis, 2013). The final version of ISO 21500 was published in September 2012 and the second ISO standard published in the project management field after ISO 10006.

ISO 21500 is considered guidance on project management and can be used by any organisation including public, private or community-based organisations for any type of project, irrespective of complexity, size and duration (ISO, 2012).

The structure of ISO 21500 includes the following clauses:

- Clause 1 covers the scope of ISO 21500, i.e. the managing of projects in most organisations, in most of the time.
- Clause 2 covers 16 project management terms and their definitions.

- Clause 3 describes the concepts that play a significance role during the implementation of most projects such as: projects and its management, project governance, organisational strategy and projects, projects and operations, project environment, stakeholders and project organisation, project life cycle, project constraints, competences of project personnel and the relationship between project management concepts and processes.
- Clause 4 identifies the recommended project management processes that should be applied to both the whole project and certain phases. These processes are generic and can be used by any project in any organisation or entity. Generally, the project sponsor and the project manager choose the best applicable operations and the sequence in which they are executed. This sequence will depend on the project at hand and the needs of the organisation or entity.
- There are five process groups: Initiating, Planning, Executing, Controlling and Closing, and 39 processes that are divided into ten project management themes, called subject groups: Integration, Scope, Time, Cost, Quality, Risk, Resource, Stakeholders, Procurement and Communication (ISO, 2012).

ISO 21500:2012 is the latest standard elaborated by the International Organization for Standardization in the field of project management. ISO 21500:2012 was developed to start on the core of the standard elaborated by the PMI. There are many similarities between ISO 21500:2012 standard and the PMBOK® Guide, but some differences have also been observed (Drob and Zichil, 2013). Thus, ISO 21500 divides project processes into five process groups. Moreover, in this system there are only 39 knowledge areas (ISO, 2012).

2.7.2.4 The AIPM's Australian National Competency Standards for Project Management (ANCSPM)

The Australian Institute for Project Management (AIPM) developed and documented their standards in 1977 as the ANCSPM (Gvozdenovic et al., 2008). The format of ANCSPM has emphasised performance-oriented recognition of competence in the workplace, and includes the following major components (Dinsmore and Cabanis-Brewin, 2006):

- Units of competency: the significant major functions of the profession.
- Elements of competency: the building blocks of each unit of competency.
- Performance criteria: the type of performance in the workplace that would constitute adequate evidence of personal competence.
- Range indicators: describe more precisely the circumstances in which the performance criteria would be applied.

Dinsmore and Cabanis-Brewin (2006) note that elements of competency are shown in the following words: determine, conduct, guide, implement and others. There are three main elements of competency for each unit. The ANCSPM incorporated the nine knowledge areas of the PMI`s PMBOK directly into the knowledge part of their qualification program (Gvozdenovic et al., 2008).

2.7.3 Project Management Methodologies (PMM)

The term “project management methodology” was first defined by early 1960 (Adrian and Anca, 2014). this term has been developed and modified over time. A PMM is a structured approach for delivering a project, and consists of a set of processes and activities, with each process or activity having clearly defined schedule and resources (Turner, 2000). A good PMM provides the framework to improve inter-organisational communication; and avoid duplication of effort by having documentation, common resources and training (Clarke, 1999). However,

Kerzner (2001) believes can develop a good PMM through continuous lessons learned of successfully managed projects (Kerzner, 2001).

PMI-PMBOK (2013) defines a PMM as “a system of practices, techniques, procedures and rules” (PMI, 2013, p. 546). A PMM, more specifically described, is a strictly combination of logically related policies, practices, processes, tools, techniques and templates, that determine how best to plan, execute, monitor and deliver a project (Whitaker, 2014). Generally, a PMM provides a theoretical framework to describe each task in depth, so that a project manager and project team will know what to do in order to implement activities of project according to the budget, the schedule, the specifications and other requirements (Kerzner, 2004).

Nowadays, there are plenty of project management methodologies, such as the ISO 21500 standard, PMBoK, PRINCE2, P2M, RUP, Agile methodologies and many others (Kononenko at al., 2013). These methodologies need to be tailored and customised according to the project's individual needs (Cheema, 2005). As Cockburn (2000) notes, “projects and teams differ, so one methodology won't fit all of them” (Cockburn, A., 2000).

2.7.3.1 Six Sigma

Six Sigma is a set of techniques and tools for process improvement. It was introduced by engineer Bill Smith while working at Motorola in 1986 (Tennant, 2001). Since then, it has been launched most countries of the world and many organizations testify to its vital and important role in their success (Hutchins, 2000). Famous examples of Six Sigma companies include General Electric, Motorola, AlliedSignal (now Honeywell), ABB, Lockheed Martin, Polaroid, Sony, Honda, American Express, Ford, Lear Corporation and Solectron (Klefsjö et al., 2001). Motorola originally developed Six Sigma in 1987 and targeted an aggressive goal

of 3.4 ppm defects (Barney, 2002; Folaron, 2003). In 1994 Larry Bossidy, CEO of Allied Signal, introduced Six Sigma as a business initiative to "produce high-level results, improve work processes, expand all employees' skills and change the culture" (ASQ, 2002, p. 14). This was followed by the well-publicised execution of Six Sigma at General Electric starting in 1995 (Beam, 1999).

There are many definitions of Six Sigma in the literature. Antony et al. (2007) define Six Sigma as "a process-focused data driven methodology aimed at near elimination of defects in all processes which are critical to customers" (p. 242).

According to Mikel et al. (2000), "Six Sigma is a disciplined method of using extremely rigorous data gathering and statistical analysis to pinpoint sources of errors and ways of eliminating them" (p. 23).

Several recent studies also point to the parallel organizational structure that promotes improvements within Six Sigma (Schroeder et al., 2008; Zu et al., 2008). Based on literature and case study data, Schroeder et al. (2008) have defined more specifically Six Sigma as: "an organized, parallel-meso structure to reduce variation in organizational processes by using improvement specialists, a structured method, and performance metrics with the aim of achieving strategic objectives" (p.540).

This definition also refers to some of the elements that differentiate Six Sigma from TQM, the structured improvement procedure and the role structure (Zu et al., 2008). this role structure is often indicated to as the 'belt system' and could be easily seen as a method to standardize the improvement competences in a corporate. The role of black belt signifies a co-worker with advanced knowledge of improvement, working as an improvement expert (Mader, 2002).

Six Sigma utilizes two different sets of methodologies, Define-Measure-Analyze-Improve-Control (DMAIC) and Define-Measure-Analyze-Design-Verify (DMADV), to examine and address complementary aspects of existing business processes. Despite they look very similar, the methodologies overlap during the process of examination and share the same ultimate aim, improvement of business processes. Both methodologies have its own group of guidelines and objectives targeted at improving processes through the use of data collection and statistical analysis tools. While those methodologies are designed to achieve the same objective, there are some differences between them that should be considered by developers in organizations environments or in manager's roles.

Design for Six Sigma (DFSS) is a systematic methodology using tools, training and measurements to enable the organization to design processes and products that meet expectations of customer and can be produced at desired quality level of Six Sigma. (Mader, 2002).

The structured improvement procedure – DMAIC – is utilize to solve quality problems of greater complexity and with unknown root reasons (Schroeder et al., 2008), and used to improve existing processes and products to reduce defects (Cronemyr, 2007).

The DMAIC framework is described briefly here:

- Define – ascertain who the customers are and what their needs are. Define the project purpose and scope. Define the current process and what the customer wants from it.
- Measure – how the process is performing and how it is measured. Gather data on how well the current process performs at meeting customer needs.
- Analyse – what the most important causes of problems are. Identify root causes of performance gaps and confirm with data.

- Improve - how can the causes of problems be removed? Plan, test, and implement solutions that eliminate root causes (use data to evaluate both the solutions and plans used to carry them out).
- Control – how can the improvements be maintained? Maintain the gains by standardising work methods or processes. Anticipate future improvements and preserve the lessons from this effort.

The Six Sigma methodology is traditionally applied through a five-phased approach called the (Define, Measure, Analyse, Improve and Control) DMAIC model, which is analogous to the Shewhart's "Plan, Do, Study and Act" cycle of continuous improvement. An overview of the DMAIC model is as follows (Cronemyr, 2007):

- Define - address the identification of specific processes to be evaluated.
- Measure - record data and employ metrics to track effectiveness and evaluate efficiencies.
- Analyse - utilise critical thinking skills to review data and clarify goals.
- Improve - create changes in processes geared toward improvement and best alignment with company goals.
- Control - build a system of checks and adjustments for ongoing improvement in production processes.

Based on Cronemyr (2007, p. 198), DMAIC and DMADV have both differences and similarities: "As described above, DMAIC and DFSS are often associated with different domains – Manufacturing versus Product Development – and consequently many see the two topics as very different. From now on – as it is the most commonly used DFSS road map – we select DMADV as our DFSS road map. When examining the tools of DMAIC and DMADV

and considering only process development (not product development), both differences and similarities can be found".

Iterations of the procedure are occasionally necessary but also eligible for successful project completion. Significant for this and other characterizations of the DMAIC roadmap is the instrumental method oriented towards procedures and tools (see e.g. Dahlgaard and Dahlgaard-Park 2006: Antony et al. 2007; Schroeder et al., 2008; Zu et al., 2008). However, as several authors have observed, the how-aspects of learning in the refinement cycles are seldom described or explored. (Ibid).

2.7.3.2 PRINCE2: Projects in Controlled Environments

The PRojects IN Controlled Environments (PRINCE2) methodology was first edition released by the United Kingdom Government in 1996, and its most recent (5^{th}) edition was released in 2009 and the new version will be launched in mid-2017 (AXELOS, 2017). PRINCE2 was based upon an earlier incarnation named as PRINCE that meaning projects in controlled environments. Despite initially confined to utilize within the public sector in UK, it has grown and nowadays widely applied by both public and private sectors in most countries of the world (Bentley, 2010).

PRINCE was founded in 1989 by the Central Computer and Telecommunications Agency (CCTA), and then renamed as the Office of Government Commerce (OGC). Since 2000, the OGC former owner of Best Management Practice, had been the custodian of the portfolio management on behalf of the UK government. In June 2010 because of reorganisation of UK government, the Office of Government Commerce -Best Practice Management- functions have moved into the Cabinet Office (AXELOS, 2017). PRINCE was originally based on Project Resource Organisation Management Planning Techniques (PROMPT), a project

management method developed by Simpact Systems Ltd in 1975, and adopted by Central Computer and Telecommunications Agency (CCTA) in 1979 as the standard to be used for all UK Government for information systems (IT) project management. In 1989, When PRINCE was created, it effectively superseded PROMPT within public domain projects in UK, and offers best practice guidance of project management. The PRINCE2 first version was published in 1996, and since then has become increasingly popular, contributing to consortium of many European organisations and across the United Nations system (Ibid).

The PRINCE2 methodology breaks the projects into some stages and each stage is managed separately. These 7 process groups include starting up a project, directing a project, initiating a project, controlling a stage, managing product delivery, managing stage boundaries and closing a project. Each process group offers checklists of recommended activities, related responsibilities and products (Ibid).

2.7.3.3 Japan's P2M, Bodies of Knowledge in Project Management and Project Quality Management.

Japan's Engineering Advancement Association (ENAA) founded a committee for the introduction, development and research of project management in 1999. It created A Guidebook of Project and Program Management for Enterprise Innovation, which was officially abbreviated to P2M in 2001. This standard guidebook was prepared for students, businesspeople, managers, and professionals wishing to expand their knowledge of project management. The work reflects an intention to enlarge the scope of project and program management from the conventional focus on front work for organisations as a whole, including at general management level (P2M, 2002).

The development of P2M and the certification system appeared as the result of Japanese enterprises' needs to develop more innovative approaches for the development of their business. The P2M Guidebook is a very long and detailed document that covers various areas of project and program management. However, P2M works as a guide but does not necessarily claim to be comprehensive of all PM knowledge (P2M, 2002). P2M has the following chapters on project management (Gvozdenovic et al., 2008):

- Project Strategy Management
- Project Finance Management
- Project Systems Management
- Project Organization Management
- Project Objectives Management
- Project Resources Management
- Risk Management
- Project Information Technology Management
- Project Relations Management
- Project Value Management
- Project Communications Management

2.7.3.4 GAPPS (Global Alliance for Project Performance Standards)

The GAPPS is a non-profit organisation and a unique alliance of professional associations, industry, government, training/academic institutions and national qualification bodies, that are working since 2003 together to help practitioners and organisations make sense of the many recognized standards and qualifications globally to guide the managing of projects. (Peng et al., 2007; Crawford, 2013). The GAPPS has produced a number of standards,

frameworks and tools, that could be used for many of purposes to help the project management community. Also, has developed several comparability maps of other standards and frameworks that are targeted to facilitate mutual recognition of qualifications and standards. These standards and frameworks are available to the general public via online resource (Dinsmore and Cabanis-Brewin, 2006; GAPPS, 2017).

Over the last decade, a group of dedicated volunteers has been working together through GAPPS to provide a bridge between the different standards and certificates for project management which is developed by each of professional associations, commercial organizations and academic institutions. The GAPPS has aim to provide independent standards to assist the project management community and to provide a basis for mutual recognition of project management standards and certificates (Dinsmore and Cabanis-Brewin, 2006). The following standards have been mapped to the GAPPS Project Manager standard:

- Australian National Competency Standards for Project Management (ANCSPM)
- Australian Institute of Project Management Standards (AIPM)
- IPMA Competence Baseline V3.0 (ICB)
- PRINCE2 2009
- P2M (Japan)
- The Project Management Institute's PMBoK Guide 2008
- SAQA National Qualifications Level 5 Standard

With the release of the GAPPS Program Manager standard in 2011, work is progressing on mapping of the following:

- Managing Successful Programmes (Cabinet Office, 2011)
- The Standard for Program Management (PMI, 2006)

2.8 Project Management Processes

Project management processes, as explained by standards or guidelines, consist of five logically grouped project management processes (initiating, planning, executing, monitoring/controlling and closing) which have appropriate applications and are integrated, according to most project management institutions, as shown in Table 2.4.

Table 2.4 Process groups/ processes for seven institutions of project management body of knowledge

Organisation	BSI	ISO	PMI	APM	GOC	PMCC	IPMA
Country	**UK**	**International**	**USA**	**UK**	**UK**	**Japan**	**International**
Last Version Code	BS 6079-1	ISO 21500	PMBOK	PMBOK	PRINCE2	P2M	ICB3
Last Version Year	2010	2012	2013	2012	2009	2008	2006
Status	Standard & Guideline	Standard & Guideline	Guideline and ANSI Standard for Project Management	Guideline	Guideline	Guideline	Guideline
Processes Group	Initiating	Initiating	Initiating	Initiation	Starting up a Project, Initiating a Project	Designing	Starting up a project
	Planning	Planning	Planning	Requirements & Planning	Managing Product Delivery, Managing Stage Boundaries	Planning	Integrated Planning incl. Supporting
	Implementing	Implementing	Executing	Execution	Directing a Project, Managing Product Delivery, Managing Stage Boundaries	Implementing	Execution
	Controlling	Controlling	Monitoring & Controlling	Monitoring & Controlling	Controlling a Stage	Coordinating	Integrated Controlling incl. Monitoring
	Closing	Closing	Closing	Closing	Closing a Project	Delivering	Closing

The major project management processes are organised in terms of the integration between the processes, their interactions, and the purposes they serve. Project management processes are grouped into five categories known as Project Management Process Groups (PMI, 2013; ISO, 2012):

- Initiating Process Group: Consists of activities that performed before plan the project. to define a new project or a new phase of an existing project by facilitate the formal authorization to beginning the project or phase.
- Planning Process Group: Consists of those processes required to define the scope of the project, refine the objectives, and identify the course of action required to achieve those objectives.
- Executing Process Group: Those processes performed to manage people and coordinate resources to complete project works as outlined in the project management plan to accomplish the project's objectives.
- Monitoring and Controlling Process Group: Consists of those processes required to observe project execution and regulate the progress and performance of the project, so that probable problems can be identified in a timely manner and define any areas in which changes to the plan are required and corrective action be taken, when necessary, to control the implementation of the project.
- Closing Process Group. Those processes performed to formally finalize all activities across all Process Groups of a project or phase.

2.9 RIBA Plan of Works and PM Process Models

The Royal Institute of British Architects (RIBA) proposed a new framework designed by the Chartered Institute of Architectural Technologists with the help of the Construction Industry Council, the Royal Society of Architects in Wales, the Royal Incorporation of Architects in Scotland and the Royal Society of Ulster Architects. In 1963, it was published as a sheet fold-out and played a significant part in the construction and design of a matrix format. The approach to some significant stages of projects proposed by the RIBA plan facilitates management by way of a substantial framework; these maps apply distinct managerial techniques and processes while the project is under way. This plan works comprehensively by involving various fundamentals to eradicate intricacies in constructing projects by managing each process and department; it encompasses widespread steps and models that work for better regulation of projects that strengthen their chances of success. It governs better identification of any complexities concerning effective representation and development of industries.

The plan in question entailed multiple routes regarding procurement and transit from simple to multiple matrixes for multi-disciplinary teams and played an essential role as a gateway for improving competencies in construction and design (Lombardi et al., 2011). The RIBA book supports the RIBA publications. However, there are certain aspects that have attracted criticism, concerning its wider focus on architecture that may complicate matters for the customer; it possesses inadequacies that may result in abridging the construction of projects. In 2013, the authority introduced its latest edition and integrated its work in terms of assessing the issue of radical services. This revised method has been found to be successful for a number of projects, making use of planned processing and procurement that helps to increase the scope of services. Moreover, building information modelling (BIM) allows management to plan and specify projects

by re-structuring and adapting new and significant policies. It is due to its planned and strategic designing and construction that facilitates the development of effective and technical designs for projects (Dadam and Reichert, 2009).

Process-based models work well for achieving aims by incorporation of distinct and widespread techniques that drive firms towards integrity. These models entail substantial processes that improve the ability to complete projects under the estimated costs. It performs a vital role in sustaining cohesion in terms of meeting expected outcomes and planning for a strategic approach for coordinating projects. Furthermore, the method works with regard to critical processing that is best suited to best practice in project management. It helps to identify multiple methods that are entirely process-based and yields the expected outcomes. The process in this method is based on large-scale projects and effective project management. By using this model, management may achieve significant gains by eradicating various complexities that may cause inflexibility.

2.10 Project Management Knowledge Areas

The field of project management consists of the following knowledge areas that combine to accomplish a given project. These areas include: (Table 2.5)

1) Integration Management:

   This area drives the project forward by developing plans for execution that help to integrate management roles. Integration management entails development by making alterations to ensure that aims are being met by offering various remunerations to the stakeholders of the project. It gives assurance by fulfilling the needs and prerequisites of the project by close synchronisation during the initial design stages.

2) Scope Management:

This area contributes to success by promoting effective collaboration and incorporating the fundamentals of project management in order to achieve the intended results. It is done by taking various resources that allows project to extend scope of better construction and optimistic effects on project management.

3) Time Management:

This is another key area that contributes towards project success for reaching key objectives. Time management is crucial in project management and plays an essential role in developing and structuring the actions of team members.

4) Cost Management:

Effective project management must be efficient at managing costs and initial estimations by ensuring the inclusion of all key areas (Gido and Clements, 2014). This aspect can be achieved using techniques such as the Earned Value management practice that controls the budget of the project.

5) Quality Management:

Quality management demands that criteria (i.e. specification of aims and needs) be determined in order to gauge the successful completion of the project. It contributes to the fulfilment of the project by ensuring the delivery of the expected outcomes.

6) Human Resource Management:

The human resource management is an organisational aid in controlling cohesion regarding team work and leading effective management of project processes.

They contribute to consistency by gathering all significant aspects for client satisfaction on completion of the project.

7) Communication Management:

Communication among team members is a vital component that affects the appropriate progress of the project by connecting people in terms of their interaction. Through successful communication paths, management can gather new designs and concepts that may help to improve the efficient management of the project. Project completion is entirely based on processes like planning, delivery, recovery, construction and monitoring of key information.

8) Risk Management:

Risk management plays an essential part in project completion; competence in this area helps to minimise issues and maximises chances of effective progress of construction. It extends the scope of success by planning of and control over fundamentals that guide the project manager to obtain successful outcomes.

9) Procurement Management:

This area of management exerts control over suppliers and has command over appropriate legal information concerning the project; it further maintains the integrity of the project by provisioning for external factors in order to minimise risk. It may include outsourcing large-scale projects, and requires the acquisition of resources in order to provide effective results (Gido and Clements, 2014).

10) Stakeholder Management:

A fundamental knowledge area of project management includes the effective management of stakeholders, which entails engagement of contributors and people working with the organisation on a particular project.

Table 2.5 Knowledge areas and project management institutions

Organisation	BSI	ISO	PMI	APM	GOC	PMCC	IPMA
Country	UK	International	USA	UK	UK	Japan	International
Last Version Code	BS 6079-1	ISO 21500	PMBOK	PMBOK	PRINCE2	P2M	ICB3
Last Version Year	2010	2012	2013	2012	2009	2008	2006
Knowledge Area	Cost Management	Cost Management	Cost Management	Financial and Cost Management	Business Case	Finance	Cost, Finance
	Managing scope	Scope Management	Scope Management	Scope Management	Business Case		Project content, Scope
	Managing Schedule	Time Management	Time Management	Schedule Management	Plans, Business Case		Schedules
	Managing Risk	Risk Management	Risk Management	Risk Management	Risk	Risk	
	Managing Resources			Resource management		Resources	Resources
	Managing Quality	Quality Management	Quality Management	Quality Management	Quality		
		Human Resource Management	Human Resource Management		Organization	Organization	Team (building) & Project Organisation
	Managing Communications	Communication Management	Communication Management			Communications	
	Managing Stakeholders	Stakeholder Management	Stakeholder Management			Relationships	Stakeholders
	Managing Procurement	Procurement Management	Procurement Management				Procurement, Contracts
	Managing Planning	Integration Management	Integration Management	Integrative Management			
	Controlling Change				Change		
	Managing Configuration						Configurations
						Strategy	Strategies
						Objectives	Objectives
	Managing Benefits				Progress	Systems	Project Phases, Life Cycle
	Managing Reporting					Information Technology	
	Managing Issues					Value	
	Managing Documentation						

2.11 Summary

This chapter began by defining the key words project, project management and engineering project management, then reviewing a brief history of project management. Five periods were covered in the development of modern PM, including the first period (prior to 1958) until the fifth period (2012 - present day). Also, the evolution of the concepts, methods and techniques of project management in recent decades through the use of digital tools was reviewed. The PM constraints of the triple constraint, the diamond and sustainable PM star were also discussed. In addition, approaches to managing cost, time, quality, social, and environmental constraints of projects were outlined, in which project managers play a major role in their integration.

This chapter also reviewed the major sources of knowledge for PM, which were divided into professional associations such as the IPMA, APM and PMI, as well as standards institutions including the BSI, ANSI and ISO, highlighting the most influential standards and guides published to date. This overview was followed by a brief explanation of PM methodologies, such as Six Sigma, PRINCE2, GAPPS, and P2M. The next section outlined key knowledge areas and processes in project management.

The next chapter will highlight the existing literature on project management best practices and review related studies.

Chapter 3 : Project Management Best Practices

3.1. Introduction

This chapter encompasses a literature review of project management best practices. It is intended to compile foundational knowledge based on studies conducted by others in related fields, and includes relevant topics of interest to this research study from previous academic sources. Thus, adopting a longitudinal approach for its organisation, a systematic review will be conducted with a view to locating and synthesising the literature on this topic. Along with chapters two and four, this chapter attempts to help provide a theoretical foundation for research questions with which to support the results of this research. In this context, the review of the related literature in this chapter will encompass three main topics: project management best practices, project governance, and the human factor in project management.

3.2 Project Management Best Practices

Historically, the 1950s marked the recognizing of project management as a separate management method, different from other methods of management employed in company business or government (Cleland and Gareis, 2006; Lientz, 2012). Best practice is based on experience (Kerzner, 2010) and is used to describe the process of developing and following a standard way of doing things (Madison, 2005). The term “best practice” is used by several professional bodies to include those practices that lead to higher performance (Bogan, 1994; Zairi, 1996) and success in that profession. The PMI defines best practice as “an optimal way currently recognized by industry to achieve a stated goal or objective” (PMI, 2003, p. 171). A best practice is a method, technique,

or process that is believed to be more effective and efficient in achieving an objective than any other method, technique or process, when applied to a particular case or circumstance, and that through experience and research has reliably led to desired or optimum outcomes (Wideman, 1999; PMI, 2004; Cosby and Kendall, 2006).

For a best practice to be as beneficial as possible, it is vital that the stakeholder group consents to it; the best practice model must therefore be accessible, aiming to engage and influence stakeholders. Here, the leader should be able to send powerful messages to the stakeholders (Nastase, 2009; Scott, 2016) to ensure that the intention of the message is understood and the desired response achieved (APM, 2012; Jordan et al., 2016). In this context, a document is often used to delineate the essence of the procedures and processes involved (Crawford, 2008).

The Construction Industry Institute (CII) defines a best practice as "a process or method that, when executed effectively, leads to enhanced project performance" (CII, 2012). Best practices described as optimum ways of performing work processes to achieve high performance (Bogan and English, 1994; Zairi, 1996; Ramabadron et al., 1997; PMI, 2003; APM, 2012). While several authors addressee best practices in the context of competition where corporation benchmark against the best, world-class companies for targeted processes such as new product performance (Pfeffer, 1994; Cooper, 1998) or a management process of human resource such as training (Bassi, 1997), there is also the context of internal benchmarking. Great organizations compete against themselves (Martin, 2010). They may be the best but they are never good enough, those organizations can always become better (McLagan, 1997; Mirabile, 1997).

Best practices come from, first and foremost, an organisational culture that values and nurtures best practices (Cooper, 1998; Bertels et al., 2010). Alternatively, best practice can arise

from the existence of competencies, where it may be seen as a set of knowledge, skills, and abilities, such as competence when undertaking a task or activity; an output competency; or a result competency (APM, 2008; PMI, 2016).

O'Dell et al. (1998) reported that methods for the internal transfer of best practices are better than focusing on benchmarking against external organisations. Similarly, Toney and Powers (1997) investigated best practices in a benchmarking study of project management of Fortune 500 companies. In this case, best practice is understood as adopting management practices of the most successful organisations through benchmarking. The best practices for project management require some development (Smith and Haar, 1993). Three levels of best practice maturity have been defined, with "minimum requirements for an associate best practice, best practice, and mastery of best practice" (Kerzner, 2004, p.22).

Best practices are collective wisdom based on real work experience; they are the conclusion of hundreds or even thousands of deployments around the world (Gates and Hemingway, 2000) and are based on expertise, not theories. In fact, they mature and develop over time. They are continually refined to reflect new individual or organisational deployments and new technological capabilities, so they give organisations the benefit of internal and external lessons learned from any similar project carried out anywhere else in the world (Gates and Hemingway, 2000, 2014; HP, 2008; Turner, 2016).

Developing flexibility to respond to future practices is a key aspect of ensuring organisational survival and growth (Boyle, 2006; Boyle and Scherrer-Rathje, 2009). Successful companies seek a strategic approach of developing a relentless and continuous focus on investigating, adapting and adopting best practice (Cusumano, 2010; McLaughlin, 2013; Scott,

2016). Employing a best-practice approach to project management could help eliminate wasted time, cost and efforts, while also helping to anticipate problems and generating awareness of the business environment; this strategy can also help organisations to learn from their experience (Alotaibi and Mafimisebi, 2016).

Part of the challenge in identifying project management best practices in developing countries is that the field lacks empirical and comprehensive research that arises from assessing project management practices to determine if they will produce 'desired or optimum' results. Most writing is descriptive, relying on brief case studies or anecdotal stories to support the authors' assertions.

3.2.1 Sources of Best Practices

Best practices can be captured either within an organisation or externally. Benchmarking is one way to capture internal or external best practices, perhaps by using the project management office as the lead for external benchmarking activities. Kerzner (2014) stated that some external sources of benchmarking for identifying best practices are as follows:

- Professional project management associations and institutes publications;
- Forms, guidelines, templates, and checklists that can affect the execution of the project;
- Forms, guidelines, templates, and checklists that can affect the definition of the success of a project;
- Each of the PMBOK® Guide areas of knowledge or domain areas;
- Within company-wide or isolated business units;
- Symposiums and seminars on general project management concepts;
- Symposiums and seminars specialising in project management best practices;

- Relationships with other professional societies; and
- Graduate-level theses (Kerzner, 2014, p. 23).

Isomorphism theory suggests the possibility of applying only what is considered best practice in organisations which are situated in a common environment and resemble each other. Also, only organisations which have been recognised by the external professional community should be used (DiMaggio and Powell, 1983).

3.2.2 Validation of Best Practice

Validation of best practice can be done by the project manager, functional manager, or project team. Any or all of these people must consider that what they have discovered is, in fact, best practice. When project managers are very active in a project, emphasis is placed upon the project manager for the final decision on what constitutes best practice (Schwalbe, 2015). Kerzner (2014) mentions that, according to a spokesperson for AT&T, the responsibility for determining what is best practice rests with "the individual project manager that determines how it had a positive influence on their project". Nevertheless, it is quite common for there to be other validation procedures that may engage a significant number of stakeholders (Kerzner, 2004; IIL, 2007; Schwalbe, 2015).

Occasionally, project managers removed from where the work is still ongoing and may not be familiar with activities of project that could lead to the identification of a best practice. Corporations that have a PMO place a heavy dependence on the PMO for support because the recognized best practices are later integrated into the methodology (Kerzner, 2014; Power, 2015), and the PMO is usually the guardian of the methodology (Voehl and Harrington, 2016). The vision of a corporation is to centrally manage and maintain all methodologies, from core skills including

project management through to specialised methodologies. Furthermore, the methodology maintenance process allows for the participation of an expert to ensure compatibility in updates and methodology change management (Power, 2015; Voehl and Harrington, 2016), which can also be carried out by identifying a specific group of experts for each methodology, and holding meetings with them on a regular basis to review content material and feedback from stakeholders (Nowakowski et al., 2014; Power, 2015), internal lessons learned (Limam Mansar and Reijers, 2007), best practices from industry and potential contributions of new material (Jennifer et al., 2015). These committees will take the decision upon themselves of whether to update, replace, remove or add to the methodological content (Kerzner, 2014).

3.2.3 Levels of Best Practices

As stated in the existing literature, best practices come from knowledge transfer (Spender and Grant, 1996; APM, 2008; Abudi, 2011; Kerzner, 2014; PMI, 2016) and can be discovered anywhere within or outside the organisation (Gates and Hemingway, 2000; Kerzner, 2014), as shown in Figure 3.1.

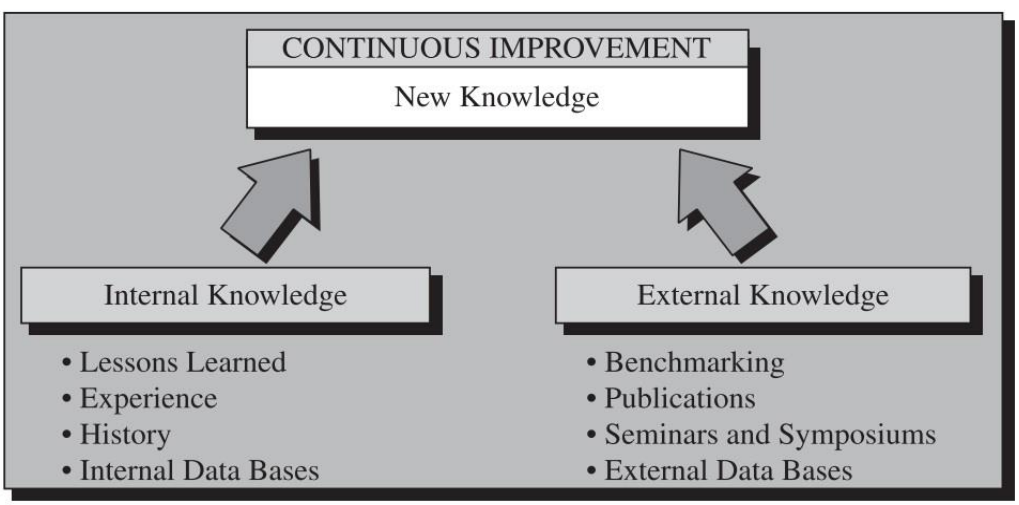


Figure 3.1 Knowledge transfer (Kerzner, 2014, p. 44)

Corporations that maintain libraries of best practices are likely to achieve high levels of best practices (Kerzner, 2014). Figure 3.2 demonstrates the various levels of best practice.

Figure 3.2 Levels of best practices (Kerzner, 2014, p. 44)

Each level of best practice can have sub-categories within the level. The bottom level refers to professional standards, which would include international professional standards as defined by, but not limited to, ISO, BS, PMI and APM. Any organisation or project management body accepts to abide by the standards or guide in a professional publication, which can have a significant impact on project success.

The international professional standards or guide identifies generally recognized as good practices. “Generally recognized means that the knowledge and practices described are applicable to most projects most of the time”, and there is consensus about their value and advantage. “Good practice means there is general agreement that the application of the knowledge, skills, tools, and techniques” can enhance the chances of success over many projects. However, it does not mean

that the knowledge and practices described should consistently be applied uniformly to all corporations or projects; the corporation and/or project management team is responsible for identifying what is suitable for any given project (PMI, 2013).

The international professional standards have the greatest number of best practices, but they are more of a general nature than specific and have a low level of complexity.

The industry standards level would identify best practices regarding performance within the industry. For instance, the construction industry has established standards and best practices specific to the building industry. With progress of levels to individual best practices, the complexity of best practices moves from general to very specific applications and, as expected, the quantity of best practices is fewer (Kerzner, 2014).

According to the literature, three players have a vital role in the management of best practices:

a) The best practice's owner, who has the responsibility of maintaining the integrity of the best practice and tries to enhance and maintain it for as long as possible (Hollmann, 2002; Bates, 2008; Crawford et al., 2008; Unger et al., 2012; Kerzner, 2014);
b) The PMO, who has the final authority over best practices and makes the final decision on where to place it, and how it should be reviewed, revalidated and removed (Dai and Wells, 2004; Kerzner, Unger et al., 2012, 2014; Hill, 2013; Pemsel and Wiewiora, 2013);
c) The best practices' library administrator, who is merely the caretaker of the best practice and may keep track of how often staff review the best practice, assuming that it is readily accessible in the library of best practices (Kerzner, 2013, 2014).

3.2.4 Best Practice Guidelines or Standards

Nowadays, project management has reached a global level, and the methods used in project management are constantly evolving in terms of the guidelines and international standards generally accepted and employed (Ilieş et al., 2010). It therefore cannot be expected that the same set of processes and methods will foster the success of each and every project (Ahlemann, 2009). These standards and guidelines were and are still looking to improve project management (Purdy, 2010). It is indisputable that standards or guidelines have many differences, despite each of them being focused on the same topic of project management. This fact cannot be contested in any aspect from the structure and history of their institutions. As such, when using different approaches to project management in its particular parts, how can it be determined which one is right for a project or company? It will all depend on the different factors at play and how the company intends to structure projects for the best results. What is certain is that there is a methodology to suit every industry, project style, and team qualification level, although perhaps determining the correct one can be as challenging as the project itself.

There is not one professional Association or Institute recognised as representative of all practitioners in various countries around the world. Nor should there be, when there are differing cultures with differing needs and ways of thinking (Georgieva and Allan, 2008). Nonetheless, projects the world over share some commonalities that practitioners and most companies recognise as the processes in project management. These include the processes of collecting and analysing requirements, design, execution, monitoring, control, and project close-down. The main question addressed in most best practice research was, given that a project manager carries out the usual processes in a project, what are the “best practices” used by a PMO that deliver truly successful results.

Gina Abudi (2011) has mentioned that when organisations look at developing a best practice around the project management function, they are usually referring to one or more of the following:

- Standardised processes
- Development of a process for resource planning/allocation
- Standardised software
- Standardised tools and templates
- Development of strategic training/education programmes
- Assessment of skills
- Development of competencies
- Development of career paths
- Formalised mentoring and coaching plans
- Requirement and support for industry certification
- Development and roll-out of a PMO function

Organisations desire to establish best practices to meet many needs, including the following:

- Effective management of different project resources
- Alignment of projects to the strategic aims of the organisation
- Improve the tracking and reporting on status of projects
- Reduction in the duration and funds spent on ensuring projects are brought to a successful outcome (Abudi, 2011).

3.2.5 Benchmarking

Benchmarking is one of a manager's best tools for performance improvement (Boxwell, 1994; Lankford, 2000; Barber, 2004; Kim and Huynh, T.A., 2008; Ahuja et al., 2010; PMI, 2013; Grant, 2016). The primary motive behind any benchmarking initiative in any field, including that of project management, is practice improvement (Ajelabi and Tang, 2010). The concept behind the "Develop the process" stage is of continuous learning and improvement, by assessing project progress, learning from its experiments and using the information to improve the PM process of future projects (Ikpe et al., 2015).

In recent decades, project management has been an effective process and a successful tool for performance change in organisations (Ajelabi and Tang, 2010). Xerox Corporation initiated the concept of benchmarking in order to face the competitive challenges in Japan at the beginning of the Seventies (Lankford, 2000; Išoraite, 2004). There are many different ways to classify types of benchmarking; for instance, it can be classified by the performance, by the process or by the strategy (Camp, 2013; Ikpe et al., 2015).

For performance benchmarking to have meaning, it must provide valid and useful information in order to make comparisons (Poister, 2008). The comparisons may evaluate progress in terms of achieving given goals or targets, estimate trends in performance over time, or weigh the performance of one firm against another (Garnett and Pickrell, 2000; Poister, 2008; Kärnä et al., 2016). It is inappropriate to point out that performance benchmarking is the comparison with established standards or performance information of other organisations in order to improve the organisation's own performance (Cowper, and Samuels, 1997; Dey, 2002; Poister, 2008).

3.3 Project Governance

Project governance is: ‘’The set of policies, regulations, functions, processes, and procedures and responsibilities that define the establishment, management and control of projects’’ (APM, 2012, p. 237).

The Institute of Directors (IoD) adds that a governance framework should ensure that corporate boards effectively monitor managerial performance and achieve an equitable return for shareholders – reinforcing the transparency, values of fairness, accountability and responsibility (IoD, 2010). Effective project governance starts with leadership, commitment, and support from the top management; however, such leadership, although crucial, is not enough (Crawford, 2010; Chait et al., 2011; Dinsmore, 2012; Brinkworth, 2016). Appropriate organisational structure, roles, and responsibilities are required for all stakeholders (Crawford, 2010; Dinsmore, 2012; Kerzner, 2013; Villinova, 2014; Brinkworth, 2016). There are three main organizational components to project governance: executive leadership, the program and/or portfolio management team and project managers (APM, 2012; Müller, 2012; Dinsmore, 2012; PMI, 2013). Effective project governance requires that the individuals who direct and oversee governance activities be organized, and their involvement modeled to ensure that authority, in addition decision making have a clear source, the effective oversight, and the needs for direction and decisions are addressed (Müller, 2012; Dinsmore, 2012; PMI, 2013; Cooke-Davies, 2015; Kerzner, 2013).

Governance defines project objectives, the manner in which the required resources are gained, and how progress is monitored (Müller, 2009; Turner, 2009). The governance of a project is nearly similar the governance of an organisation (Bromley, 2016). Understanding governance as it applies to portfolios, programs and projects is increasing in importance to organizations,

because suitable governance is a factor in the failure or success of organization's programs and projects (PMI, 2016).

Implementing an effective governance framework can be challenging due to factors such as regulatory requirements, rapid changes in technology, increasing business complexities and business environments (PMI, 2016). Several organizations do not have a consistent approach to portfolios, programs and projects governance (ibid.).

3.3.1 Overview of Governance Related to Project Management

It is important that governance covers all levels of the organization, starting with company governance flowing from the board level to the portfolio, program and project management level responsible for execution, and down to the program and project level of governance (PRINCE2, 2008; Klakegg et al., 2009; Mülle, 2012; PMI, 2016). Not only is senior management commitment to best governance critical for both the governance of project management and a project, but it has also been found that appropriate involvement of senior management with project management is directly correlated with successful projects (PRINCE2, 2008; Bromley, 2016).

The PMI's governance practice guide (2016) outlines that the basic elements of governance of portfolios, programs and projects are the governing body, a governance framework, the governance domain and the governance function. These elements have both a connected and a hierarchical relationship and are defined by the PMI as follows:

- Governing body: A permanent or temporary organised group consisting of members by areas of authority and responsibility to provide guidance and decision-making for portfolios, programmes, and projects, such as boards or steering committees.

- Governance framework: The four governance domains with functions, processes, and activities for portfolios, programmes, and projects.
- Governance domain: A set of functions executed by an organisation, group, individual, or to address a specific governance field of concentration.
- Governance function: A set of processes related to each other and across governance domains that are carried out in order to support governance (ibid.).

Figure 3.3 shows the dimensions of governance in a simplified way; in reality, governance is recognised as a complex notion. Governance-related elements are dynamic and should adapt to the changing organizational and environment of portfolio, program, and project (PMI, 2016).

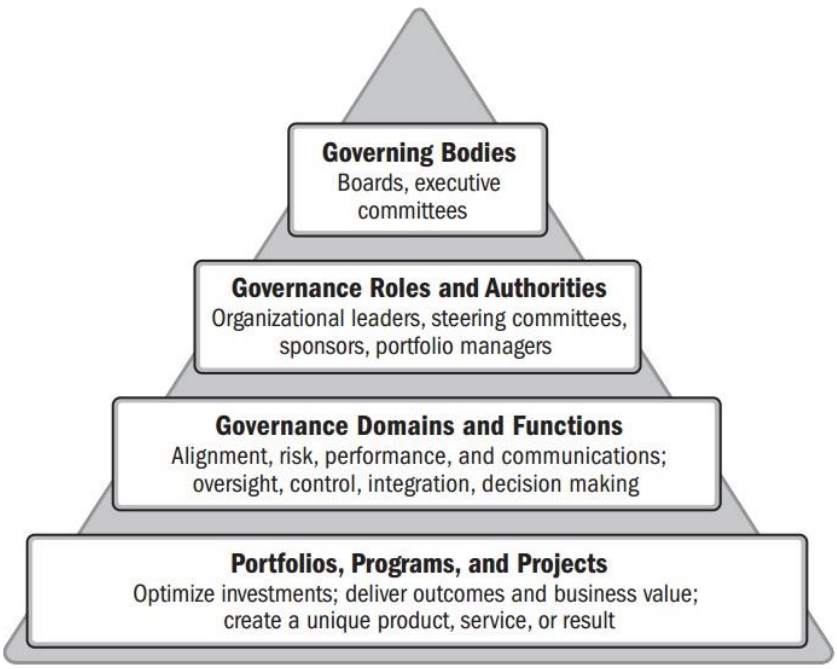


Figure 3.3 Governance elements (PMI, 2016, p. 5)

Too and Weaver (2014) identified characteristics of governance in the domain of projects as a group of nested management and governance functions. At its centre are the approaches of governance for individual projects and their performance and deliverables, which are nested within project governance. They stated that governance differs from corporate management: the governance system defines the structures utilized by the organization or project, allocates responsibilities and rights within those structures and requires assurance that relevant management is working effectively and properly within the defined structures. The management role is to manage the organization or project within the framework defined by the governance system; this applies particularly to the governance and management of organization or projects (Too and Weaver, 2014).

3.3.2 Project Management Offices (PMO)

Nowadays, projects are structured in various organisational forms, often by project-based organisations, which represent one of the newest forms of organisations (Tsaturyan and Müller, 2015). The great number of industries utilising project work has migrated away from traditional project-based industries, like construction and IT, towards infrastructure and public services, insurance and financial services, in addition to heavy manufacturing. Governance of these new kinds of organisations is in need of organisational structures and institutions such as portfolio and programme management, as well as project-steering committees (Müller, 2012).

The PMI (2013) defines a PMO as "a management structure that standardizes the project-related governance processes and facilitates sharing of the resources, methodologies, tools and techniques. The responsibilities of a PMO can range from providing PM support functions to actually being responsible for direct management of one or more projects" (PMI, 2013, p. 11).

The APM (2012) states: “Infrastructure provides support for programmes, portfolios and projects, and is the focal point for the development and maintenance of P3 management within an organisation” (APM, 2012, p. 18).

Historically, in the last fifteen years, a PMO has been extensively explored as an integrated idea and a strategic research unit with contemporary organisational structure. Researchers have discovered the usefulness of PMOs in many contexts; for example, in 2004, Dai and Wells (2004) suggested a new model for more effective operations in project-driven organisations, by implementing a PMO relationship to project performance (Dai and Wells, 2004). APMO has also been suggested as a knowledge-based archetype (Desouza and Evaristo, 2006), described as an organisational innovation (Hobbs et al., 2008), and as an agent and subject of change and renewal (Pellegrinelli and Garagna 2009). The effects of a centralised and decentralised PMO have been studied (Curlee, 2008), as well as PMOs in transition (Aubry et al., 2010), PMO roles and their impact on portfolio management execution and success (Unger et al., 2012), and forces driving PMO changes have been identified (Aubry et al., 2010a; Rose, 2012). PMOs have been proposed as knowledge brokers (Pemsel and Wiewiora, 2013), their typology has been theorised (Hobbs et al., 2008; Glückler et al., 2013), PMOs with aligned strategy and implementation have been studied (PMI, 2014), and methods of achieving strategic organisational objectives through a PMO have been tested (Alkhuraissi, 2015). The modern PMO takes a centre-of-excellence approach to strike the right balance: building competencies; delivering them in a lightweight, service-oriented method; and stripping bureaucracy (Visitación et al., 2016).

A PMO is designed to coordinate and manage projects under a contemporary organization portfolio. A PMO is occasionally referred to as a program and project management office or a program and project office. Each PMO term may have a different mission depending on the

organization's alternative for PMO setting up. A PMO is mostly created to support a specific business department or unit functional purpose, or it could have an organizationally great focus to manage the organization portfolios, programs and projects (Tasic, 2014).

The APM (2012) states that governance starts with the host organisation whose board must ensure that projects, programmes and portfolios are duly managed. The standards set by the board will be applied by a portfolio management to its component programmes and/or projects. A programme management will be responsible for applying the standards to its component projects (APM, 2012). This process is shown in Figure 3.4 below.

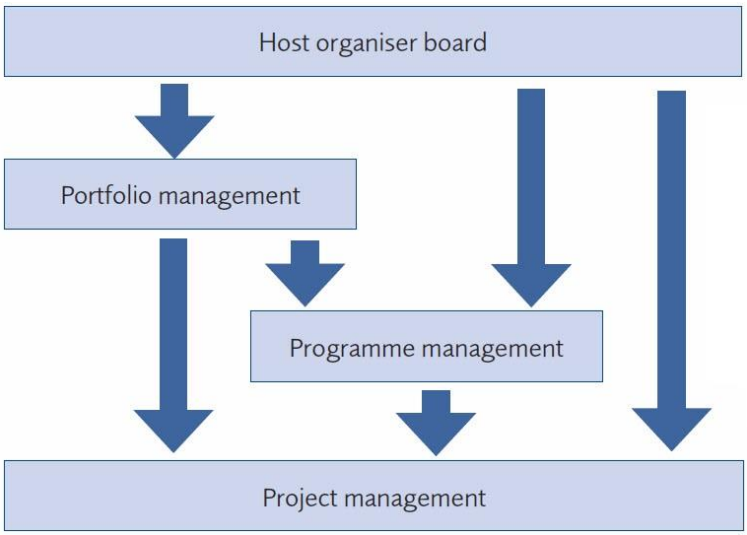


Figure 3.4 Governance structure (APM, 2012)

3.4 The Human Factor in Project Management

Authors often argue that the excellent firms are the way they are because they are organized to gain extraordinary effort from ordinary individuals. (Peters and Waterman Jr, 1982; Campbell and Tawadey, 2016).

One of the greatest difficulties of successful project implementation is the building of the project team. The challenge of recruiting a diverse combination of individuals, with different cultures, backgrounds and experience, from a variety of functional areas, who may have conflicting agendas or clashing motivations, assigning them to a task within a project team, and finding a leader who is not their direct site supervisor, can challenge the achievement of objectives and success of any project (Ciccotti, 2014). Leadership without management is of limited value (and vice versa); Both are required to be effective (Liu et al., 2003)

As stated in the literature, project characteristics have a significant impact on the behaviour and actions of employees, and, consequently, their productivity (Aubry et al., 2010; KyuMan, 2009; Hobbs and Aubry, 2008; Mullins, 2007). Equally, human behaviour impacts upon the nature of the project (Turner and Simister, 2001; Eriksson and Westerberg, 2011; Nahavandi et al., 2013; Wagner and Hollenbeck, 2014; Das, 2016). As suggested by Paul Naybour (2014), there are so many components of human nature that can either have a negative or positive effect on a project's results that it is significant to handle them properly (Naybour, 2014).

3.4.1 Leaders of Project Management

Leadership is a critical and substantial element for any project management team (Kidd, 2009). As stated in the literature, a leader is someone who has the ability to influence and motivate (House, 1996) and to translate a vision into reality (Bennis, 2013), directing the activities of a group of individuals to achieve a shared goal (Yukl, 2002; Northouse, 2015). A leader inspires others to give their maximum performance to complete successfully any task, objective or project (Cohen and March, 1974). and enables others to contribute to the efficiency and success of an organisation (House, 1996). It is therefore important to have knowledge and skills in building,

leading and facilitating a project team. A great leader can create a successful team of individuals who may seem to lack ability. However, a poor leader can cause the failure of a great team (Kidd, 2009).

PM leadership literature has identified the 9 most common skills which are characteristic of strong leaders. These skills include: understanding the needs and characteristics of the post; communicating powerfully and prolifically; knowing and using the resources of the group; planning; controlling group performance; solving problems and analysing issues; building relationships and trust; and inspiring, motivating and developing others (Cohen and March, 1974; House, 1996; Yukl, 2002; Zulu, 2007; Kidd, 2009; Karas et al., 2009; Bennis, 2013; Northouse, 2015; Storey, 2016).

3.4.2 Project Manager

Different organisations in various industrial sectors use the title of project manager, with a wide range of meanings (Crawford, 2000). In project management, a project manager is the most important person in a project and has the greatest power and responsibility for the project as a whole (Villinova, 2014). Project managers should be able to select the silent facts and be able to use them in the best manner by taking needed procedures, while filtering out the unimportant and irrelevant materials (Liikamaa, 2015). An effective project manager must simultaneously be the manager, the leader, the mentor, the facilitator and good communicators (Flannes and Levin, 2001; Gharehbaghi and McManus, 2003) and must be able to identify themselves with the project objectives (PMI, 2013; Villinova, 2014).

The main tasks of a project manager are to choose a good team (Weinstein and Jaques, 2010), to organise and coordinate the work and to provide control (Gharehbaghi and McManus, 2003). To sum up, project manager fruition is a dynamic process of leading, planning, coordinating and controlling a diverse and complex set of people and processes in the seeking of accomplishing the project objectives (Pinto and Kharbanda, 1996; GAPPS, 2007; Liikamaa, 2015; PMI, 2013).

Project sponsor and project owner roles are determinants in project governance (Cooke-Davies, 2015). In different projects, recruiting the wrong project manager is one of the factors that may cause the failure of project management and the project itself. Therefore, successful projects and project management require the careful appointment of a skilled and qualified project manager (Pinto and Slevin, 1988; Munns and Bjeirmi, 1996; Weinstein and Jaques, 2010).

3.4.2.1 Role of the Project Manager

The project manager function can be a full-time or temporary professional role an individual is recruited to perform. The nature of the role will depend on the structure of the organisation, its culture, and the goals of the project (Atencio, 2012). The project manager is responsible for delivering the project, along with the objectives, deliverables, scope and requirements, from initiation through planning, execution, monitoring and controlling to project closure (ISO, 2010; APM, 2012; PMI, 2013). Furthermore, "the project manager is responsible for coordinating and integrating activities across multiple, functional lines" (Kerzner, 2013, p. 12). Therefore, project managers are perceived to be steering a diverse group of people with little direct control over the members of the project team (Cleland and Ireland, 2002). Moreover, projects are managed by bringing together diverse individuals as a team in a work environment. This task is complex for two reasons: firstly, each project is unique, and secondly, the circumstances or

conditions for team selection and motivation are often far from ideal (Smith, 2002; Anantatmula, 2016), as a typical organization structure presents problems in team selection, and in many organizations a project manager may not have the discretion to select the members of project team (Anantatmula, 2016).

As such, the role of project manager can be viewed as more difficult than that of a typical functional manager. In addition to working across functional and organizational environments which traditionally designed to support functional managers (Anantatmula, 2010). The project manager often faces other challenges including providing leadership without documented and formal authority. In addition, mostly, working in multilevel organization where unity of command is an important issue (Cleland, 1995).

3.4.2.2 The Role of the Project Manager in Sustainability

As stated in their publication on sustainability in project management, APM's former chairman Tom Taylor was one of the first to suggest that the project managers should have an understanding of sustainability issues, "while recognizing that more should be done to contribute to a more sustainable society" (Silvius and Schipper, 2014b). Taylor's appeal was the output of several members in APM, who recognised that the project managers were not well equipped to deal with sustainability issues and decided to investigate this issue (Ibid).

Jennifer Tharp Russell, at the 2008 European conference of PMI, identified the corporate social responsibility for project managers (Russell and Chaudhury, 2008). She pointed out also that a project manager "is perfectly positioned to influence the project's operations towards greater sustainability" (Ibid). Furthermore, Schieg (2009) and Goedknegt and Silvius (2012) made a moral

appeal to project managers to take responsibility for sustainability, concluding that project managers have significant influence on the application of sustainability standards to their projects.

The explicit inclusion of a sustainability issues-related competence in the IPMA-ICB 4.0 reveals that the project manager plays a vital role in the sustainability of a project (Silvius, 2016). This draws attention to critical aspects of the project, including the specifications and requirements of the deliverable, sometimes as well as the materials used and the business case. These factors are logically regarded not only as primarily the responsibility of the project's sponsor or owner, but also of the project manager as the person responsible for the sustainability of the project (ibid.).

Similarly, several authors conclude that the project manager plays a central role with regard to sustainability (Turner, 2010; Silvius and Schipper, 2014b; Silvius, 2016). Maltzman and Shirley (2012) referred to the "pivotal role" of the project manager. The project manager occupies a central position in the project which provides an opportunity to influence many aspects of it. This influence is not only limited to the process of executing the project, but it also provides an opportunity to discuss sustainability issues or concerns with the project owner, sponsor, the project team or with other stakeholders.

3.4.2.3 Project Manager Competencies

The literature surrounding project management often presents various recommended requirements, characteristics and skills for project manager success. The efficiency of project managers is tremendously important. Therefore, project managers have to develop themselves with the right training and follow-up coaching in order to be able to respond to the increasing requirements of their jobs (Crawford, 2000; Wysocki, 2003; Liikamaa, 2015; PMI, 2016). Whiddett and Hollyforde (2003) define competencies as "behaviours that individuals demonstrate

when undertaking job-relevant tasks effectively within a given organizational context". Competencies are useful concepts when we try to explain why many individuals in various workplaces perform better than others (Richard, 1982; Kets de Vries, 2001; Boyatzis, 2008; Hopkins and Bilimoria, 2008). Edum-Fotwe and McCaffer (2000) perceive project management as a combination of three elements: acquired knowledge, skills developed through experience and the application of this acquired knowledge (Edum-Fotwe and McCaffer, 2000).

The Project Management Institute (2007) defines PM competence as follows: "competence is the demonstrated ability to perform activities within a project environment that lead to expected outcomes based on defined and accepted standards" (PMI, 2008). According to the PMI-Project Manager Competency Development Framework (2007), the competence of a project manager includes three separate dimensions. The first consists of knowledge competence, referring to the knowledge of the project manager of the application of processes, techniques and tools for project activities. Second is performance competence, which describes the extent of the application of project management knowledge by the project manager in order to meet the project requirements. Finally, personal competence describes the core personality characteristics and attitudes of the project manager when implementing activities within the environment of a project. In order to be recognised as fully competent, a project manager needs to meet each of these three dimensions (PMI, 2008).

The International Project Management Association-Individual Competence Baseline (IPMA-ICB 4.0) defines individual competence as the application of knowledge, abilities and skills in order to achieve the desired outcomes (IPMA, 2015). These three concepts (knowledge, abilities and skills) are related in that having a skill presupposes some relevant knowledge. Having ability presupposes relevant knowledge and skills, but adds to that the use of these in practice, in

the right way and at the right time (ibid). However, according to IPMA ICB 4.0 experience plays an important role in competence: "without experience, competence can neither be demonstrated nor improved" (Ibid, p.16). Undoubtedly, experience is a key success factor to the development of the individual within a successful team and organisation. Individuals need to accumulate appropriate experience and thus consummated the potential for their competencies (PMI, 2015; IPMA, 2015).

3.4.2.4 Project Manager Certifications

The last component of training and qualification of project manager is certification. A project management certification can add depth, value and breadth to the skills of a project manager. Established standards are used for accrediting a project manager (Crawford and Pollack, 2007). Certification states that the person has done all that is required in terms of acquiring and demonstrating knowledge and experience (Morris et al., 2006). Therefore, state of the art certification and assessment systems do not assess knowledge alone, but focus on competence together with experience acquired (IPMA, 2015).

Project managers can also be certified in a methodology such as the PMP approach from the PMI in the USA; PRINCE2 Practitioner is a standard project methodology from the UK. Certification also correlates with the maturity level of the organisation (Caupin et al., 2012). The conclusion is that the higher the organisation's maturity level, the higher the level of certification of the project managers (Marnewick and Labuschagne, 2010). Table 3.1 shows a comparison of the most important international certificates in the field of project management.

Table 3.1 Best project management certification (www.knowledgetrain.co.uk)

Provided by	AXELOS[1]			IPMA[2][3] (via national associations)		Project Management Institute (PMI)[4]	
Qualification	PRINCE2 Foundation	PRINCE2 Practitioner	PRINCE2 Professional	IPMA Level D	IPMA Level C	CAPM	PMP
Launch year	1996	1996	2012	1998	1998	2003	1984
Certification holders at end of 2013	770,000	320,000	100	110,000	40,000	24,000	600,000
Countries with certification holders	150+	150+	1	50+	50+	130+	180+
Main regions/countries where popular	UK, Australia, Europe, India	UK, Australia, Europe, India	UK	Europe	Europe	USA, Asia, Africa	USA, Asia, Africa
Assessment of Knowledge	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Assessment of Workplace Practice	No	No	Partly	No	Yes	No	No
Assessment of Interpersonal Skills	No	No	Yes	No	Yes	No	No
Accreditation period	Lifetime	5 years	Lifetime	Lifetime	5 years	5 years	3 years
Need project management experience	No	No	Yes	No	Yes	Yes*	Yes
Exam/assessment	1 hour	2.5 hours	2.5 days	3 hours	2 days	3 hours	4 hours
Exam pass mark	50%	55%	N/A	Varies	Varies	61%	61%
Exam centre or online via web	Centre, Web	Centre, Web	Centre	Centre, Web	Centre, Web	Centre	Centre
Text book languages	12	12	12	Unknown	Unknown	11	11
Exam languages	20	12	1	50+	50+	14	14
GAPPS[5] mappings of global project management standards (100% is best)	92-93%	92-93%	92-93%	Unavailable	Unavailable	70-79%	70-79%
Certification is maintained through	N/A	Examination	N/A	Examination	PM log book and portfolio	Examination	Professional development units (PDUs)
Do trainers require accreditation?	Yes	Yes	N/A	Yes	N/A	No	No

* No, if project management training was completed.

Most project managers undertake global professional project management certifications because they aspire to improve their career and increase their salary. Additionally, these qualifications can expand their employment opportunities, enabling them to lead projects in nearly every country and work in virtually any industry, with any methodology (Phillips, 2013).

3.4.2.5 Tools and Techniques for Manager

Project managers must be proficient in the techniques and tools that are used to convert inputs into outputs, such as scheduling techniques, Gantt charts, reporting tools, estimation techniques, collaboration tools and work breakdown structures (WBS) (White and Fortune, 2002; Murphy and Ledwith, 2007; PMI, 2013). These techniques and tools can assist the project manager to be more productive and fruitful if the techniques and tools are used optimally (Rigby, 2001).

Complex PM techniques, such as earned value (Marshall, 2007) and critical path methods (CPMs) (Antill and Woodhead, 1990; Leach, 2014), can be automated using a tool such as Microsoft Office Project (Gido and Clements, 2008), Primavera software (Jones, 2004), or Project Manager's Workbench (Kastor and Sirakoulis, 2009). These techniques and tools are part of the methodology, standards, and process components; for example, during the planning process Microsoft Office Project can be used to develop a critical path method to determine the best way to implement the project. Project managers should have the knowledge and skills to use the appropriate techniques and tools to ensure the optimum outcome of a specific activity (Marnewick and Labuschagne, 2010; Leach, 2014).

3.4.3 Differences Between Public and Private Organizations and Managers

A core element of the concept of public sector management is that public institutions should import managerial behaviour and processes from the private sector (De Vries and Nemec, 2013). In recent years, a majority of public sector scientists have claimed that the concept of new public management is outdated (Johnsson et al., 2014; De Vries et al., 2013; Jałocha et al., 2014; Hyndman and Lapsley, 2016). Furthermore, other authors argue that it may be tempting to think that the advent of new public management has shifted the ethos of public leaders and managers entirely toward managerialism, competence and efficiency; and such of local government perhaps reinforces this view (Watson, 1994; Miller, 2005; Macaulay and Lawton, 2006). However, according to Van der Wal et al. (2008) the most important values in the public and private sectors differ to some extent. In the public sector, the most important values are reported to be "accountability, lawfulness, reliability, incorruptibility and expertise" (Van der Wal et al., 2008, p.465). On the other hand, the highest-ranking values in the private sector are profitability,

accountability, reliability, effectiveness, expertise, efficiency, honesty and innovativeness (Van der Wal et al., 2008).

The main conventional difference between public- and private-sector organisations is their ownership (Kassel 2010; Boyne, 2002). Particularly, organisations in the public sector are owned and operated by government, which may include federal, provincial or municipal governments. Conversely, private-sector organisations are not part of the government. The latter group consists of firms owned and operated by individuals or groups of individuals. The aims of private firms revolve around maximising revenue (Jałocha et al., 2014; Hyndman and Lapsley, 2016). The goals of public establishments are more complex and vague than those of their private counterparts, because organisational purposes and non-essential additional constraints are imposed through the political process, rather than selected by managers themselves (Boyne, 2002). Another characteristic of public institutions is that often they have more formal routine procedures, complex decision-making, are less flexible and adaptive and are more risk-averse (Boyne, 2002; Bozeman and Ponomariov, 2009).

Consequently, there are significant differences between public- and private-sector managers because of the work environment and their managerial values (Farnham and Horton, 1996). Managers working in the private sector typically seek to raise demand for their product or services. Still, in the public sector, the managers must often suppress production or services in order to stay within their budget (Reichard, 1998). Moreover, public managers cannot use economic efficiency as the primary decision criterion due to the mission of their organisations. In other words, public-sector managers must follow public service ethics in their activities (Farnham and Horton, 1996).

Another key difference between public- and private-sector managers is that public managers must balance the different needs and expectations of stakeholder groups (Kerzner, 2010), which may include politicians (Reichard, 1998). Reichard (1998) also believes that managers working in the public sector are less materialistic and have a stronger desire to serve the public than managers in the private sector (ibid.).

3.5 Summary

This chapter has presented a literature review of project management best practices as a term used by several professional bodies and their relationship with performance improvement and success. In addition, related literature regarding sources of best practice has been reviewed, including how to validate it and its varying degrees. The role of guidelines and standards in achieving best practice has also been outlined. Benchmarking has also been discussed as one of the best tools for performance improvement. It has further been identified how governance covers all levels of the organisation, concluding that the basic elements of governance of projects are the governing body, governance framework, governance domain and governance function, and that those elements have both a connected and a hierarchical relationship. Additionally, literature regarding project management offices has been presented as a structurally integrated unit that provides services and an organisational focus on project management. The competencies, certifications, tools and techniques of leaders and project managers were also discussed, as well as their role in the success of a project. Finally, the difference between public and private organisations and managers has been identified. The next chapter will review primary and secondary data collected as part of this research and the reasons for selecting the techniques used in this study.

Chapter 4 : Main Factors Affecting Project Success

4.1 Introduction

This chapter provides a literature review of the main factors affecting project success, and is divided into four different sections. The first, Section 4.1, focuses on project success, the major causes of delays, cost overruns and quality failures in projects. Section 4.2 discusses a brief history of studies of project success factors and a review of sustainability and success in project management. Next, Section 4.3 presents the main causes of delays in projects, as well as giving a summary of previous studies of these delays. Section 4.4 reviews previous studies that have focused on critical factors that have an impact on cost performance. Finally, Section 4.5, through investigation of the literature, will identify the main causes of quality failure in projects. This section will also review some academic studies and project management journals that have been carried out in the last few years, which aimed to find the major causes that affect projects success. This review is important for the purpose of this research as one of the main sub-objectives of this research is to identify the major causes of delays, cost overruns and quality failures in projects. As a result, the review provided in this chapter will be very useful for the processes of data collection and analysis in the following chapters. Thus, adopting a longitudinal approach for the organisation of the literature review, a systematic review will be conducted.

4.2 Project Success

The ever more frequent use of projects in all fields has increased the importance of efficient and effective project management. Considering the direct relationship between achieving project objectives and the sustainable development of an organisation, aspects related to the success of projects are topics of significant interest in project management literature. Project success has been defined as achieving the goals outlined and complying with predetermined conditions of time, cost and scope (PMI, 2013).

In general, the knowledge developed in the field of project management now considers that the "golden triangle" is not enough to define project success (Cooke-Davies, 2002; Drury-Grogan, 2014). In practices of project management, the reality sometimes seems even more complicated (Mir and Pinnington, 2014). Moreover, several researchers argue that success criteria should now be linked to the sustainability constraints of a project, expanding these parameters to include social and environmental impact as well as time, economy and quality (Chan and Chan, 2004; Elattar, 2009; Almahmoud et al., 2012; Brones et al., 2014; Brones and de Carvalho, 2015; Martens and Carvalho, 2016).

Furthermore, defining project success is not often easy, because the literature suggests that stakeholders have different perceptions of which factors contribute to project success (Davis, 2014). This section of the chapter aims to present an overview of the concept of project success and identify key factors of success when dealing with projects using a literature review method.

4.2.1 A Brief History of Project Success Factors

Using a longitudinal approach, this historical literature review will explore the development of project success studies over time from the 1970s to the present.

Numerous studies have focused on project success factors. First, Jugdev and Müller (2005) produced a historical review of success factors, classifying them by decades. Their review was chiefly concerned with graphically representing the time frame and stages of the life cycle of a project, in terms of examining different perceptions of project success. Moreover, they concentrated more on success factors and the involvement of stakeholders (Jugdev and Müller, 2005). Using this method, they presented an evolving understanding of project success over the past four decades and discussed conditions for success, success frameworks and critical factors of project success. The authors conclude with "a holistic view of project success and its implications for practice" (Jugdev and Müller, 2005, p. 19), and suggest that the topic is also important because "the success of individual projects, thus, impacts the wider organization in many dimensions and makes the term of project and project management success that much more relevant (Ibid). Clearly, review of success factors from previous practices provide a chance to learn and enhance relevant capacities, and has a bearing on the future directions of project management. Table 4.1 shows the most important success factors as presented in previous studies over past 45 years.

Table 4.1 A brief history of project success factors (Jugdev and Müller, 2005; Davis, 2014), expanded by the researcher.

Period	Success factors	Key factors	Authors
1970s	Viewpoint of examining technical aspects of a project (Davis, 2014)	1. Operational side, tools and techniques	(Pinto and Slevin, 1988b; Cooke-Davies, 1990; Munns and Bjeirmi, 1996; Atkinson, 1999; Lim and Mohamed, 1999; Jugdev and Müller, 2005)
		2. Requirements or performance project at implementation stage	
		3. Communication with customers	
		4. Lacked behavioural 'soft skills'	
1980s –1990s	Critical success factor lists (Pinto and Slevin, 1987)	1. Project mission (Clearly defined goals and direction)	(Kerzner, 1987; Pinto and Slevin ,1987; 1988a; 1989; Pinto and Prescott, 1990; Munns and Bjeirmi, 1996; Turner, 1999)
		2. Top management support (Resources, authority and power for implementation)	
		3. Schedule and plans (Detailed specification of implementation process)	
		4. Client consultation (Communication with and consultation of all stakeholders)	
		5. Personnel (Recruitment, selection and training of competent personnel)	
		6. Technical tasks (Availability of the required technology and expertise)	
		7. Client acceptance (Selling of the final product to the end users)	
		8. Monitoring and feedback (Timely and comprehensive control)	
		9. Communication (Provision of timely data to key players)	
		10. Trouble-shooting (Ability to handle unexpected problems)	
1990s –2000s	Development of critical success factor frameworks (Lester, 1998)	1. Factors associated with the project manager and project team	(Belassi and Tukel, 1996; Lester, 1998)
		2. Organisation and external environment	
		3. Support from top management is crucial	
		4. Importance of success being dependent on internal and external stakeholders	
21st Century	Strategic Project Management (Jugdev and Müller, 2005)	1. Importance of a collaborative working relationship between project manager, owner and sponsor for the performance of the project	(Jugdev and Müller, 2005; Turner et al., 2009; Turner and Zolin, 2012; Beleiu et al., 2015)
		2. The project manager should be empowered with flexibility to deal with unforeseen circumstances as stakeholders see best.	
		3. Highlight how projects are implemented within the organisation.	
		4. Roles and responsibilities are more likely to be clearly defined	
		5. Project team's level of effectiveness and efficiency increases	
		6. The level of stakeholders' satisfaction increases	
		7. Projects are more likely to respect the planned budget, time frame and performance criteria	

In a thematic study of twenty-nine articles, Kate Davis (2014) examined key literature related to the success of projects and provided a background to the development of project success since the 1970s. An inductive thematic analysis was then used in the investigation of stakeholder factors, which were perceived as key to project success. The investigator endeavoured to provide a better understanding of project success and determine the perspectives of senior management, project teams and project stakeholder groups. The key issue highlighted by this study was that, for some categories surveyed, there were no common factors of project success. This demonstrates a lack of agreement regarding the perceptions of project success factors among these three categories (Davis, 2014). According to Davis (2014), analysis of stakeholder opinions proves that the project manager is the most highly referenced stakeholder, followed by the project team and the client. Davis (2014) identifies authors grouped by their reference to different stakeholders, as shown in Figure 4.1.

Frequency stakeholder mentioned in the literature as having an interest in project success.

Stakeholder	Number of references	Literature
Project manager	31	Andersen et al. (1987), Atkinson (1999), Barclay and Osei-Bryson (2009), Belassi and Tukel (1996), Belout and Gauvreau (2004), Cooke-Davies (1990), Smith-Doerr et al. (2004), Freeman and Beale (1992), Jugdev and Müller (2005), Kendra and Taplin (2004), Kerzner (1987), Lim and Mohamed (1999), Müller (2003), Müller and Turner (2007a, 2007b), Munns and Bjeirmi (1996), Pinto and Slevin (1987, 1988a, 1988b, 1989), Shenhar et al. (1997), Tishler et al. (1996), Toor and Ogunlana (2010), Tukel and Rom (2001), Turner (2004), Turner et al. (2009), Turner and Müller (2005, 2006), Wang and Huang (2006), Wateridge (1998), and Wenell (2000)
Project team	24	Barclay and Osei-Bryson (2009), Belassi and Tukel (1996), Bounds (1998), Cooke-Davies (1990, 2002), Smith-Doerr et al. (2004), Jugdev and Müller (2005), Kerzner (1987), Munns and Bjeirmi (1996), Pinto and Prescott (1990), Pinto and Slevin (1987, 1988a, 1988b, 1989), Shenhar and Dvir (2007), Slevin and Pinto (1986), Toor and Ogunlana (2010), Turner (1999, 2004), Turner (2009), Turner et al. (2009), Turner and Müller (2006), Wang and Huang (2006), and Wateridge (1995, 1998)
Client	18	Atkinson (1999), Barclay and Osei-Bryson (2009), Belassi and Tukel (1996), Bryde and Robinson (2005), Jugdev and Müller (2005), Kerzner (1987), Müller and Turner (2007a), Munns and Bjeirmi (1996), Pinto and Prescott (1990), Pinto and Slevin (1987, 1988b, 1989), Shenhar et al. (1997), Slevin and Pinto (1986), Toor and Ogunlana (2010), Turner et al. (2009), Turner and Müller (2006), and Wateridge (1998)
Contractor Users/end user/consumer	15	Contractor—Barclay and Osei-Bryson (2009), Bryde and Robinson (2005), Jugdev and Müller (2005), Kerzner (1987), Lim and Mohamed (1999), Morris and Hough (1987), Müller and Turner (2007a), Pinto et al. (2009), Tishler et al. (1996), Toor and Ogunlana (2010), Turner (2004), Turner et al. (2009), Turner and Müller (2006), Wang and Huang (2006), and Wateridge (1998) Users/end user/consumer—Atkinson (1999), Jugdev and Müller (2005), Kerzner (1987), Lim and Mohamed (1999), Müller and Turner (2007a), Munns and Bjeirmi (1996), Pinto and Prescott (1990), The Standish Group (1995), Tishler et al. (1996), Toor and Ogunlana (2010), Turner (1999, 2009), Turner et al. (2009), Turner and Müller (2006), and Wateridge (1998)
Customer Project sponsor	14	Customer—Atkinson (1999), Barclay and Osei-Bryson (2009), Cooke-Davies (1990, 2002), Freeman and Beale (1992), Jugdev and Müller (2005), Kerzner (1987), Lim and Mohamed (1999), Shenhar et al. (1997), Shenhar and Dvir (2007), Tishler et al. (1996), Tukel and Rom (2001), Turner et al. (2009), and Wateridge (1998) Project sponsor—Barclay and Osei-Bryson (2009), Cooke-Davies (1990, 2002), Freeman and Beale (1992), Jugdev and Müller (2005), Kerzner (1987), Morris and Hough (1987), Müller (2003), Müller and Turner (2007a, 2007b), Turner (1999, 2004), Turner et al. (2009), and Wateridge (1998)
Top management	9	Top management—Atkinson (1999), Belassi and Tukel (1996), Cooke-Davies (1990), Jugdev and Müller (2005), Kerzner (1987), Pinto and Prescott (1990), Pinto and Slevin (1987, 1989), and Slevin and Pinto (1986)
Organisation Owner	8	Organisation—Belassi and Tukel (1996), Bounds (1998), Cleland and Ireland (2002), Jugdev and Müller (2005), Morris and Hough (1987), Pinto and Slevin (1988b), Shenhar et al. (1997), and Wang and Huang (2006) Owner—Jugdev and Müller (2005), Lim and Mohamed (1999), Pinto and Slevin (1988b), Pinto et al. (2009), Turner (2004), Turner et al. (2009), Wang and Huang (2006), and Wateridge (1998)
Line manager	7	Cooke-Davies (1990), Jugdev and Müller (2005), Kerzner (1987), Müller and Turner (2007b), Toor and Ogunlana (2010), Turner and Müller (2005), and Wenell (2000)
Project leader Project personnel Team members	4	Project leader—Pinto and Slevin (1988b), Slevin and Pinto (1986), Smith-Doerr et al. (2004), and Wateridge (1998) Project personnel—Kerzner (1987), Müller and Turner (2007a), Slevin and Pinto (1986), and Tishler et al. (1996) Team members—Atkinson (1999), Belassi and Tukel (1996), Tishler et al. (1996), and Turner and Müller (2005)
Executive Executive management Internal and external Management Public Senior management Supporters	3	Executive—Jugdev and Müller (2005), Kerzner (1987), and Toor and Ogunlana (2010) Executive management—Barclay and Osei-Bryson (2009), Kerzner (1987), and The Standish Group (1995) Internal and external—Lester (1998), Morris (1997), and Pinto and Slevin (1988b) Management—Bounds (1998), Freeman and Beale (1992), and Morris and Hough (1987) Public—Lim and Mohamed (1999), Munns and Bjeirmi (1996), and Turner et al. (2009) Senior management—Jugdev and Müller (2005), Kerzner (1987), and Wateridge (1998) Supporters—Toor and Ogunlana (2010), Turner (1999), and Wateridge (1998)
Director Engineer External environment Investor Management Other interested parties Project team leader Supplier	2	Director—Cooke-Davies (1990) and Smith-Doerr et al. (2004) Engineer—Smith-Doerr et al. (2004) and Wang and Huang (2006) External environment—Belassi and Tukel (1996) and Jugdev and Müller (2005) Investor—Barclay and Osei-Bryson (2009) and Turner et al. (2009) Management—Cooke-Davies (1990) and Toor and Ogunlana (2010) Other interested parties—Turner et al. (2009) and Turner and Müller (2006) Project team leader—Pinto and Slevin (1988a, 1989) Supplier—Müller and Turner (2007a, 2007b)
Environment External influences Other suppliers/Project executive/Senior supplier	1	Environment—Kerzner (1987) External influences—Morris and Hough (1987) Other suppliers/Project executive/Senior supplier—Turner et al. (2009)

Figure 4.1 Frequency stakeholder mentioned in the literature as having an interest in project success (Davis, 2014)

Alotaibi and Mafimisebi (2016) conducted a review of recent academic studies to answer the question "what challenges face project management in the worldwide practice of 21st century?". They reviewed recent literature to assess which project management practices are truly valuable to modern organisations, companies and the community, and identified the factors that provide the greatest chance of project success. Their research findings demonstrated that commitment to use of a project management methodology and standard which helps project teams to arrive at the better project outcomes was the most important factor. These methodologies and standards strongly focus on clearly defining the project before beginning the project; for example, a project charter document contains details of the justification, scope, duration, budget estimate, performance criteria, high-level alternatives analysis, assumptions, constraints, risks, project organisation, and stakeholders (internal and external) of the project, as well as critical success factors. Therefore, the authors conclude that the aforementioned elements should be stated and agreed upon before the project begins (Alotaibi and Mafimisebi, 2016). Their findings also revealed that employing a project-management approach involves creating values and relationship with stakeholders", and "could help eliminate wasted time and efforts that would have been directed at irrelevant tasks, through measuring progress and tracking project tasks. In addition, managing ad-hoc resources was found to be critical to project success. This work supports strongly that applying project management methodology and standard at the strategic level of the organisation could help in establishing a business environment for undertaking successful projects (ibid.).

4.2.2 Sustainability and Success in Project Management

The concept that sustainability is connected to economic, social and environmental dimensions has required a new perspective on organisational project management (Labuschagne et al., 2005; Munck et al., 2013; Brones et al., 2014; Martens and Carvalho, 2016a). Sustainability issues are still emerging in project management literature, and project management bodies of knowledge such as APM-PMBOK (APM, 2012), PMI-PMBOK (PMI, 2013) and IPMA-ICB (IPMA, 2015) still do not sufficiently address this topic (Martens et al., 2016d). While, these bodies still not pay particular attention to the sustainability issues, which spreads increasingly in the daily practice of the project area (Ugwu et al., 2006; Agarwal et al., 2015; Ishak et al., 2016; Martens et al., 2016d).

Several researchers believe that it is necessary to incorporate the economic, social and environmental dimensions into the functions of project management (Labuschagne et al., 2005; Sarkis et al., 2012; Munck et al., 2013; Brones et al., 2014; Sánchez, 2015). This reality has attracted the interest of academics and professionals alike with a view to integrating sustainability into the context of success in project management (Grevelman and Kluiwstra, 2010; Silvius et al., 2013; Martens et al., 2016d; Martens and Carvalho, 2016b). Indeed, project management can serve as a means to positively contribute to incorporating dimensions of sustainability (Bocchini et al., 2014).

Previous studies have focused primarily on the role of sustainability in project success, as in the study of Atkinson (1999), who believes that success criteria depend on fulfilling the economic, environmental and social requirements of a community. In addition to this observation, Kometa et al. (1995), Kumaraswamy and Thorpe (1996), and Lim and Mohamed (1999) considered that project success criteria should also include health and safety issues. Similarly,

Chan and Chan (2004) concluded that environmental criteria should also constitute a criterion for project success in the construction sector. Furthermore, Elattar (2009) argues that project success criteria are linked to the project's social acceptability. In addition, Ebbesen and Hope (2013) and Grevelman and Kluiwstra (2010) indicate that sustainability is seen by practitioners as a key success factor of project planning and implementation. Finally, Martens et al. (2016c) and Carvalho and Rabechini Junior (2015) developed the model produced by Shenhar and Dvir (2007) by adding a sustainability dimension to their model.

As previously discussed, for project success, the project triple constraint (time, cost, and scope) is widely referenced in the literature. Now it has been posited that strategic sustainability aspects such as environmental and social requirements should be added to the definition of project success. Thus, in order to study project performance (as is the objective of this research), the project success evaluation criteria will consist of five dimensions: time, cost, quality, and social and environmental factors (see Figure 8.1 in chapter 8).

4.3 The Major Causes of Delays in Projects

Project delay refers to a time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project (Salunkhe and Patil, 2014; Hamzah et al., 2011). In each case, a delay is typically a costly situation (O'Brien, 1976). Delay has also been defined as an act or event which extends required time to perform or complete work of the contract manifests itself as additional days of work (Zack, 2003). According to Assaf and Al-Hejji (2006), delay can be defined as when "the time overruns either beyond the completion date specified in a contract or beyond the date that the parties agreed upon for the delivery of a project".

Consequently, project delay can be said to be an overrun or expansion of completion time specified in a contract. According to Callahan (2010), “a delay is the time during which some part of the construction project has been extended or not performed due to anticipated circumstances”. Aibinu and Jagboro (2002) have argued that delay amounts to a circumstance where contractor and project owner together or independently participate in the non-delivery of the project within the stipulated or concurred contract period.

The literature is fraught with studies of construction delays and their negative influence on project success and company execution (Couto and Teixeira, 2007). Many of these studies, had the following objectives:

- To analyse the causes and effect of delays on a project
- To classify and evaluate delays, claims and related issues
- To realize, compare and specify their issues

Delays are insidious often resulting in delay, cost overrun, conflicts, litigation, and complete relinquishment of projects (Sambasivan and Soon, 2007).

Numerous studies and papers have been published on the subject of the causes and effects of delays in projects (Sun and Meng, 2009). These studies have been done globally and in developing countries (Sambasivan and Soon, 2007). Studies have shown that Iraq is one of the Middle Eastern countries where the problem of delayed projects is most dramatically reflected. A study by Tarhini et al. (2015) showed the differing views of stakeholders on the reasons for project delays: typically, the owner was more concerned with financial issues, contractors regarded contractual relationships as the most important and consultants considered project management issues to be the most important causes of delay.

Two studies have been conducted in recent years in relation to project management in Jordan. Sweis and Sweis (2008) studied the factors affecting time overruns in public construction projects. The critical factors were found to be the presence of unskilled labours, a shortage of technical professionals in the contractor's organisation, improper technical study by the contractor during the bidding stage, and poor planning and scheduling of the project by the contractor. The second study, conducted by Al-Momani (2000), investigated the causes of delay in 130 public projects in Jordan. The study revealed that the most important causes of delay in public building projects were related to the designer, changes made by the client, weather, site conditions, late deliveries, and economic conditions.

In Kuwait, Koushki et al. (2005) studied the delays in construction of private residential projects. Issues identified included changing orders, the owners' financial constraints and lack of experience in the construction business, as major factors affecting delay. Assaf and Al-Hejji (2006) studied the delay in different types of projects in Saudi Arabia. 73 causes were identified and classified according to three groups of project participants (clients, consultants and contractors).

Mobarak (2004) studied the role of consultancy in minimising the delays in large projects and showed possible categorisations of causes of delay such as internal and external, financial and non-financial. Construction delay problems in Egypt were studied by Amer (1994) through the analysis of causes that contribute to construction delays in order to improve the ability to implement construction projects with minimal delays. Kaming et al. (1997) studied the factors influencing delays in the construction of 31 high-rise buildings in Indonesia. The study found that the major factors causing delays are design changes, poor labour productivity, inadequate planning and resource shortages.

Many other research studies have been carried out in other developing countries. In Malaysia, Sambasivan and Soon (2007) identified delay factors and their impact on project completion. The results pointed to top 10 causes of delays. Among them were poor planning and site management by contractors, client's inadequate financial resources and payments for completed work, and problems with sub-contractors. A similar study by Alaghbari et al. (2007) identified 31 causes of delay. The study concluded that the most important causes were financial problems and coordination problems.

Kumaraswamy et al. (1998) surveyed the causes of delay in Hong Kong. They found that there was a difference in perception as to the causes of delay by different groups of participants in building and civil engineering works.

4.3.1 Summary of Previous Studies of Causes of Delay in the Middle East

This section will refer to theoretical studies using Excel analysis functions to determine the key literature related to delay causes, particularly in the Middle East. The literature recognises that there is insufficient coverage of project delays as a research field, both in academic studies and leading project management journals. Moreover, it could be argued that the largest number of studies related to delayed projects is from countries in the Middle East.

This section begins by providing background to the theoretical framework using a literature review of previous studies related to delay causes since 1995. An inductive thematic analysis then investigates which factors are involved in the delay of projects and are therefore perceived as key to project problems. The results of this investigation will inform the design of questionnaires and interviews in the next phase of this study.

The literature review for this section uses a combination of a coding framework (Bryman and Bell, 2015), an "integrative literature review" (Levy and Ellis, 2006; Davis, 2014) and "thematic analysis" (Ritchie et al., 2013; Davis, 2014) to ensure an in-depth search process. According to the literature, Levy and Ellis (2006) suggested that a valid method should be followed, in order to perform a systematic "integrative literature review" (Levy and Ellis, 2006). Webster and Watson (2002) argued that "a systematic search should ensure that you accumulate a relatively complete census of relevant literature" (p. 16).

Many studies in the Middle East have been reviewed on the topic of construction project delays. Such studies are found in different countries like Saudi Arabia, Lebanon, Kuwait, the United Arab Emirates (UAE), Jordan, Syria, Iran, Afghanistan, Oman, Turkey, Egypt and Qatar.

As such, the author began by reviewing 18 articles about the 12 countries in the Middle East. Of course, the construction projects in these countries are subject to differentiated political, economic, social and cultural conditions. The focus was on key articles and an initial reading of abstracts, results and findings led to the extraction of project delays and their factors. This resulted in thirteen articles being selected for review. One recently published article was selected for each Middle Eastern country. The exception to this rule was Saudi Arabia, for which two articles published in 1995 and 2012 were chosen, because of the large number of studies that were written in the context of this country related to the delay of projects. Table 4.2 shows a summary of previous studies on construction delays in the Middle East.

Table 4.2 Summary of previous studies of the causes of delay in construction projects in the Middle East

No.	Country	Researchers	Rank	Major causes of delay
1	Saudi Arabia	Assaf et al., 1995	1	Slow preparation and approval of shop drawings
			2	Delays in payments to contractors
			3	Changes in design/design error
			4	Shortages of labour supply
			5	Poor workmanship
2	Lebanon	Mezher et al., 1998	1	Owner had more concerns with regard to financial issues
			2	Contractors regarded contractual relationships as the most important
			3	Consultants considered project management issues
3	Kuwait	Koushki et al., 2005	1	Changing orders
			2	Owners' financial constraints
			3	Owners' lack of experience in the construction business
4	United Arab Emirates (UAE)	Faridi and El-Sayegh, 2006	1	Slow preparation and approval of drawings
			2	Inadequate early planning of the project
			3	Slowness of owner's decision-making
			4	Shortage of manpower
			5	Poor site management and supervision
			6	Low productivity of manpower
5	Jordan	Sweis and Sweis, 2008	1	Presence of unskilled labourers
			2	Shortage of technical professionals in the contractor's organisation
			3	Improper technical study by the contractor during the bidding stage
			4	Poor planning and scheduling of the project by the contractor
			5	Too many changes to orders from owner
			6	Slow decision-making by owner
6	Syria	Mustafa and Hussain, 2010	1	Difficulties in financing projects by the contractor
			2	Delays in delivery of the project site obstacles
			3	Disputes between the contractor, supervision and owner
			4	Errors and inconsistencies in design documents
			5	Unqualified labourers
			6	Labour shortages, causing a delay in the contracting process and supply of building materials
7	Iran	Pourrostam and Ismail, 2012	1	Delay in processing payments by client
			2	Changing of orders by client during construction
			3	Poor site management
			4	Slowness in decision-making by client
			5	Financial difficulties of contractor

8	Saudi Arabia	Abdullah Albogamy et al., 2012	1	Low performance of the lowest bidder contractor
			2	Delays in sub-contractor's work
			3	Poor qualification, skills and experience of the contractor's technical staff
			4	Poor planning and scheduling
			5	Delay in processing payments by the owner
9	Afghanistan	Niazai and Gidado, 2012	1	Security
			2	Corruption
			3	Poor qualification of the contractor's technical staff
			4	Delay in processing payments by owner
			5	Poor site management and supervision by contractor
10	Oman	Alnuaimi and Al Mohsin, 2013	1	Planning and programming of construction work
			2	Poor construction experience
			3	Shortage of material
			4	Failure of work programmes in practice
			5	Poor site management
11	Turkey	Cülfik et al., 2014	1	Labour-related delays
			2	Finance-related delays
			3	Material-related delays
			4	Changes/revision-related delays
			5	Contract-related delays
12	Egypt	Marzouk and El-Rasas, 2014	1	Finance and payments of completed work by owner
			2	Variation of orders/changes of scope by owner during construction
			3	Effects of subsurface conditions (e.g. soil, high water table, etc.)
			4	Low productivity level of labourers
			5	Ineffective planning and scheduling of project
13	Qatar	Emam et al., 2015	1	Delayed response from utility agencies
			2	Major change of design during construction
			3	Ineffective planning and scheduling
			4	Ineffective control of progress
			5	Changes in the scope of the project
			6	Slow decision-making

According to the surveys carried out by 13 authors in 12 Middle Eastern countries, including projects in the construction sector, changes in design or changing orders are the greatest

cause of project delays in 10 out of 12 countries. This factor is jointly followed by the two second highest causes of projects delay in 8 out of 12 countries: (a) difficulties in financing or delayed payments for completed work by the owner, and (b) unqualified people working in the domain of the project. Poor project planning is ranked in third place among the factors that caused the delay of projects in 6 out of the 12 Middle Eastern countries. Finally, the last major factor that caused a delay in projects in 4 out of 12 countries is slow decision-making by the owner, as shown in Figure 4.2.

On the other hand, it was found that some causes of delay in other nations were not common among most Middle Eastern countries, such as:

1) The dispute between the contractor, supervision and the owner in Syria.

2) Security and corruption in Afghanistan.

3) Shortage of material in Oman.

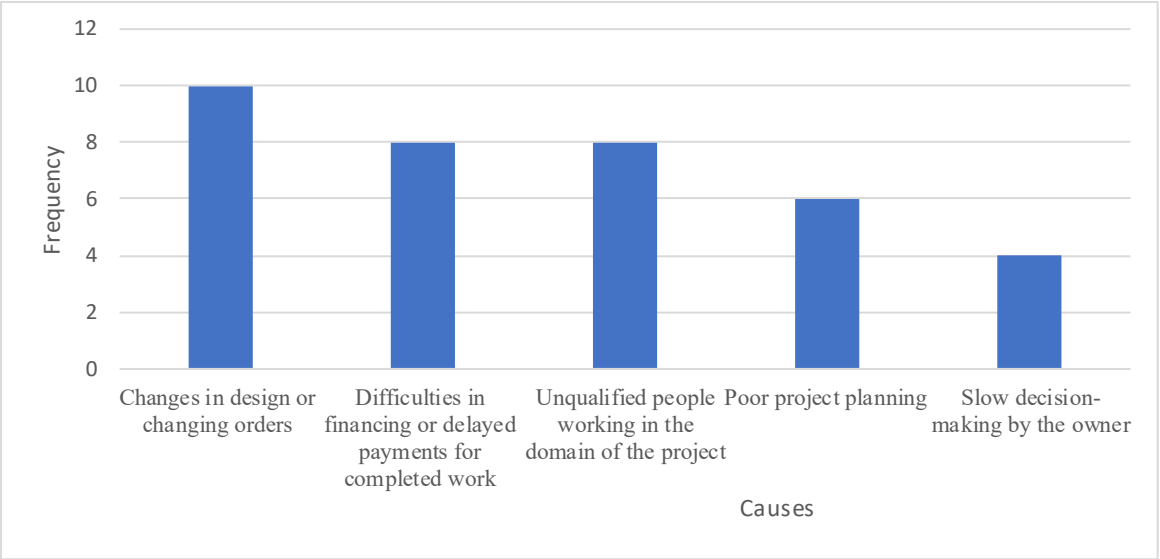


Figure 4.2 Major causes of delays to projects in the Middle East

4.3.2 Summary of Previous Studies of Causes of Delay in Iraq

It is well known that reconstruction projects in Iraq suffer from delays, in addition to other problems (Awad and Al-Hindawi 2007; Jahanger, 2013; Ghanim, 2015). The main objective of this section is to identify the major causes of delays in public projects in Iraq through a comprehensive literature review of all relevant articles which included surveys used to assess the perceptions of the key stakeholders involved in reconstruction projects in Iraq. Table 4.3 shows a summary of three previous studies on construction project delays in Iraq.

Table 4.3 Summary of previous studies of the causes of delay in construction projects in Iraq

Study 1	Causes of Delay in Iraq Construction Projects, Hussein Ali Awad and Gafel Karim al-Hindawi (2007)	
No.	Delay Factor	Responsible Group
1	Delays in laboratory tests of materials	Owner
2	Inefficient financial management by contractor	Contractor
3	Increase in price of materials	External
4	Miscalculation of project duration by contractor	Contractor
5	Sale of contract for more than a contractor (sub-contracting)	Contractor
6	Lack of commitment to the project schedule progress by contractor	Contractor
7	Lack of technical competence of the contractor's staff	Contractor
8	Poor security	External
9	Delayed payment of financial dues to contractor by owner	Owner

Study 2	Important Causes of Delay in Construction Projects in Baghdad City, Qais Kadhim Jahanger (2013)	
No.	Delay Factor	Responsible Group
2	Ineffective planning and scheduling of project by contractor	Contractor
3	Poor site management and supervision by contractor	Contractor
4	Poor qualification of the contractor's technical staff	Contractor
5	Unclear and inadequate details in drawings	Owner
6	Inadequate design-team experience	Owner
7	Insufficient data collection and survey before design	Owner
8	Difficulties in financing project by contractor	Contractor
9	Obsolete or unsuitable construction methods	Contractor
10	Unqualified workforce	External
Study 3	Causes of Delay in Public Construction Projects in Iraq, Ghanim A. Bekr (2015)	
No.	Delay Factor	Responsible Group
1	Security measures	External
2	Government change of regulations and bureaucracy	Owner
3	Official and non-official holidays	External
4	Low performance of the lowest bidder contractors	Owner
5	Slow decision-making by the owner	Owner
6	Design changes by the owner	Owner
7	Delay in processing payments by the owner	Owner
8	Problems with local community	External
9	Owner's lack of experience in construction	Owner
10	Economic conditions, local or global	Owner

The main objective of the study by Hussein Awad and Gafel al-Hindawi (2007) was to identify causes of delay to construction projects in the city of Karbala, Iraq. They found that the most important factors influencing the delay of construction projects were delays in testing materials, inefficient financial management by the contractor, the increase in the price materials,

miscalculation of the duration of the project by the contractor, the sale of contract for more than a contractor (sub-contracting), lack of commitment to the project's schedule by contractor, lack of technical competence of the contractor's staff, poor security and delayed payment of financial dues to the contractor by the owner.

Secondly, the study by Qais Jahanger (2013) aimed to identify causes of delay in construction projects in Baghdad, Iraq. The author concluded that the most important causes of delays are ineffective planning and scheduling of the project by the contractor, poor site management and supervision by the contractor, poor qualification of the contractor's technical staff, unclear and inadequate details in drawings, inadequate design-team experience, insufficient data collection and survey before design, difficulties in financing the project on the part of the contractor, obsolete or unsuitable construction methods and an unqualified workforce.

Finally, the study by Ghanim Bekr (2015) concluded that the most significant delay factors affecting public projects in Iraq are "security measures, official and non-official holidays, government change of regulations and bureaucracy, low performance of lowest bidder contractors in the government tendering system, design and changes by owner, design changes by consultants, delay in progress payments by the owner, owner's lack of experience in construction, problems with local community and economic local and global conditions" (Ghanim, 2015).

The results of these three studies showed that the ten most important causes of delay for projects are as follows (arranged in descending order of importance):

1) Delays in tests of materials.
2) Ineffective planning and scheduling of project by contractor.
3) Security measures.

4) Inefficient financial management by contractor.

5) Poor site management and supervision by contractor.

6) Government changes of regulations and bureaucracy.

7) Increase in price of materials.

8) Poor qualification of the contractor's technical staff.

9) Official and non-official holidays.

10) Low performance of the lowest bidder contractors.

To sum up, the major cause groups of project delays in Iraq, arranged in descending order by importance, are: the owner (government), external factors and the contractor.

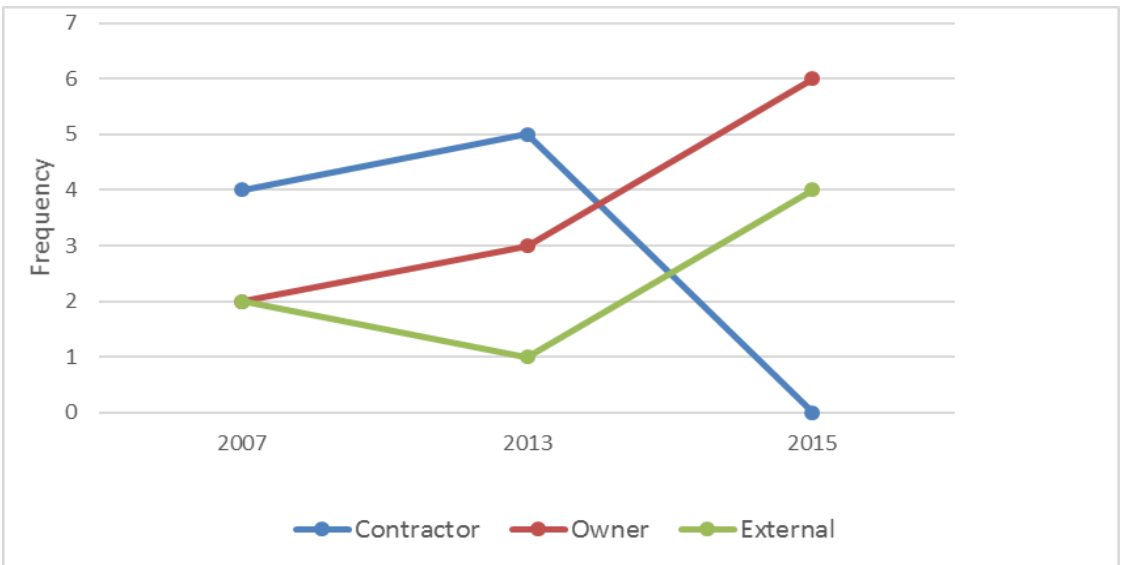


Figure 4.3 Frequency of delay factors over years 2007, 2013 and 2015 by cause groups

Figure 4.3 shows that the contractor-related causes declined dramatically from 2007 to 2015, at the same time as a gradual increase in owner-related (government) causes during this

period. The external factors fluctuated in the results of the three studies, but in general also rose in 2015.

4.3.3 Classification of delays

The literature mostly classifies delays according to responsibility into the following two major types: excusable and non-excusable. An excusable time overrun is one that is beyond the control of the contractor, entitling the contractor to extensions of contract time (Fugar and Agyakwah-Baah, 2010).

Delays can be logically divided into four levels of considerations: contract, parties of contract, justification of delay and whether or not the delay is compensable, as follows (Figure 4.4):

Level 1: Considering the causes from the contract, the delays can be divided into two groups, consisting of internal causes and external causes. Internal causes arise from the contract itself or its parties. External causes arise from things that happen beyond the control of the contract or its parties, such as environmental, security, economic and political conditions (Ahmed et al., 2003).

Level 2: Considering causes stemming from the parties bound by the contract, the internal causes can be divided into five groups. These are: owner-, client-, consultant-, and contractor-related causes (Ahmed et al., 2003). The fifth group refers to concurrent delays; these delays are due to the combination of two or more independent causes of delay during the same period. These delays may lead to disputes between the

contractor and the client (Bramble and Callahan, 1987). Concurrent delay is a complex concept, the legal situation of which remains mysterious.

Level 3: Considering the justification of delay. Bolton (1990) classified delay as follows: excusable delays are caused by occurrences which are not attributable to any of the parties. Inexcusable delays result from the fault of the contractor, their subcontractors or material suppliers. In addition, delays may be the fault of the owner or their representatives.

Level 4: Compensable and non-compensable delays. Compensable delays result from acts or omissions of the owner or someone for whose acts the owner is liable. Non-compensable delays are caused by occurrences which are attributable to one of the parties (Bramble and Callahan, 1987; Bolton, 1990).

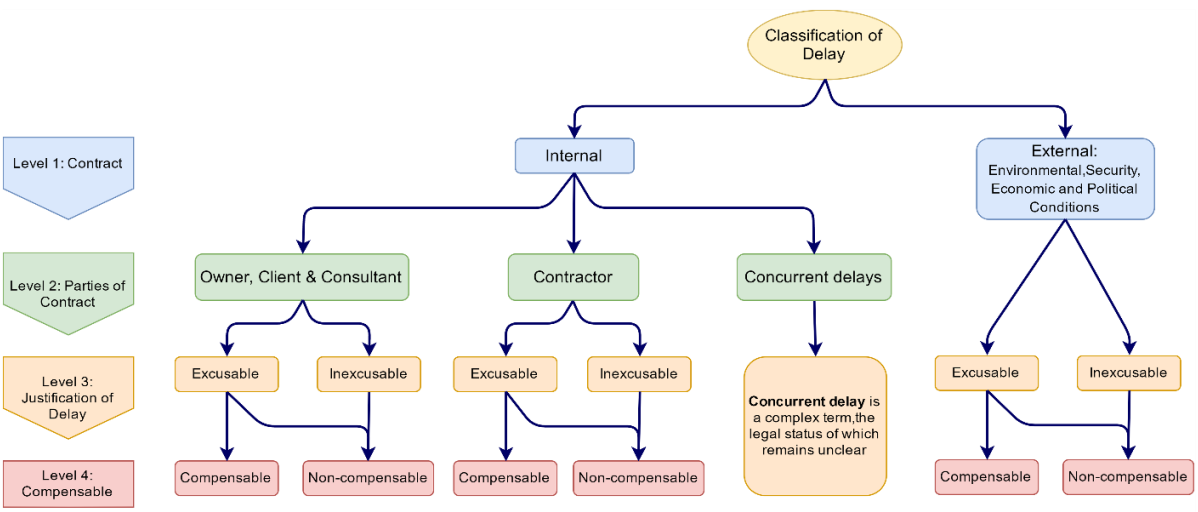


Figure 4.4 Classification of Delay

4.4 The Major Causes of Cost Overrun in Projects

Cost overrun is a very frequent phenomenon in construction industries, and is almost associated with nearly all projects, both in developed and developing countries (Azhar et al., 2008; Enshassi et al., 2009; Sweis et al., 2013; Green, 2016). The significance of the topic has attracted the attention of academic studies and scientific journals over recent decades (Arditi et al., 1985; Dlakwa and Culpin, 1990; Mansfield et al., 1994; Kaming et al., 1997; Dawood, 1998; Frimpong et al., 2003; Creedy, 2004; Koushki et al., 2005; Doloi, 2012; Allahaim and Liu, 2015; Senouci et al., 2016). This is because cost is one of the most essential criteria for measuring the success of projects (Ramon San Cristobal, 2009; Becker et al., 2014; Shehu et al., 2014; Memon et al., 2014).

The construction sector is a dynamic industry which has constantly been faced with the challenge of risk and uncertainties in its project budgets (Laufer and Tucker, 1987; Chan, 2010). These uncertainties, the complexity of projects (Shehu et al., 2014), time overrun (Bekr, 2015), fluctuating costs of labour and materials (Memon et al., 2014) and additional work (Aziz, 2013) make cost management difficult. The probability of cost overrun in such projects is therefore high (Doloi, 2012). Despite vast improvements in the tools and techniques of project management, the challenges of cost overruns are still a critical issue (Mansor et al., 2016).

Susana Arcila (2012) defines cost overrun as when the final cost of the project exceeds the original contract value at completion. Ivars Avotos (1983) agrees that cost overrun occurs when "the final cost of the project exceeds the initial estimate or budget" (Avotos, 1983, p. 142). Nevertheless, the initial or estimate budget is constantly changing during the implementation of the project (Durdyev et al., 2012). Some authors argue that the initial budget is estimated when the decision to begin work on the project is made (Flyvbjerg et al., 2002; Odeck, 2004). On the other hand, other authors uphold the idea that cost overrun is the difference between the actual and

estimated costs as a percentage of the estimated cost, “with all costs calculated in constant prices” (Lee, 2008). “The difference between cost overrun definitions may cause a difference in the magnitude of cost overruns that have been reported over the years” (Love et al., 2012).

The literature is fraught with studies of cost overruns in projects and their negative influence on project success (Frimpong et al., 2003; Doloi, 2012; Sweis et al., 2013; Allahaim and Liu, 2015; Senouci et al., 2016). Many of these studies had the following objectives:

- To analyse the causes and effect of cost overruns on project success.
- To classify and analyse cost overruns, as well as claims and related issues.
- To demonstrate by comparing and specifying their issues that cost overruns are insidious, often resulting in conflicts, litigation, and complete relinquishment of projects.

Numerous studies and papers have been published on the subject of causes and effect of cost overrun in projects. These studies have been done in both developed and developing countries (Sweis et al., 2013; Green, 2016). Iraq is one of the Middle Eastern countries which faces the greatest problem of cost overrun in projects, yet there is a lack of published studies investigating this topic. To this end, six articles from six developing countries reviews in this section. Of course, the construction projects in these countries are subject to differentiated political, economic, social and cultural conditions. The focus was on key articles, and an initial reading of abstracts, results and findings led to determining the projects’ cost overruns and their factors. This resulted in the selection of one recent article for each country. Table 4.4 shows a summary of previous studies on construction cost overruns in six developing countries.

Table 4.4 Summary of previous studies of the causes of cost overruns in projects in developing countries

No.	Country	Author	Study Title	Rank Factors
1	Ethiopia	Nega, 2008	Causes and effects of cost overrun on public building construction projects in Ethiopia	1 Inflation or increase in the cost of construction materials
				2 Lack of planning and coordination
				3 Fluctuations in the cost of labour and/or material
				4 Insufficient geotechnical investigation
				5 Additional costs due to variation in work
				6 Change in foreign exchange rate (for imported materials)
				7 Changing orders
				8 Costs due to exceptional risks
				9 Delay of drawings and/or orders requested by the contractor
				10 Changes in plans and drawings
2	Malaysia	Memon et al., 2011	Preliminary Study on Causative Factors Leading to Construction Cost Overrun	1 Poor design and delays in design
				2 Unrealistic contract duration and requirements imposed
				3 Lack of experience
				4 Late delivery of materials and equipment
				5 Relationship between management and labour
				6 Delay in preparation and approval of drawings
				7 Inadequate planning and scheduling
				8 Poor site management and supervision
				9 Mistakes during construction
				10 Changes in material specification and type
3	Turkey	Durdyev et al., 2012	Factors causing cost overruns in construction of residential projects; case study of Turkey	1 Improper planning
				2 Inaccurate project cost estimation
				3 Lack of coordination between parties
				4 Inadequate duration of contract period
				5 Lack of communication between parties
				6 Poor on-site management
				7 Cost overruns arising from design changes
				8 Soil conditions
				9 Inadequate site investigations
				10 Site location and environment

4	Egypt	Aziz, 2013	Factors causing cost variation for constructing wastewater projects in Egypt	1 Lowest bidding procurement method (owner-originated)
				2 Additional work (owner-originated)
				3 Bureaucracy in bidding/tendering method (owner-originated)
				4 Wrong method of cost estimation (designer-originated)
				5 Funding problems (owner-originated)
				6 Inaccurate cost estimation (designer-originated)
				7 Mode of financing and payment for completed work (owner-originated)
				8 Unexpected ground conditions (miscellaneous)
				9 Inflation (miscellaneous)
				10 Fluctuation in prices of raw materials (miscellaneous)
5	Jordan	Bekr, 2015	Identifying Factors Leading to Cost Overrun in Construction Projects in Jordan	1 Schedule delay (time overrun)
				2 Frequent design changes
				3 Changes and additional works at owner's request
				4 Mistakes and errors in design
				5 Inadequate planning and scheduling
				6 Inflation/price fluctuation
				7 Change in the scope of work (by owner)
				8 Incomplete drawings/detailed design at the time of tender
				9 Shortage of skilled site workers
				10 Construction mistakes and defective works
6	India	Rajakumar, 2016	Analysis of Cost Overrun in Road Construction Activities: A Critical Review	1 Land acquisition and increase in land cost
				2 Cost escalation
				3 Financing and payments for completed works (delay in payment)
				4 Force majeure (act of God)
				5 Design changes during construction phase
				6 Delays in shifting existing utilities
				7 Increase in quantities due to actual site conditions
				8 Non-availability of construction materials
				9 Design errors
				10 Increase in or unstable interest rates

The results of these six studies showed that the ten most important causes of cost overrun for projects, arranged in descending order of importance, are:

1. Fluctuations and escalation in cost of labour and/or material
2. Changes and delays in design or poor initial quality
3. Improper planning and lack of experience
4. Lowest bidding method by owner
5. Schedule delay (time overrun)
6. Land acquisition and increase in land cost
7. Insufficient geotechnical investigation
8. Unrealistic contract duration and requirements imposed
9. Inaccurate project cost estimation
10. Additional works

The overall ranking results indicate that three groups - client (government), contractor and external - are considered the most significant factors that can cause cost overruns in projects. According to the surveys carried out by six authors from six countries, including projects in the construction sector, the cause group that relates to the client (government) has been the most influential in incurring cost overruns (65%). External causes came in second place in influencing the cost overrun of projects (22%). Finally, contractor-related causes were found to have the least impact on the cost of the projects surveyed in the studies mentioned (13%), as shown in Figure 4.5.

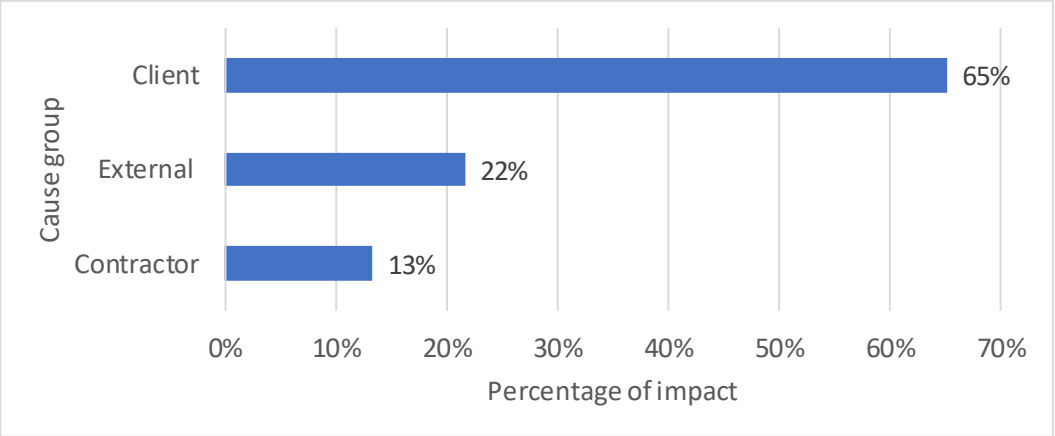


Figure 4.5 Percentage of impact for each cause group on cost overrun

4.5 The Major Causes of Quality Failures in Projects

In recent decades, the importance of the quality of a project has been highlighted in the construction industry (Holm, 2000). Several studies have examined critical factors affecting project quality (Tan and Lu, 1995; Chan and Tam, 2000; Jha and Iyer, 2006; Callistus et al., 2014; Jraisat et al., 2016). Johnson (1993) and others have explained and developed quality management systems (Hughes and Williams, 1991; BSI, 1987; ISO, 1992; Harris and McCaffer, 1993; Barrett, 2000). Numerous studies have also identified the cost of quality in design and construction (Bonshor and Harrison, 1982; Davis et al., 1989; CII, 1990; Love and Irani, 2003). Subsequently, other authors have developed techniques for measuring quality (Stevens et al., 1994; Stevens, 1996; Al-Nakeeb et al., 1998; Abdel-Razek, 1998). However, despite the existing literature that addresses the issue of quality, most developing countries suffer from poor quality in the majority of their projects (Lukumon et al., 2015).

Quality is described by Collins (1994) as the world's oldest documented profession. Project quality has been broadly defined. However, quality in its simplest form can be defined as

conformance to requirements (Crosby, 1979), conformance to specifications (Levitt, 1972) or meeting the customer's expectations (Grönroos, 1984; Parasuraman et al., 1985). When implementing a project, achieving quality among other constraints is the final objective of all stakeholder groups (Ofori, 2006).

According to Tan and Lu (1995), there are various critical problems and challenges facing the construction industry, but one of the most significant is the low level of contractor and client competence (Chan and Tam, 2000; Callistus et al., 2014). Further to this point, Jha and Iyer (2006) stated that there is a lack of top management support or leadership (Callistus et al., 2014; Davidkumar and Kathirvel, 2014; Jraisat et al., 2016). However, Oyedele et al. (2015) said that poor quality management systems are the most important factors affecting the quality of projects (Oyedele et al., 2015). They noted that the contractor is employed by the client to fulfil a contract and finish a project within a stipulated time. They added that construction projects require different resources that contractors are unable to provide; in such cases, unskilled subcontractors are used and lower their productivity (Ibid). Table 4.5 shows a summary of previous studies on construction quality failure factors in Asian and African countries.

Table 4.5 A summary of previous studies on construction quality failure factors in Asian and African countries

No.	Country	Author	Study Title	Rank Factors
1	Taiwan	Tan and Lu, 1995	On the quality of construction engineering design projects: criteria and impacting factors	1 Capability of project managers
				2 Capability of design staff
				3 Clarity and reasonableness of owner's requirements
				4 Changes to owner's requirements
				5 The effectiveness of the quality control and quality assurance programme
				6 Monitoring and control of schedule and performance
				7 Stability of design staff
				8 Utilisation of common and standardised construction methods and materials
				9 Consideration of possible variations in construction environments
2	Hong Kong	Chan and Tam, 2000	Factors affecting the quality of building projects in Hong Kong	1 Effectiveness of design team leader
				2 Effectiveness of client's project manager
				3 Complexity
				4 Effectiveness of construction team leader
				5 Project scope
				6 Support from parent company
				7 Nature of client
				8 Environment
				9 Competency of client
				10 Client's emphasis on quality
3	India	Jha and Iyer, 2006	Critical Factors Affecting Quality Performance in Construction Projects	1 Project manager's competence
				2 Top management support
				3 Monitoring and feedback by project participants
				4 Favourable working conditions
				5 Commitment of all project participants
				6 Owner's competence
				7 Interaction among project participants - internal
				8 Interaction among project participants - external
				9 Good coordination among project participants
				10 Availability of trained resources
4	Ghana	Callistus et al., 2014	Factors Affecting Quality Performance of Construction Firms in Ghana: Evidence from Small–Scale Contractors	1 Lack of training on quality for staff
				2 Lack of management leadership
				3 Lack of previous experience of contractor
				4 Lack of technical and professional expertise and resources to perform task
				5 Lack of management commitment to continual quality improvement
				6 High level of competition
				7 Poor financial control on site
				8 Resource wastage on site
				9 Fraudulent practices and kickbacks
				10 Poor planning and control techniques

5	Nigeria	Oyedele et al., 2015	Critical factors affecting construction quality in Nigeria: evidence from industry professionals	1 Poor quality of material delivered to site
				2 Low level of skill and labour experience
				3 Poor inspection and testing
				4 Poor site installation procedure
				5 Lack of quality assurance
				6 Contractors' poor technical knowledge
				7 Unrealistic constraints of project cost
				8 Making site decisions on cost and not value of work
				9 Inadequate site supervision
				10 Poor project planning
6	Egypt	Ebrahim Abu El-Maaty and El-Hamrawy, 2016	Management of Highway Projects in Egypt through Identifying Factors Influencing Quality Performance	1 Availability of experienced staff in the owner's and contractor's teams
				2 Efficiency of the owner's inspection team
				3 Clarity of responsibilities and roles for each owner, consultant, and contractor
				4 Pavement is not designed according to the regional conditions
				5 Asphalt quality and type used in the construction process
				6 Contractor's labour and equipment capability
				7 Lack of program for quality management to be adhered to by the owner, consultant, and contractor
				8 Clarity and accuracy of specifications in relation to the required compaction level
				9 Availability of quality specified materials
				10 Aggregates quality used in the construction process
7	Jordan	Jraisat et al., 2016	Quality in construction management: an exploratory study	1 Human resource management
				2 Customer satisfaction
				3 Top management commitment
				4 Construction-specific factors
				5 Supplier management
				6 Uses of technology
				7 Quality management systems
				8 Leadership
				9 Culture
				10 Process management

The results of the seven studies above showed that the ten most important causes of quality failure in projects, arranged in descending order of importance, are:

1) Capability of project managers
2) Effectiveness of design team
3) Top management support

4) Quality management systems

5) Lack of training on quality for staff

6) Conformance to codes and standards

7) Poor inspection and testing

8) Lack of management leadership

9) Lack of previous experience of contractor

10) Selection of wrong contractor

The overall ranking results indicate that the three main groups of factors affecting failure to achieve the required quality in projects are: the client (government), the contractor and external factors. These three are considered the most significant factors that can cause quality failure in projects. According to the surveys carried out by seven authors from seven countries (consisting of 3 African and 4 Asian countries) on projects in the construction sector, the cause group that relates to the client (government) was found to have the greatest influence on the failure to achieve the requisite quality (54%). Contractor-related came in second place in influencing overrun in a project's quality (34%).

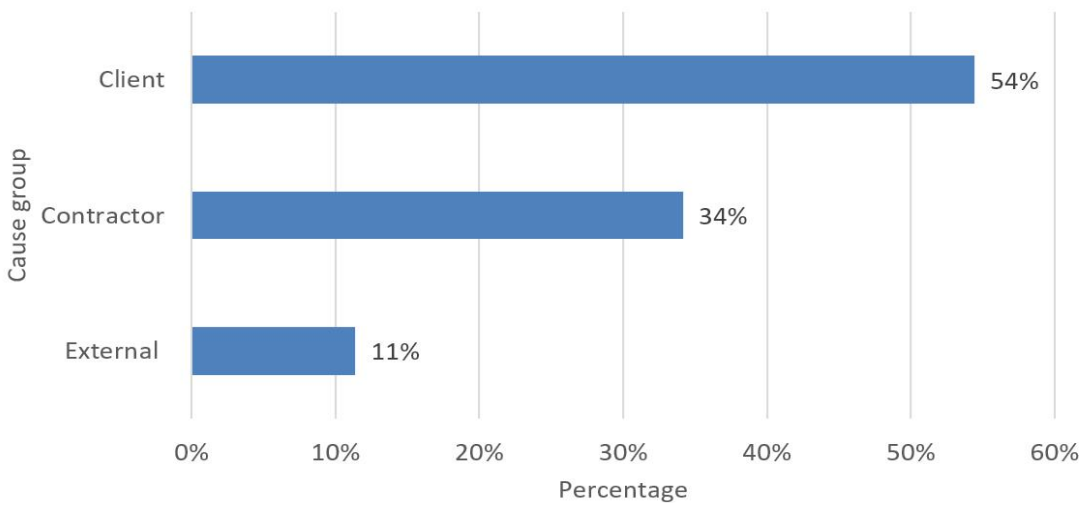


Figure 4.6: Percentage of impact of each cause group on quality failure

Finally, external causes had the least impact on the quality of the projects surveyed in the studies mentioned (11%), as shown in Figure 4.6.

4.6 Summary

This chapter has enabled the acquisition of a better understanding of the topic of factors affecting the success or failure of projects. It has thus been possible to identify the top ten factors affecting time, cost and quality of projects. In general, this review has contributed to the compilation of questionnaires and interviews for the purposes of this research.

Review of relevant studies led to an examination of several areas, comprising academic studies and project management journals, including identification, assessment and management of global factors that affect the success or failure of a project. This chapter also discussed the concept of project sustainability and its use in the success-management process. Furthermore, this chapter identified the most significant factors and causes of delays, cost overrun and quality failure in projects. These factors were then classified in accordance with global research into construction projects. The following chapter presents the research methodology that was adopted to conduct the surveys that make up this study.

Chapter 5 : Research Methodology

5.1 Introduction

All research has adopted some underlying philosophical presumptions about what essence 'valid' research and which research method(s) is/are suitable for the development of knowledge in a certain study. (Thomas, 2010; Antwi and Hamza, 2015). Methodological consistency is a substantial element of any scholarly study (Wessels, 2013). In order to conduct and evaluate any research, it is therefore important to know what these assumptions are. According to TerreBlanche and Durrheim (1999), the research process has three main assumptions: ontology, epistemology and methodology. According to them that a research paradigm is an all-encompassing system of interrelated thinking and practice that identifies the nature of research along these three dimensions. Guba and Lincoln (1994) argued that a research paradigm is intrinsically associated with the notions of ontology, epistemology and methodology. They thought that an investigation of research should be based on the notions of ontology ("what kinds of things exist - what entities or 'things' there are in the universe" (Blackburn, 1996)). Epistemology is the study of knowledge and justified belief (Collins, 2010), or the process in which the investigator comes to know the truth and reality, and methodology is the method adopted in conducting the investigation. According to these authors, the answer to questions regarding these three dimensions offers an interpretative framework that guides the entire research process including strategies, methods, time horizons, techniques and procedures (Borg, 2012).

This chapter discusses the philosophical assumptions and the design strategies underpinning this research study. Common philosophical assumptions are reviewed and presented,

and the interpretative paradigm is identified for the framework of the study. In addition, the chapter discusses the project design and methodology used to achieve the research aims and objectives outlined in chapter one (including strategies, instruments, and data collection and analysis methods), while explaining the stages and processes involved in the study.

5.2 Research Paradigm

A philosophical worldview assists in determining the research strategy and has an effect on the research practice. As such, it needs to be recognised, and is usually identified based on the researcher's preferences (Slife and Williams, 1995). According to TerreBlanche and Durrheim (1999), the research process has three main assumptions: ontology, epistemology and methodology. According to them that a research paradigm is an all-encompassing system of interrelated thinking and practice that identifies the nature of research along these three dimensions. This research uses the model of the "Research Onion" (Saunders et al, 2012, p. 128) to illustrate how these final elements (at the core of the Research Onion) need to be considered in relation to other design elements (the outer categories of the Onion). It is the researcher's understanding and associated decisions in relation to these outer layers that provide the context and limits within which data collection methods and analysis procedures will be selected.

The Research Onion diagram (Figure 5.1) excludes the three philosophies of Ontology, Epistemology and Methodology. Understanding and selecting a philosophy is a significant step in planning and conducting research, so the researcher has included these as three additional elements outside of the main onion. The first layer of the Research Onion (Figure 5.1) shows a number of research philosophies, i.e. positivism, realism, interpretivism, and pragmatism. The second layer shows differing research approaches like inductive or deductive, while the third layer shows

research strategies such as experiments, surveys, case studies, grounded theory, ethnography, and action research. The fourth layer shows time horizons, such as cross-sectional and longitudinal; the fifth layer shows various primary and secondary data-collection methods; finally, the reliability and validity of the research is measured (Saunders et al, 2012).

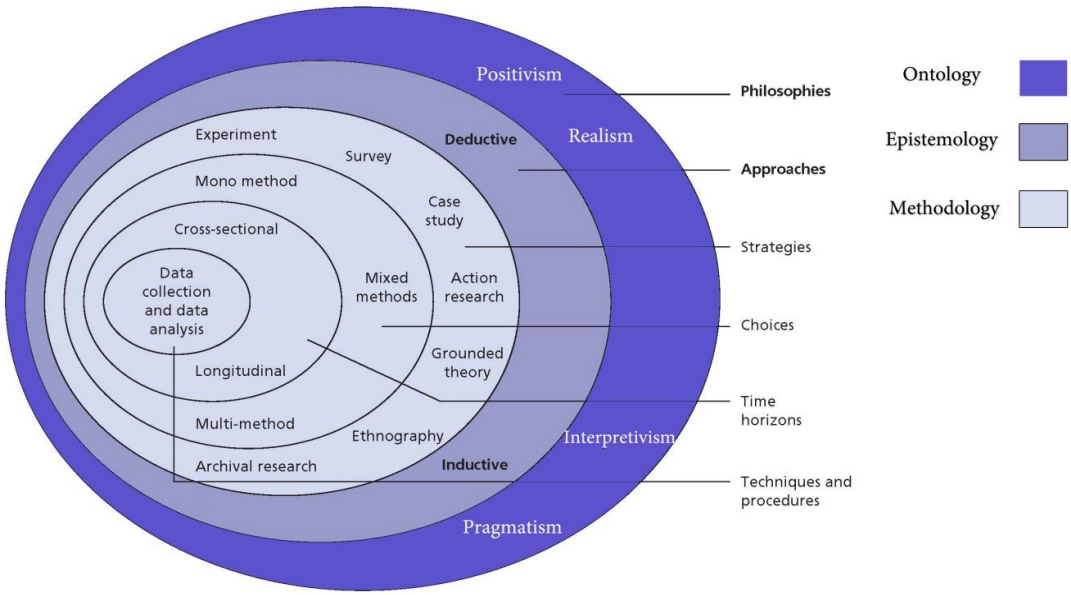


Figure 5.1 The Research Onion (Saunders et al, 2009)

5.3 The Ontological Level

The term Ontology is from two Greek words (onto, which means 'being' and logia, which mean 'science, study or theory'. Ontology points out to one of the major branches of philosophy concerned with clarifying the nature of reality and structure of the world (Wand and Weber, 1993). It specifies the form and underlying nature of reality and what can be realize about it. (Antwi and

Hamza, 2015). In business and management studies there are four major research philosophies: positivism, realism, interpretivism and pragmatism (Saunders et al. 2009).

5.3.1 The Positivist Paradigm

Positivists thought that reality is stable and can be observed and described from an objective perspective, they stated that knowledge is based on natural phenomena without interfering with this phenomenon being studied and that observations should be repeatable (Levin, 1988). This often includes manipulation of reality with variations in only a single independent variable so as to discover regularities in, and to form relationships between, various of the constituent elements of the social world (Guba, 1990).

Positivism is associated with the natural sciences. Positivist science was to determine laws of society with possibilities of social engineering of society which began as a reaction against religious dogma stressing a return to observable data. Kvale (1996), known to be the founder of the social sciences was closely tied to positivism.

The positivist paradigm of explaining social reality is based on the philosophical thoughts of the French philosopher, Auguste Comte (1798–1857), who emphasized that observation, reason and effect are the best means of understanding human behaviour and attitudes; According to this philosopher, true knowledge comes only or primarily from sensory experience and can be gained by observation and experiment. At the ontological level, positivists presume that reality is objectively given and is quantifiable using characteristics which are independent of the investigator and instruments. Positivistic philosophers adopt scientific approaches as a means of systematize the knowledge generation process with the help of quantification to promote precision in the description of parameters and the relationship among them (Henning et al., 2004).

Positivism is concerned with uncovering truth and introducing it by empirical instruments.

5.3.2 The Realism Paradigm

Realism is another philosophical attitude which relates to scientific research. The essence of realism is that what the senses show us as reality is the truth: that objects have an existence independent of the human mind. In this sense, realism is against idealism, the theory that only the mind and its contents exist. Realism is a branch of ontology which is similar to positivism in that it supposes a scientific approach to the knowledge development (Saunders et al., 2011). This assumption underpins the collection of data and the understanding of those data. This meaning (and particularly the relevance of realism for business and management studies) becomes more evident when two forms of realism are contrasted (Mark et al., 2009). The first form of realism is direct realism, which says that what you see is what you get: what we experience through our senses portrays the world accurately. The second kind of realism is named critical realism. Critical realists stated that what we experience are sensations, the pictures of the things in the real world, not the things directly. Critical realists concluded how often our senses deceive us emphasises (Le Morvan, 2004).

5.3.3 The Interpretivism Paradigm

The ontological position of interpretivism is relativism (Scotland, 2012). Relativism is the view that reality is subjective and differs from person to person (Guba and Lincoln, 1994), which looks for "culturally derived and historically situated interpretations of the social life-world" (Crotty, 1998, p. 67). Our realties are mediated by our senses. Without awareness the world is senseless. Reality emerges when awareness engages with objects which are already pregnant with

meaning (Crotty, 1998). The knowledge gained in this paradigm is socially constructed rather than objectively identified (Berger and Luckman, 1967; Hirschman, 1985; Carson et al., 2001).

The interpretivist school stresses the importance of interpretation and observation in consciousness the social world. The interrelatedness of various aspects of people's lives is a very important focus of qualitative studies, and psychological, social, cultural and historical factors are all recognised as playing an important role in shaping people's perception of their world. Qualitative study practice has reflected this in the employ of methods which endeavour to provide a holistic understanding of research participants' viewpoint and actions in the context of their lives overall (Ritchie and Lewis, 2003).

Therefore, the goal of interpretivist research is to comprehension and interpret the meanings in human behaviour rather than to generalize and predict causes and effects (Hudson and Ozanne, 1988; Neuman, 2000). For an interpretivist researcher, it is important to understand motives, meanings, reasons and other subjective experiences which are time and context bound (Hudson and Ozanne, 1988; Neuman, 2000). Interpretivism advocates that it is necessary for the researcher to understand differences between humans in our role as social actors. This emphasises the difference between carrying out research among people rather than objects. In business and management research, this means looking at organisations from the perspectives of different groups of people (Saunders et al., 2009).

5.3.4 The Pragmatism Paradigm

Pragmatism was a philosophical tradition that originated in the United States in the last decade of the 19th century (Hookway, 2008:2013) that had a profound and wide-ranging impact on American and European thought (Pratt, 2002). It derives from the work of Peirce, James, Mead,

and Dewey (Cherryholmes, 1992). Other writers include Murphy (1990), Patton (1990), and Rorty (1990). The pragmatic worldview is defined as "a basic set of beliefs that guide action" (Guba, 1990), as cited in Creswell (2009). Its allows us to think of the practical consequences that follow from acknowledgement of a belief. At the core of pragmatist thought is the view that our theories must be linked to experience or practice (Dalsgaard, 2014). Inspired by an evolutionary perspective, pragmatism emphasises interaction and integration that combines theory with practice for new, productive purposes (Buchanan, 1991).

Pragmatism has many forms; however, many philosophers think that pragmatism as a worldview arises out of actions, situations, and consequences rather than prejudgements (as in post-positivism). There is a concern with applications—what works—and solutions to problems (Patton, 1990). Rather than focusing on methods, researchers confirm the research problem and use all methods obtainable to understand the problem (Rossman and Wilson, 1985). As a philosophical foundation for mixed-methods methodology, Morgan (2007), Patton (1990), and Tashakkori and Teddlie (2010) convey its importance for centring attention on the research problem in social science studies, and then using pluralistic methods to obtain knowledge of the problem (Morgan, 2007; Patton, 1990; Tashakkori and Teddlie, 2010). According to Cherryholmes (1992), Morgan (2007), and Creswell (2009), pragmatism provides a philosophical basis for research, in that:

- Pragmatism is not indebted to any one frame of reality and philosophy.
- Individual researchers grant themselves the freedom of option. In this way, they are free to choose the strategies, methods, techniques of research that best meet their needs and purposes.
- Pragmatists do not consider the world as an absolute unity.
- Researchers have many methods for collecting and analysing data rather than only adopting in

one way (qualitative, quantitative and mixed methods).

- Truth is what works at the time. It is not based on a dualism between reality independent of the mind or within the mind.
- Pragmatist look to the "what" and "how" of research investigations based on its target consequences – where they want to go with it.
- Pragmatists agree that research always occurs in social, political, historical, and other contexts.

Thus, for the researcher, pragmatism opens the door to various methods, worldviews, and assumptions, as well as different frameworks of data collection and analysis.

5.3.5 Paradigm Adopted in this Study

Researchers adopt in their work on specific philosophical perspectives; it may be based on a single or more paradigm(s), depending on the sort of work they are doing. Such a research environment provides the researcher an opportunity to observe, investigate, and understand the process phases, and further, gather and document the subtleties of participants' experiences through strategies for example; participant observation, different written texts, face-to-face individual as well as focus-group interviews.in a work environment, to explore social and cultural context.

The present research adopts the pragmatic philosophical worldview (Figure 5.2) because it enables the researcher to deal with things sensibly and realistically in a way that is based on primarily practical considerations. It also provides the appropriate theoretical basis for the research in practices of organisational improvement, as outlined by Creswell et al., (2009):

- Lack of restrictions when selecting methods and procedures for the investigation to meet the research purpose.

- Assists with the use of a mixed-method approach (qualitative and quantitative methods) in order to better understand the research problem.
- Assists with applying multiple methods for the purposes of data collection and analysis.

Pragmatism is generally regarded as the philosophical partner for the mixed methods approach (Johnson and Onwuegbuzie, 2004; Maxcy, 2003; Rallis and Rossman, 2003). The research focuses on two main areas that represent research domains: organisational culture and best practice; in other words, understanding the organisation and how it works, in order to achieve the desired improvements.

Table Comparison of four research philosophies in management research

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: *the researcher's view of the nature of reality or being*	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: *the researcher's view of the role of values in research*	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Adopted by the research

Figure 5.2 Comparison of four research philosophies in management research (Saunders et al., 2009)

5.4 The Epistemological Level

Epistemology is a branch of philosophy that is interested in the study of human knowledge. Epistemologists concern themselves with investigates the origin, nature, ways, and limits of knowledge. And to find answers to following questions "how can we know about reality?" and "what is the basis of our knowledge?" Social research has focused on three main issues (Table 5.1):

Table 5.1 Three main epistemological issues in natural and social research

Epistemological Issue	Natural Science	Social Science
1. Relationship between the Researcher and the Study	Independent	Dependent (Non-Neutrality)
2. Truth	• Correspondence Theory	• Pragmatic Theory • Coherence Theory
3. Ways to Acquire Knowledge	• Induction • Deduction • Experiment • Reason or logic • Modelling	• Induction • Deduction

The first issue concerns the relationship between the researcher and the study (Ritchie and Lewis, 2003). In the line of enquiry of natural sciences, the phenomena are independent of the behaviour of the researcher; consequently, the research can be considered objective and the results of the investigation can be deemed neutral (Ibid). Conversely, some scholars believe that, in the social world, that relationship between people and social phenomena is interactive. In this way, the researcher cannot be viewed as objective and neutral when dealing with data that is to be collected and analysed. In addition, this school of thought considers the impact of the research

process on the participants and the evidence presented. Scholars therefore propose “empathic neutrality”, a position that recognises that research cannot be value-free but which advocates that researchers should work with study respondents to seek vicarious understanding without previous judgement (neutrality) (Patton, 2002).

The second issue surrounds theories about “truth” (Ritchie and Lewis, 2003). There are a number of views about the similarities or differences between the natural and social worlds. The dominant theory of truth in the natural sciences is one of correspondence - that is, that there is a match between observations or readings of the external world and an independent reality. However, a pragmatic theory of truth is more appropriate for the study of the social world. James (1995) postulated that everything in the world is relative; the worth of ideas, principles, doctrine and practices depends on how they working in a given situation. If they work well, they may be judged as correct, good, right, and beautiful; if they do not work well, they may be judged as wrong, false, ugly, evil etc. An alternative view, known as the coherence theory of truth, mentions that this “independent” reality can only be gauged in a consensual rather than an absolute way. If some reports confirm a statement, then it can be deemed true as a representation of a socially constructed reality.

Finally, the third issue concerns the way in which knowledge is obtained (Ritchie and Lewis, 2003). There are many ways to acquire knowledge, such as induction, deduction, experiment, reason or logic, or modelling. The main options are through induction by looking for patterns and association derived from observations of the world, or through deduction whereby hypotheses or propositions are reached theoretically, through a logically derived process.

In other words, inductive processes involve using evidence as the genesis of a conclusion; deductive processes utilize evidence in support of a conclusion. Although qualitative,

quantitative and mixed-methods research often use an inductive and deductive approach, both induction and deduction include the processes of sampling and generating knowledge in the form of a research output.

5.4.1 Inductive Versus Deductive Reasoning

In a research approach, two main methods of logic can be distinguished: deductive and inductive reasoning (Axinn and Pearce, 2006). The "Wheel of Science" (as shown in Figure 5.3) has been used to describe deductive and inductive methods. In a deductive approach, the starting point is a theoretical basis. From the theory, hypotheses are derived that are then examined by observation. This can lead to confirmation or non-confirmation of the original or new theories. In an inductive reasoning, the starting point is the observation (Wallace, 1971). From specific observations, patterns are searched for and initial hypotheses are formulated, leading to the development of new theory. Eisenhardt (1989), for example, successfully shows how an inductive approach can lead to a new theory.

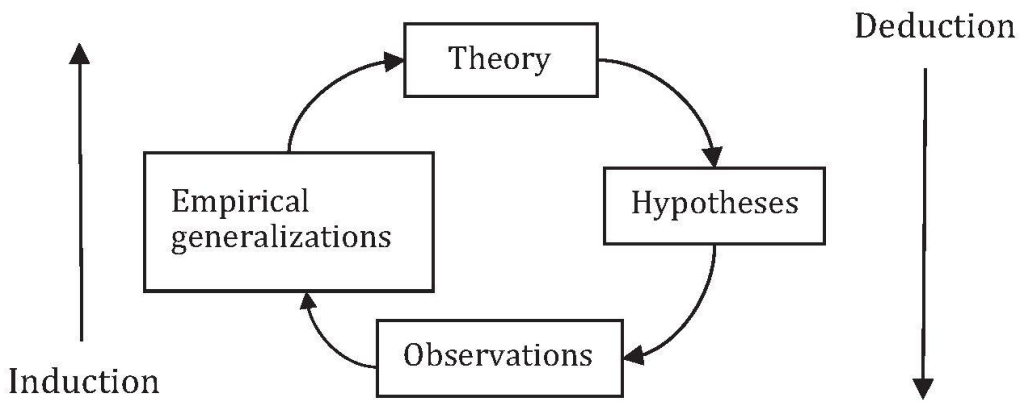


Figure 5.3 Wheel of Science (adapted from Wallace, 1971)

In the Wheel of Science, phases of inductive and deductive research naturally follow on from each other (Bosch-Rekveldt, 2015). For example, when there is no theory available, one starts with observations which, via experimental generalisations, can lead to new theory (induction). From this newly developed theory, hypotheses are formulated which are then tested by, again, observations (deduction).

5.4.2 Epistemology Adopted in this Research Study

The pragmatic approach, when adopted, allows the researcher to draw heavily on inductive and deductive reasoning; it therefore helps the researcher to analyse a phenomenon fully. In this study both types of reasoning are used (see Figure 5.3). In the first part of the research, in order to investigate the research questions 1, 2 and 3 (outlined in chapter one), the inductive approach was adopted. This method was chosen because the objective of the research is to observe how organisational structures and process issues in their current form affect project management in Karbala city, as well as the nature of the problems that they face. As such, the investigation began with the observation of events (data collection), followed by data analysis, formulation of the research problem and development of a theory, which means moving from specific observations to broader generalisations and theories (Burney, 2008). With exploratory research, usually in the early stages, there is uncertainty about some major aspects, and therefore a need to investigate these issues arises. This part of the research project is exploratory, aimed at investigating or evaluating the specific case and the effect of organisational structure and processes of project management in line with the research questions.

In the second part of the research, with the objective of devising a framework of improvement, the deductive approach was adopted. In this method, the researcher starts with a

theoretical proposition and then moves towards empirical evidence for its confirmation (Cavana et al., 2001). The deductive approach is linked to the positivism philosophy, which includes generating assumptions to solve the search problem then testing these assumptions. In this kind of approach, it is necessary for the researcher to be general; however, the research project in question is specifically related to the development of a framework for improvement of best practice in PM in the city of Karbala (Ritchie and Lewis, 2003). It allows the researcher to establish a framework for improvement using theory. Different types of data and information are collected by the researcher in the forms of feedback surveys and a literature review in order to confirm or reject the framework of improvement and resolve the research problem (Gill and Johnson, 2010).

As shown in Figure 5.4, deductive reasoning works from the more general to the more specific, while inductive reasoning works from the ground up rather than being handed down entirely from a theory (Creswell, 2007; Gill and Johnson, 2010).

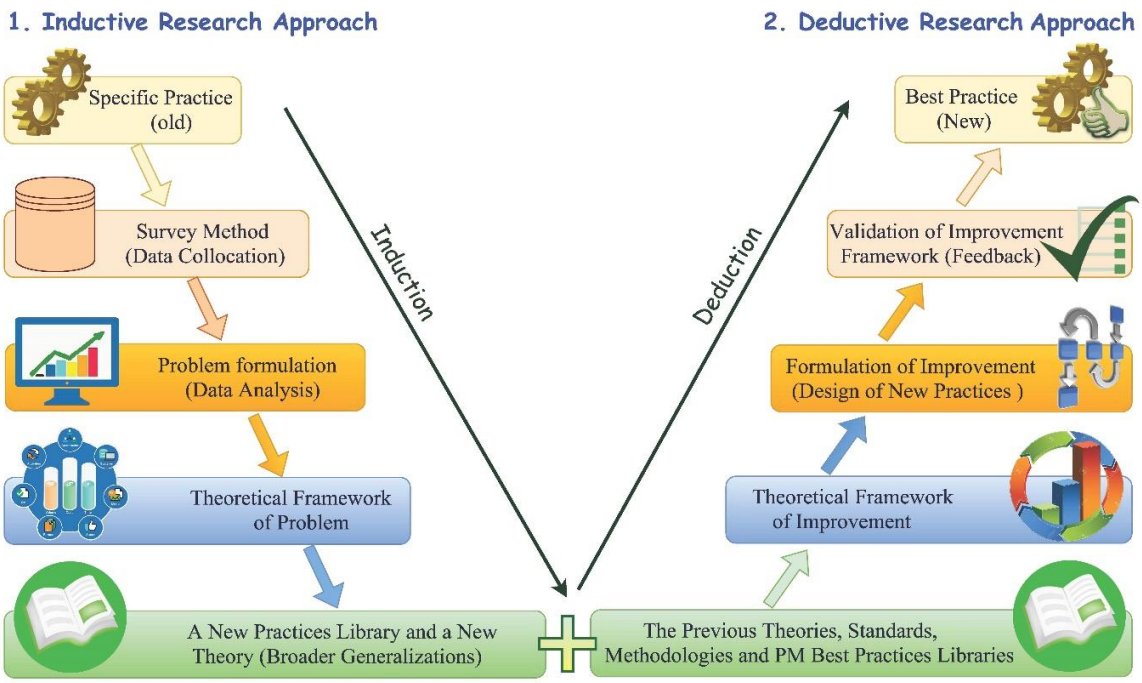


Figure 5.4 Epistemology adopted in this research

5.5 Research Strategy

Research strategy is defined as "the general plan of how the researcher will go about answering the research questions" (Saunders et al., 2009, p. 600). On a similar note, Bryman summarised a research strategy as "a general orientation to the conduct of research" (Bryman, 2015, p. 698), including the process by which the research is conducted (Remenyi et al, 1998). An appropriate research strategy should be selected based on the research questions and objectives, the extent of existing knowledge on the subject area to be researched, the amount of time and resources available, and the philosophical foundations of the researcher (Saunders et al., 2009). There are various different research strategies with distinctive characteristics available from which a researcher may choose, based on the above criteria.

Both Yin (2003) and Saunders et al. (2009) said that although different research strategies are available, there are considerable overlaps between them, and hence the key consideration would be to choose the most beneficial strategy for a particular research study. However, these strategies should not be thought of as being incompatible. For example, it is quite possible to use interviews or surveys as part of a case study (Schell, 1992).

Some common research strategies used in business and management are experiments, surveys, case studies, action research, grounded theory, ethnography, archival research, cross-sectional studies, longitudinal studies and participative enquiries (Wedawatta et al., 2011; Easterby-Smith et al., 2008; Collis and Hussey, 2009; Saunders et al., 2009). Each strategy can be used for exploratory, descriptive and explanatory research (Yin, 2013). Some of these clearly belong to the deductive approach, others to the inductive approach (Saunders et al., 2009).

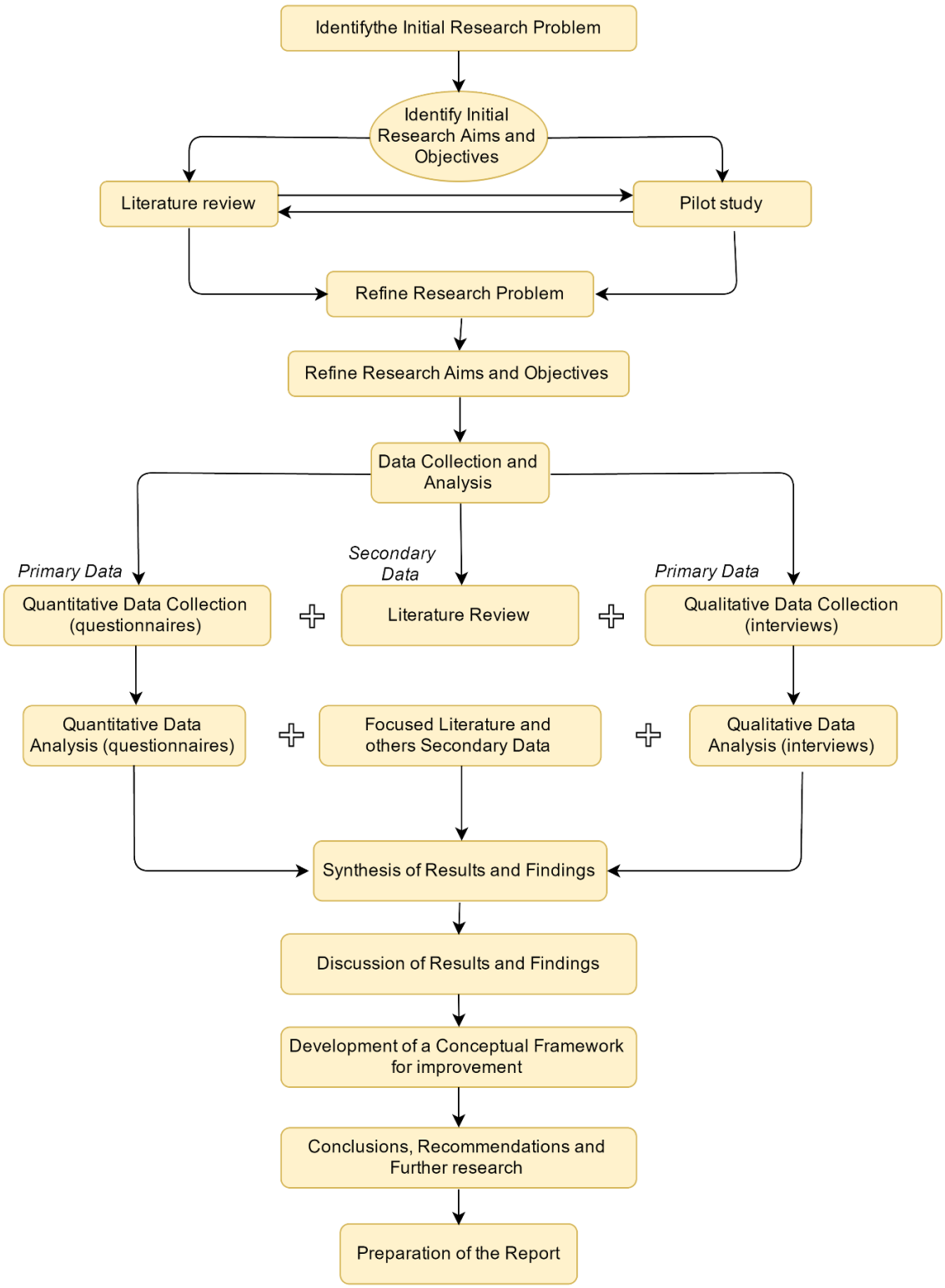


Figure 5.5 Research Methodology (a)

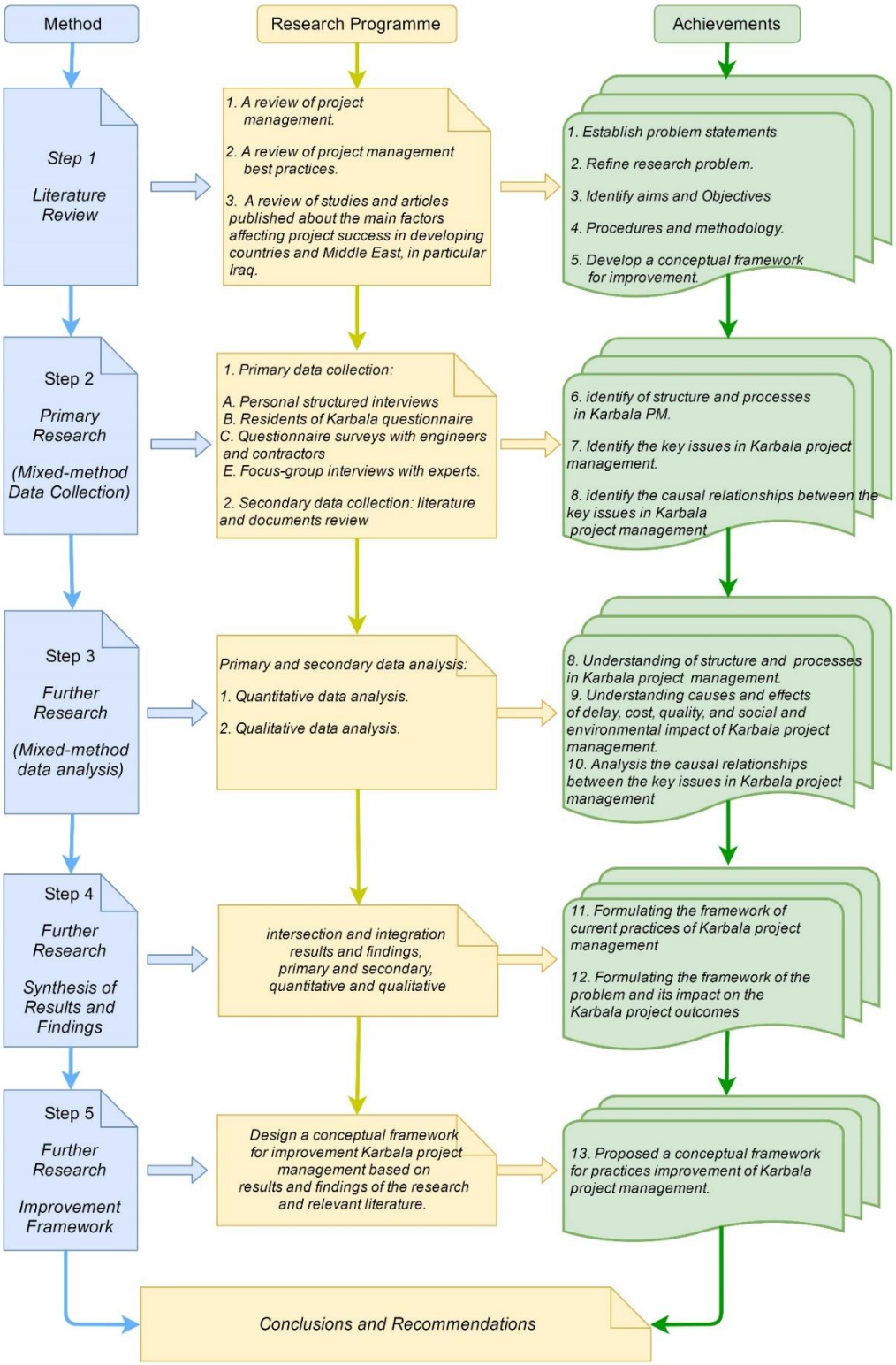


Figure 5.6 Research Methodology (b)

In this study, the first strategy used by the researcher was the action-research approach, which sought to develop and refine the research objectives through the process that the researcher followed to achieve understanding. The action-research cycle consists of four major phases: planning, acting, observing and reflecting, as shown in Figures 5.5 and 5.6. Action research is recognised as one of the most effective and sustainable ways of building bridges between theory and practice (Reason and Bradbury, 2001). This meets the needs for research to examine both theory and practice, moving from a theoretical understanding to practical application. Further strategies adopted in the research included a literature review, archival research and surveys (interviews and questionnaires), as shown in Table 5.2.

Table 5.2 Research strategy used in the present study

No.	Question	Research strategy	Choices (method)	Research output
1	What are the current organizational structures and processes for Regional Development Project Management in Holy Karbala Province?	• Literature review • Action research • Archival research • Surveys (interviews & questionnaires)	Qualitative and quantitative	Chapter 8
2	What are the key issues of concern and causal relationships thereof in Karbala's Regional Development Projects Management in its current form?	• Literature review • Archival research • Surveys (interviews & questionnaires)	Qualitative and quantitative	Chapter 4 Chapter 7
3	What is the impact of these key issues on Karbala's Regional Development Project Management?	• Literature review • Surveys (focus-group interviews)	Qualitative	Chapter 4 Chapter 8
4	d) What constitutes best practice (structures and processes) for project management and where can this be applied in Iraq?	• Literature review • Action research • Surveys (questionnaires)	Quantitative	Chapter 2 Chapter 3
5	How can best practice for project management be developed for Holy Karbala Province?	• Literature review • Action research	Qualitative and quantitative	Chapter 10

5.6 Triangulation and Mixed Methods Approach Adopted in this Study

Research methodology is a philosophical stance that underlies and informs the style of research (Sapsford and Jupp, 2006).

This study adopts a mixed-methods (qualitative and quantitative) triangulation approach (figures 5.5 and 5.6) for better understanding of the research problem and complex phenomena, than either approach alone would have done. Furthermore, mixed methods research may play a substantial role not only in encouraging the utilize of a diversity of methods in these fields, but also in bridging the micro and macro domains (Azorín et al. 2010). The mixed methods approach is generally regarded as the philosophical partner for pragmatism (Johnson and Onwuegbuzie, 2004). This research focuses on two main areas that represent the research domains of organisation and best practice. Mixed-methods has evolved to the point where it is "increasingly articulated, attached to research practice, and recognized as the third major research approach or research paradigm" (Johnson et al., 2007, p. 112). As a research paradigm, the mixed-methods approach merges a various set of ideas and practices that separate the method from the other major research paradigms (Denscombe, 2008). The intellectual roots of the paradigm are generally traced to the early work of Campbell and Fiske (1959) on mixing methods (Greene et al., 1989; Creswell, 2003: Creswell et al., 2003; Collins et al., 2006; Creswell and Plano Clark, 2007; Johnson et al., 2007). Following Campbell and Fisk's pioneering work, Webb et al. (1966), then Denzin (1978) and Jick (1979) are frequently cited in relation to developments around the notion of triangulation.

According to Creswell (2003), Creswell and Plano Clark (2007) and Tashakkori and Teddlie (1998, 2003), the defining characteristics of the mixed-methods approach involve its use of:

- Quantitative and qualitative methods within the same research project;

- A research design that distinctly specifies the priority and sequencing that is given to the qualitative and quantitative elements of data collection and analysis;
- An explicit account of the manner in which the quantitative and qualitative aspects of the research relate to each other, with heightened emphasis on the manner in which triangulation is used;
- Pragmatism as the philosophical underpinning for the research.

The researcher prefers to use the mixed-methods approach in order to take advantage of the differences between quantitative and qualitative methods, and combine these two methods for use in a single research project depending on the nature of this study and its philosophical foundation (Bryman and Burgess, 1999).

Triangulation can also be achieved by using different research techniques such as combining quantitative and qualitative methods. Triangulated techniques are useful for cross-checking and help to provide completeness and confirmation, which brings balance between qualitative and quantitative types of research. The purpose of triangulation is to increase the credibility and validity of the results (Yeasmin and Rahman, 2012; Olsen, 2004).

Triangulation at the data-analysis stage constitutes the first step of data comparison. It is used to estimate the error inherent in quantitative measurements. Despite, triangulation contributes directly to the analysis of the phenomenon being gauged, in the second stage, the qualitative data are tested to further confirm and then deepen the analysis of the quantitative findings (Terrell, 2012; Mertens and Hesse-Biber, 2012).

5.7 Time Horizons

According to Saunders et al. (2009), time horizons are needed for research design regardless of the research methodology used. Research can be in "snapshot" form, taken at a particular time (also known as cross-sectional), or it can be more similar to a "diary" and be a representation of events or phenomena for a given period of time (also known as longitudinal). The main strength of a longitudinal study is the capacity that it has to study change and development.

Longitudinal studies are repeated over an extended period. Conversely, cross-sectional research is a study of a particular phenomenon at a particular time. The bulk of the research design adopted in this study is longitudinal, in that the study is of a particular phenomenon (Saunders et al., 2009), e.g. engineers' participation in specific groups in project execution within a particular time period (2008 – 2016). Moreover, it is intended that improvement operations (plan, do, check and act) based on practice will continue after the present project. On the other hand, the use of interviews with participating managers and staff, as well as the questionnaire that was distributed to the engineers and contractors to revalidate the quantitative findings, can be described as cross-sectional.

5.8 Data Collection and Analysis

The fifth aspect of research design concerns the selection of data-collection and analysis methods. It is the process of gathering, measuring and examining information. These decisions flow from the research questions, used in research to allow investigation of phenomena in their natural and social settings (Ritchie and Lewis, 2013).

5.8.1 Data Collection

For any research to achieve its goal, the identification of an appropriate means of data collection is mandatory (Sarantakos, 1994). This study sought to explore phenomena in a real-life context and examine the issues with regard to the current situation of project management in Karbala. It was therefore necessary to gather information. The forms in which this information was collated are sorted by chronology and research requirements in the following subsections.

5.8.1.1 Literature Review

The literature review plays a vital role in every research project (Pasian, 2015). It comprises citations from a wide-ranging review of published work, consisting of a list of books, articles, documents, publications and theses, from secondary sources of data in the areas of certain interest to the researcher (Sekaran, 2006). The main driver behind a review of literature is to make sure that no significant variable that has in the past been found frequently to have caused problems is ignored or neglected (Sekaran, 1984). Hence, the literature should not only be reviewed and quoted, but it is also important that the body of relevant literature from previous studies should be critically analysed (Liu and Fellows, 1999).

For this research, the literature review was conducted by searching the existing literature on standards, guides and scientific articles in project management, with a view to refining the research questions and objectives, designing the methods of data collection and analysis, and to develop the theoretical model for improvement. The researcher was interested in finding a gap in the existing theories, thus providing potential new areas of research. In general, researchers in the Middle East, particularly in Iraq, in the project management field have not investigated the implementation of the process at all levels. Moreover, substantial research has not yet been

conducted on best practice in the context of the regeneration industry. The task of searching the published literature is made easier through the existence of electronic resource portals, computer databases, computerised catalogues, electronic journals, computerised catalogues and searches on the Internet (i.e. Google Scholar). In order to achieve the objectives of the research, four main topics were selected to be reviewed:

1. Studies, reviews and articles published about the Middle East, in particular about Iraq, in order to explore the present reality of organisations and projects in practice.
2. Project management concepts, standards, guides to practice, methods and techniques.
3. Organisational development and change management concepts, methods and techniques.
4. The link between organisational development, change management and best practice in project management.

5.8.1.2 Pilot Study

This search used four stages of data collection longitudinally, beginning with personal interviews with managers, then a questionnaire distributed to citizens, followed by an employee and contractor questionnaire, and finally a group interview with industry experts. Therefore, a process of action research was used, with its loops to refine the next plan for data-collection methods (as shown in Figure 6.6 in the following chapter). The first three stages were considered a pilot study for each subsequent stage. The pilot study was thus the preliminary step in the practical application of the research project. The researcher conducted a pilot study for the following reasons:

1. To determine the possibility and feasibility of the study (Reikvam et al., 2010), especially in Iraq, where security levels and the political situation are unstable.

2. To identify weaknesses and test the ground for a case-study area (projects in Karbala), and record participants' reactions in order to identify potential challenges, risks and obstacles.
3. To test whether the research instruments are asking the intended questions, whether the format is comprehensible, and if the selected validation tool is appropriate for the target sample (Zailinawati et al., 2006).
4. To test the appropriateness of the data-collection techniques (Baker and Risley, 1994), such as interviews or questionnaires, and to select the best methodology to achieve the research goals.
5. To test the data-collection process (Teijlingen and Hundley, 2002) – the time taken to complete the questionnaire, and the stakeholders' willingness (government agencies, participants and beneficiaries) to participate in the study.
6. To test data entry, coding of the items and appropriateness of statistical tests; and to estimate the amount of data required for the primary survey, in order to calculate the required sample size.
7. To gain a general understanding of project management in Karbala and the impact of internal and external environments on projects in order to formulate the research objectives.

5.8.1.2.1 ***Refinement of Aims and Objectives***

Possibly the most difficult aspect of conducting research is selecting one of many issues and shaping it into an answerable research question. In this section of the present research, the action research strategy was adopted, as shown in Figure 5.7. This strategy aims to generate new

knowledge based on investigations conducted within specific and often practical contexts (Koshy, 2009).

The initial objectives were as follows:

1. To conduct an in-depth study of the theoretical foundations of the development of engineering project management in Karbala.
2. To synthesise experience in the area of project management development for use in reconstruction by local governments in Iraq.
3. To enable engineering project management organisations in Karbala to implement policies and procedures of reconstruction plans that reflect national priorities.
4. To set up strategies through which city authorities could overcome project management problems.

The literature review plays an integral role in the development of a research question and research objectives (Rojon and Saunders, 2012). The results of the pilot study indicated the weaknesses of the organisational situation, duplication of roles and responsibilities, poor practices and other problems. These highlighted the research problems to the researcher and helped in reviewing and updating the research objectives in order to ensure the achievement of the basic aims of the research.

Figure 5.7 Using the action research tool to refine research aims and objectives

5.8.1.3 Primary Data Collection

Primary data is collected for a particular research problem, and is normally gathered directly from respondents in a number of ways (Saunders et al., 2009). These methods may include structured or semi-structured questionnaires, interviews, focus groups, or others. The primary data is mainly collected to provide the data that would produce answers to the research questions, compared to secondary data that is utilized to develop contextual or confirmatory elements of research (Hart, 2001). As previously stated, this study adopted the use of mixed methods, which includes combining or integrating qualitative and quantitative research and data (Creswell, 2013). Mixed-method data collection refers to the triangulation strategies that involves using different data-collection techniques within the investigations of study. In order to validate one form of data with another, and to transform the data for comparison, the study has incorporated different types

of questions. For example, results from surveys, focus groups, and interviews may be compared to see if similar results can be found. If the conclusions from each of the methods are the same, then validity is established (Guion, 2002). If they are different, the researcher will seek to find an explanation for the differences, or where not important, ignore those differences. Emphasis will be on reliable results only.

In many cases, individuals have helped to provide both qualitative and quantitative data so that the data can easily be compared (Axinn and Pearce, 2006). In general, questionnaires are useful where the researcher cannot observe the phenomenon directly or where it is impractical to do so. This method of data collection allows the researcher to construct and understand the phenomena through the experience and perceptions of the participants (Nachmias, 1996).

In this study, qualitative data is collected using group and personal interviews, and may be a valuable way of triangulating quantitative data collected from the questionnaires (Saunders et al., 2009). Results are analysed independently, and the findings are then compared to convert coded qualitative data into variables for statistical analysis (Bazeley, 2006). The primary qualitative and quantitative data-collection techniques used are as follows:

1. Personal interviews with staff (qualitative interviews): Personal semi-structured interviews carried out with 30 middle-managers who represent the departments working in project management in Karbala.
2. Questionnaires for citizens of the Holy Province of Karbala: Questionnaires were conducted to gather the views of local citizens in the province of Karbala for a sample size of 541 citizens.
3. Staff and contractor questionnaire: This questionnaire aimed to collect the views of 126 managers, consultants and other staff, in addition to 78 contractors who were involved in

project management in Karbala.

4. Focus-group interviews (qualitative interviews): The final stage of data collection was carried out with 50 managers, contractors and consultants, and was used to assess the perceptions of interviewees of the relative importance of causes and effects of delay, poor quality and cost overruns in Karbala projects.

5.8.1.4 Secondary Data Collection

Secondary data describes data that have already been collected and recorded by another researcher and that are readily available from other sources. In this instance, the main source of information was the official archive. Other sources consulted were as follows: academic literature, reports such as annual statistical data of Iraq, construction and housing reports, documents such as the General Conditions of the Contract and the Bill of Quantities for consecutive years, archived documents from projects, and the official records of the local government in Karbala. These data were reviewed and analysed in order to contextualise the case study and strengthen the arguments in the research by providing both quantitative and qualitative evidence. This review also helped the researcher to analyse the data collected from primary sources concerning this particular field in a more robust and in-depth manner. The secondary data and previous studies were reviewed in order to provide appropriate support for the primary data.

5.8.2 Qualitative and Quantitative Data Analysis

Once the qualitative and quantitative data were collected, they had to be analysed and, where useful, illustrated in diagrams, charts and tables.

After collecting the questionnaires from participants, a code book was prepared comprising distinctive codes for different sections. Data written and marked in each questionnaire was entered into a document in Microsoft Office Excel according to the code book and using the unique ID which was provided for them before distributing to respondents. The code book contained a code for each section, which was then sub-coded for the parts included in that section, and details of each section were shown in a separate sheet in the Excel file. Quantitative and Qualitative data was analysed using SPSS (Statistical Package for Social Science). The level of criticality of the issues in engineering projects in Karbala, the level of effectiveness of proposed mitigation strategies and the opinion of participants on various aspects of reconstruction projects were evaluated. Categories addressed included administrative structure, processes, employee satisfaction, efficiency of projects, level of knowledge and skills of engineers and contractors, the impact of the external environment on the project and the level of sustainability adhered to in the work environment. The results from the questionnaires demonstrated how different people defined projects as a failure or of poor quality, and to what extent these failures impacted on the provision of essential services to citizens, such as electricity, water, sewage, and transportation. The quantitative data analysis results will illustrate in chapter 7 and qualitative data analysis results will present in chapter 8.

5.9 Summary

This chapter has discussed the research methodology selected for the purposes of answering the questions of this thesis, comprising the rationale for the research approach adopted, and the chosen research designs on five levels: ontological, epistemological, strategic, methodological and concerning the time horizon, as shown in Figure 5.8.

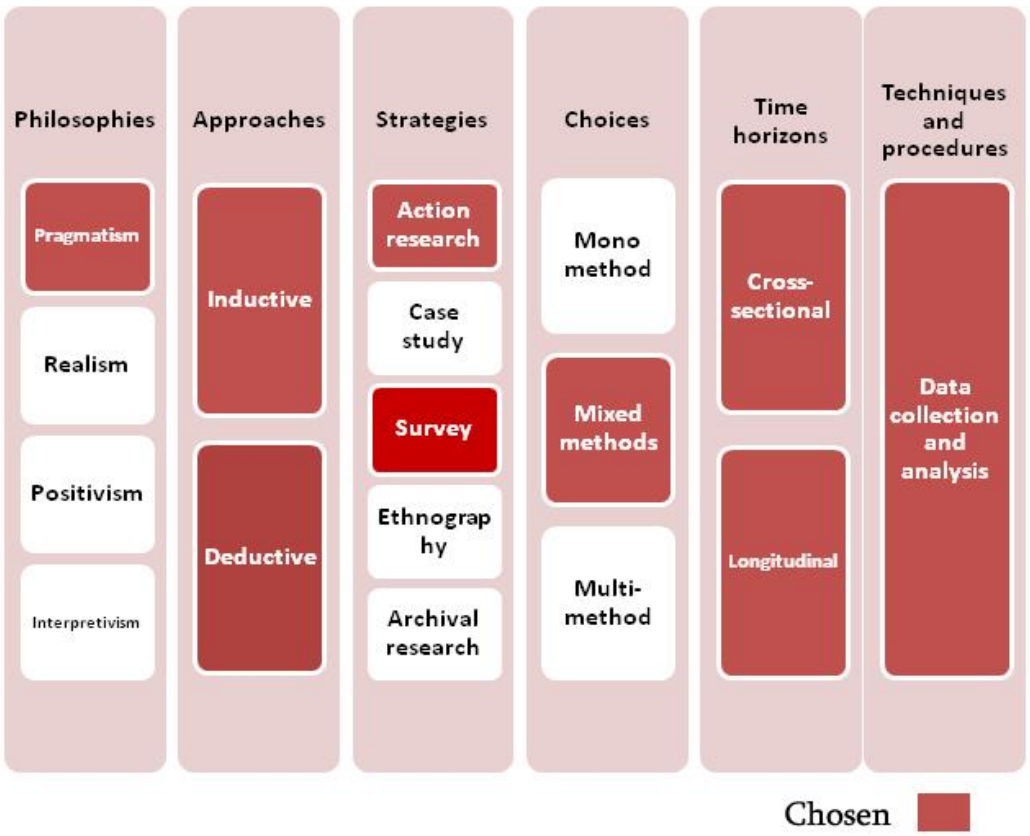


Figure 5.8 Research Design

The pragmatic approach adopted here allows the researcher to use an inductive approach in part of the study to explore the research problem, followed by the adoption of a deductive approach in the improvement framework. This chapter has described the research methodology that was adopted, as well as the triangulated research strategies employed through mixed-methods (qualitative and quantitative), as shown in Figure 5.5. The research methodology adopted well-established research approaches and is divided into five main sections: literature review; pilot studies; qualitative and quantitative data collection; data analysis (again, qualitative and quantitative); and framework development.

The next chapter will address data collection, and discusses qualitative and quantitative data-collection techniques, types of data, and questions of population sample selection.

Chapter 6 : Data Collection

6.1 Introduction

This chapter sets out to explain what data-gathering techniques are. Research data is first categorised as primary or secondary, then the reasons for selecting the methods in this study are presented and the construction of the primary research instruments used in this project is discussed. The characteristics of the population and sample are surveyed, and the problems encountered during the survey and the application of the different techniques are explained and discussed separately in the main sections of the chapter.

6.2 Data and Information

Data has been dubbed the raw material of problem-solving and decision-making (Lancaster, 2007). Graziano and Rawlin (2004) highlight the importance of data in research methods, suggesting that effective data collection is pivotal in the research process (Graziano and Rawlin, 2004) like: gathering information from the client organization (Martin, 2000), cost-effective data collection tools (Patten, 1998) and anonymity on sensitive or illegal activities (McClure, 2002).

The present research project has the objective of investigating in KPM practices' problem. Data provides the basis for beginning to address and investigate research questions and problems. Data, however, is different to information and the distinction is important (Lancaster, 2007). Data are simply facts or figures, but not information itself. "When data are processed, interpreted, organized, structured or presented so as to make them meaningful or useful, they are

called information. Information provides context for data" (Diffen LLC, 2015; citing Ventre, 2016). Ultimately, the researcher is more concerned with information than data in this instance. However, information stems from raw data; as such, data is important for the problem-solving process. The researcher should know not only what data is needed, but also the principal methods, approaches and techniques for collecting data, so that the most appropriate data collection techniques can be used (Lancaster, 2007). What, then, are the principal types of data, how may we classify data and data-collection methods, and what are the principle methods and techniques of collecting data as part of a research exercise?

6.2.1 Types of Data

Data comes in a wide range of shapes and forms. Different kinds of data can generally be classified in the following main categories:

6.2.1.1 Primary Versus Secondary Data

Amongst others, Saunders et al. (2003) offer that one of the most essential distinctions between categories of data is that of primary versus secondary data.

Primary data are data generated by the researcher using data-gathering techniques, some of which will be discussed below (Saunders et al., 2009).

Secondary data are those that have been generated by others. This category also comprises both internal and external data sources; the internal data included in case materials (structure, process and procedure); computer databases; legislations; policies; instruction of government departments; and so on. External data sources may consist of published materials, books, journals, other research and report results, other official websites and official international

statistics (Currie, 2005). In fact, secondary data is often the point of departure for data collection, inasmuch as it is the first type of data to be collected. As a result of this, and the importance and potential value of secondary data and its collection (Lancaster, 2007), the secondary data is considered important enough to warrant a separate section in this chapter.

6.2.1.2 Qualitative Versus Quantitative Data

The second major category of data types relates to the extent to which data is numerical or otherwise. In this respect, it is conventional to distinguish between quantitative and qualitative data. Ghosh and Chopra (2003), in their 'Dictionary of Research Methods', define these two types of data as follows:

- Quantitative data is typically expressed numerically or categorized by some numerical value.
- Qualitative data is typically expressed in the form of descriptive information of observations or data which is categorized by type.

Lancaster (2007) thought of quantitative data as being more objective and scientific than its qualitative counterpart and is therefore associated with the more traditional scientific approaches to research as adopted in the physical sciences. For the reason that quantitative data is in the form of numerical such as numbers and values, it can often be analysed using standard statistical techniques - for example, to test validity. Quantitative data of course implies that what is being gauged or researched can be first and foremost quantified. It is therefore only applicable to events that can be measured and quantified.

Qualitative data, in addition to that, relates to data that cannot be subjected to quantitative or numerical analysis. It is therefore related with phenomena that cannot be, or is hard to quantify.

6.2.2 Primary Data Collection Techniques

There are many major techniques that can be used to collect primary data depending on the research design. Some examples of the methodologies employed are:

- The survey technique (Currie, 2005; Lancaster, 2007; Weijun, 2008; Saunders et al., 2009)
- The interview technique (Lancaster, 2007; Weijun, 2008; Saunders et al., 2009)
- The observational technique (Currie, 2005; Lancaster, 2007)
- The case-study technique (Lancaster, 2007; Weijun, 2008; Saunders et al., 2009)
- The action research technique (Reason and Bradbury, 2001; McClure, 2002; Weijun, 2008; Koshy, 2009; Saunders et al., 2009)

In a sense, the interview techniques are likewise a survey, but the word survey has come to be associated with questionnaires. The objectives when executing interviews are more or less similar to the ones which employ questionnaires; the interview is, in effect, regularly used as a 'talking questionnaire'. Nevertheless, the techniques used are distinct for each of the two procedures (Arnold et al., 1991). In contrast to questionnaires or interviews, the observational method does not pose inquiries to respondents; rather, it collects statistics about behaviour. The researcher observes and records behaviour that is applicable to his or her research (Currie, 2005).

6.2.3 Secondary Data Collection Techniques

There are no specific methods of secondary data collection. In general, sources of secondary data are divided into three main types: documentary, survey and multiple-source (Saunders et al., 2009), as shown in Figure 6.1.

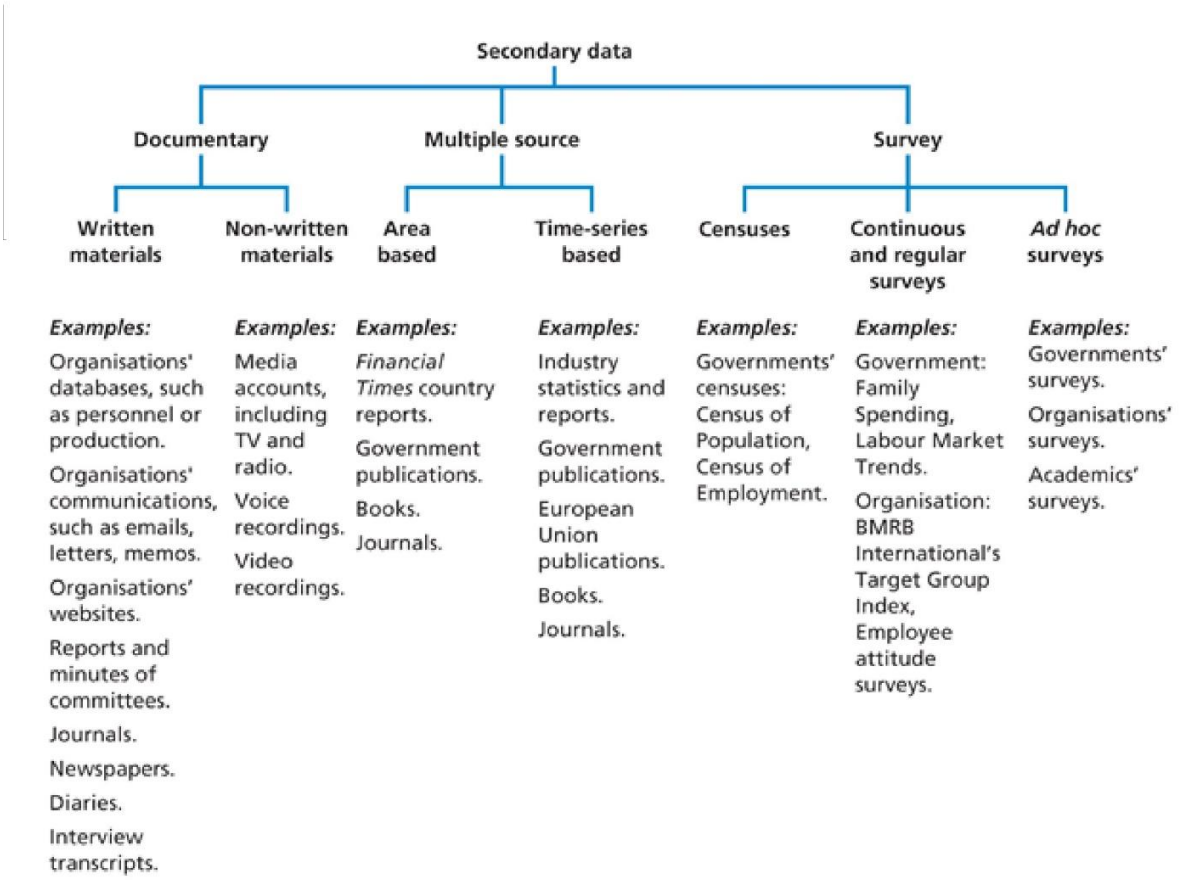


Figure 6.1 Secondary data types (Saunders et al., 2009)

A search of secondary data sources prepares the way for any primary research activity. Moreover, secondary data can be a key accompaniment to the preliminary data to solve the problem, or it at least helps the reader to understand the research problem more fully. Secondary

data is inexpensive and faster to acquire than primary data and can be more accurate (Crawford, 1997).

Secondary data, whether external or internal, either consist of electronic data or paper documents, as in Figure 6.2. Increasingly, of course, most secondary data are accessed via the internet. In essence, the internet itself can be viewed as a kind of vast data repository. Electronic databases can be classified into two types, namely online and offline databases. Many information carriers or providers, including the ones listed in our secondary resources of published data, now provide such information instantaneously on-line and/or via CD Rom disks. The contemporary researcher must be equipped to deal with the relevant computerised databases and have appropriate means of accessing and use them (Lancaster, 2007).

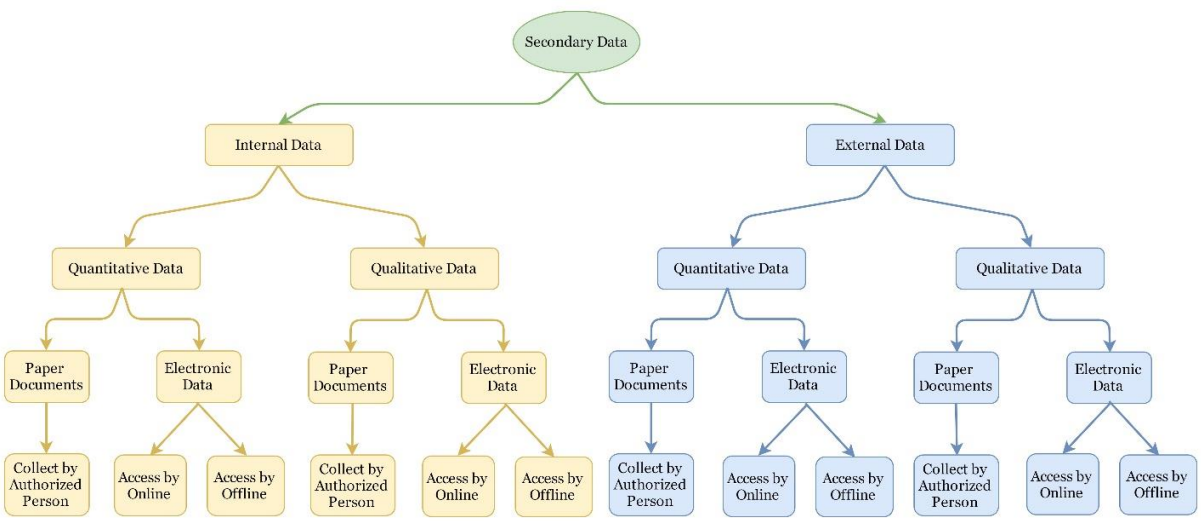


Figure 6.2 Secondary data types and access

Before utilising secondary data, there is a need to assess both the data itself and its source. In particular, interest should be paid to definitions used, measurement errors, source bias,

reliability and the time-span of the secondary data. Where possible, multiple data assets need to be used so that one source may be checked for consistency with another.

Handling documentary data are not different from those applied to other areas of social studies. In every case, data should be dealt with scientifically. Scott (2014) has formulated quality-control criteria for coping with documentary sources. These include "authenticity, credibility, representativeness" (Ahmed, 2010). Authenticity refers to whether the evidence is genuine and from implacable source; credibility refers to whether the evidence is typical of its kind; representativeness refers "to whether the documents utilized are representative of the totality of the relevant documents" (Scott, 1990, p.6), and meaning refers to whether the evidence is clear and comprehensible (Ibid).

6.2.4 Missing Data

Statistical methods in social research literature feature a wide range of studies dealing with missing data. Some key concepts and recommendations that researchers should be conscious of will be reviewed in this section. It is important to consider why the data could possibly be missing. Statisticians often use the expression ‘missing at random’ and ‘not missing at random’ to represent different perceptions (Higgins and Green, 2015).

Statisticians say that data are ‘missing at random’ if the actuality that they are missing is independent to realistic values of the missing data. For instance, if some participants like contractors are more likely to refuse to answer questions on the efficiency of the work carried out by them, but it does not depend on their work efficiency level, statisticians classify the data into two types: ‘missing at random’ and data ‘missing completely at random’, although in the context of a methodical review the differentiation is unlikely to be important (Newman, 2014). Data that

are 'missing at random' may not be imperative (Graham, 2012). Analyses based on accessible data would tend to be impartial, even when based on a survey sample size rather than the population data set (Higgins and Green, 2015).

Data would be ‘not missing at random’ if the reason that they are missing is related to the actual missing data (Graham, 2012). For instance, in project delays, participants who had a relapse of delays might be less likely to attend the interview or answer some of the questions, resulting in more of the actual results being missing. "Missing outcome data", due to attrition (drop-out) of participants during the study or exclusions from the analysis, increase the potential for conclusions drawn from the survey being biased. Here, the term ‘incomplete outcome data’ is used to refer to both cases of attrition and exclusions. When an individual participant’s results are not obtainable, they will be considered missing (Viswanathan et al., 2012; Higgins and Green, 2015).

The current principal options for dealing with missing data are:

1. As far as is possible, before applying any of the data collection methods, the researcher should employ adequate measures to prevent the occurrence of missing data (Blankers et al., 2010; Kang, 2013; Dong and Peng, 2013).
2. In the event of missing data, they should be disregarded, and only the available data should be analysed (Kang, 2013; Raghunathan, 2015; Higgins and Green, 2015). This option may be appropriate when data can be concluded to be missing at random.
3. The missing data can be substituted with replacement values (e.g. missing values can be replaced with a sample mean or mode, by assuming all were poor outcomes, or imputing the 'mean' based on predicted values from a regression analysis) (Humphries, 2013; Little and Rubin, 2014). This option is practical in most circumstances; it attempts to address data not missing at random (Higgins and Green, 2015).

4. Imputing the missing data and accounting for the fact that these were imputed with uncertainty (e.g. simple imputation; multiple imputation methods (as in point 3) with modification to the standard error) (Blankers et al., 2010; Van Buuren, 2012; Dong and Peng, 2013). This option would require the involvement of a knowledgeable statistician.
5. Utilising statistical models to analyse the missing data, suppositions can be made about their relationships with the accessible data (Little and Rubin, 2014; Zhu et al., 2014; Higgins and Green, 2015). This option attempts to address data not missing at random and would again require involvement of a knowledgeable statistician.

In this study the researcher deals with missing data as follows:

Firstly, whenever possible, contact is made with the original investigators to request missing data. Secondly, the assumptions of any processes used to cope with missing data are made explicit: for example, that missing values or that the data assumed missing at random were imagined to have a specific value, such as a poor outcome. Finally, the method of missing data processing is indicated in the chapter seven (Section 7.2.4).

6.2.5 Criteria for Effective Data: Data Quality

The concept of data quality consists of numerous aspects, beginning with the preliminary planning of the survey and finishing with publishing the data, analysis and ascertaining their usefulness. The most significant components of statistical quality elements have been established as accuracy, comparison, and quality-control techniques (Strong et al., 1997; Pipino et al., 2002).

First of all, effective data collection offers the foundation for the information required to fulfil the goals of the research. Underpinning the seemingly simple perspective as to what frames

effective data are various potentially complicated dimensions or criteria of quality in relation to assessing data. Of unique significance in dimensions or criteria of data quality are the size of what researchers seek to as validity, reliability, and generalizability (Lancaster, 2007).

6.2.5.1 Validity

Validity, as any other term in the social sciences, is a disputed concept; it means different visualizes to different observers. There are various types of validity (Bapir, 2010): content validity (Haynes et al., 1995), internal validity (Merriam, 1998), the utility criterion (Lynch, 1996) and external validity (Nunan, 1992; Burns, 1999). Based on the definitions and classifications cited by the scholars, it can be seen that validity is understood as the correct correlation between data and the conclusion; however, it is more complex is the fulfilment of such an accurate relationship (ibid.). This is not an insurmountable challenge for qualitative studies; indeed, quantitative studies can also be validated (Leung, 2015). Even in quantitative studies ‘‘the maximum advanced survey techniques themselves only control information that needed to be won sooner or later by way of asking people’’ (Fielding and Fielding, 1986, p.12), and the opportunity to access the relationship between reality and representation is still present.

The validity and robustness of research is dependent on the survey and interview instruments, and is driven by the insight and experience of the researcher and supervisors. The survey and interview questions should be developed for each of the independent and dependent variables, with the recognition that there is potential to introduce dimension error if questions have been inaccurately presented or framed for the respondents (Huck and Cormier, 1996).

In this study, the researcher chose a mixed methodology which enables the discovery of findings/phenomena in the appropriate context for them to be valid, with due regard to local

cultural specificity in the study area and contextual variables. For data collection and analysis, several methods were adopted to enhance validity, including first-tier triangulation as explained in section 6.3 in this chapter. The methodological approach used in this study is validated through the procedure of triangulation which "is not aimed merely at validation but at deepening and widening one's understanding" (Yeasmin and Rahman, 2012). As per this research aim, triangulation tends to support interdisciplinary research such as human resources, organisational theory, time management, budget and resource allocation, etc. (Olsen, 2004).

Content validity in this study also depends on the skills and behaviours of the researcher (Zohrabi, 2013). To this end, the research instruments and the data have been reviewed by the supervisors and experts in the field of research. Based on the reviewers' comments, any unclear questions have been revised and complex explanations reworded. Also, irrelevant questions have been discarded altogether. In addition, the questions were validated by these persons.

6.2.5.2 Reliability

One of the major requirements of any data collection process is that the data is reliable. Mainly, reliability transacts with the consistency, dependability and replicability of the results acquired from a piece of study (Nunan, 1992). Obtaining similar outcomes in a quantitative study is rather straightforward because the data are in numerical form. However, in qualitative methods, achieving identical outcomes requires considerable skill or effort, as the data are in narrative form and are more subjective. In this case, the goal is not to acquire the same outcomes; rather, the aim is to agree that, based on the data collection processes, the findings are dependable and consistent (Lincoln and Guba, 1985). It has been proposed that the human instrument "can become more reliable through training and practice" (Merriam, 1998, p.206).

In general, the dependability of the results can be ensured through the use of three techniques: the investigator's position, triangulation and an audit trial (Lincoln and Guba, 1985; Merriam, 1998), as outlined below:

1. The investigator's position: to increase the reliability of the research, the researcher needs to clarify explicitly the various stages and processes of the investigation. Subsequently, the investigator should provide enough detail in every part of the study.
2. Triangulation: using different data sources can enhance its reliability and the results.
3. Audit trial: the data-gathering process should be described in detail, as well as how they are analysed, how various themes are identified and how the results are acquired.

6.2.5.3 Generalisability

Most social research studies, if not all, are meant to study a specific case or phenomenon in a certain population of a focused locality in a particular context, hence generalisability of research findings is usually an expected attribute (Leung, 2015). However, a pragmatic approach to evaluating generalisability for mixed-method studies is to adopt the same criteria for validity; that is, use of systematic sampling, triangulation and constant comparison, proper audit and documentation (Finfgeld-Connett, 2010).

However, some researchers adopt the method of analytical generalisation (Kvale and Brinckmann, 2009) where one judges the extent to which the findings in one's research results can be generalised to another under a similar theoretical framework, or the proximal similarity model, where generalisability of one investigation to another is judged by way of similarities among the time, vicinity, people and other social contexts (Leung, 2015; Trochim, 2005).

6.2.6 Data Collection and Measuring Instruments

In light of the study problem and in considering the specific population sample, the data-gathering techniques and measuring instruments which are most appropriate for the study are then chosen. All data and measurements ought to have the capacity to be duplicated by scientists other than the original author of the research.

6.3 Developing a Research Strategy (Triangulation)

Mixed-methods research that incorporate quantitative and qualitative data have become more prevalent over the last two decades. and integrate these two types of data for use in a single research project depending on the nature of study and its philosophical foundation (Bryman and Burgess, 1999). Triangulated techniques are useful for cross-checking and help to provide confirmation and completeness, which brings 'balance' between quantitative and qualitative types of research. The purpose is to increase the credibility and validity of the results (Olsen, 2004; Yeasmin and Rahman, 2012; Wisdom and Creswell, 2013). In this context, it is certainly advisable to use a mixed method in order to compare the two sets of results and cross-check the data (Currie, 2005).

It is also important to understand and develop skills in the application of the techniques when employing a particular method. At this stage, the differences in meaning between ‘technique’ and ‘method’ should be distinguished. “In our context, a method is a systematic and orderly approach taken towards the collection of data so that information can be obtained from those data" (Jankowicz, 2013, p.158). Techniques, in contrast, are specific, step-by-step procedures which you can track in order to collect data, and analyse them for the information they consist (Currie, 2005).

In this research a data-collection model has been developed using the triangulated technique, as shown in Figure 6.3. It includes two levels of triangulation and mixed methods.

For this data-collection model, the major level of triangulation includes: first-tier triangulation (primary data), second-tier triangulation (internal secondary data) and third-tier triangulation (external secondary data). qualitative and quantitative data are divided into two sub-triangulations. Thereafter, a mixed method was used.

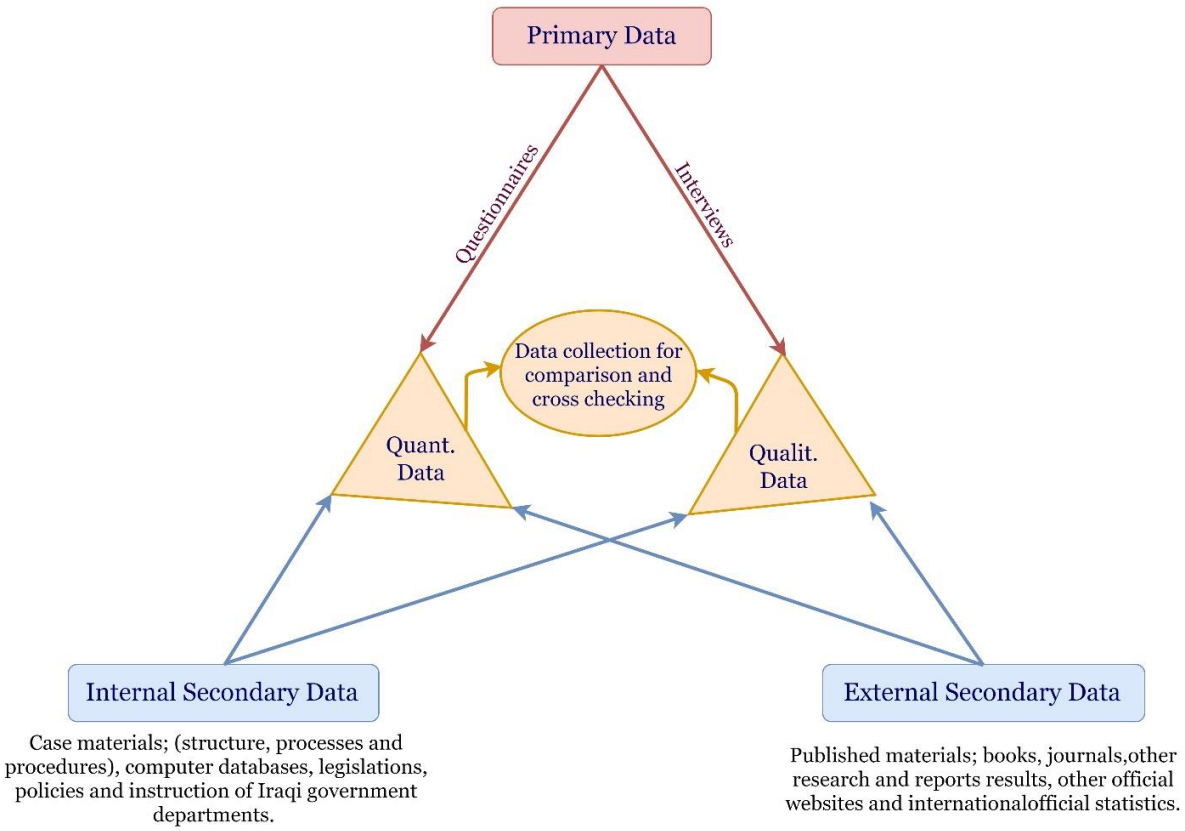


Figure 6.3 Data-collection model

6.4 Population and Sampling

In social research, whatever the questions and objectives, data collection is required. Occasionally, data from every potential case or person are gathered and analysed; this method is

termed a census. However, for many research questions and objectives, it will be impossible for the researcher either to collect or analyse all of the data available, owing to restrictions of time, money and often access (Saunders et al., 2009). Sampling techniques offer various strategies that permit the researcher to minimise the amount of data needed through considering the most important information from a sub-group instead of all possible cases or elements (Groves et al., 2009). The group of cases from which the sample is taken is called the population, as shown in Figure 6.4.

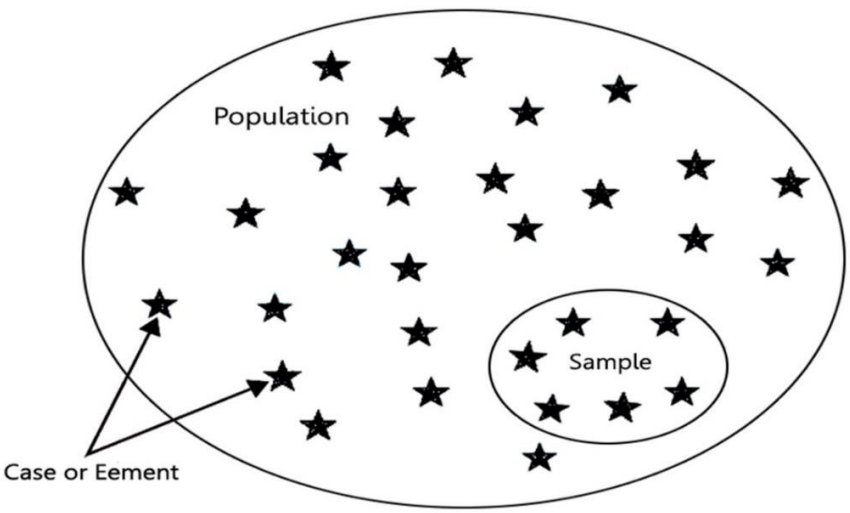


Figure 6.4 Population, sample and individual cases (Saunders et al., 2009, p.211)

Sampling provides an effective alternative to a census when it would be impossible to survey the entire population, particularly when the research project has significant constraints, such as budget, the quality of the data required and timely gathering of the results (Saunders et al., 2009). While a census is an endeavour to collect data about every member of the population, sampling collections of data use a case or element, the sample, to represent the whole. As a sample

is only a case or element of the population, it can be studied more extensively than all of the cases or elements that may be found in the population (Molenberghs, 2010).

Sampling techniques are divided into two kinds: probability and non-probability. In probability sampling, every element of the population is informed of an opportunity to take part in the study. Probability sampling techniques cover simple, stratified, orderly, multistage, and cluster sampling techniques (Brown, 2006). In non-probability sampling, sampling strata elements are selected in a non-random manner; therefore, not every population element has a chance to take part in the survey. Non-probability sampling strategies include purposive, quota, convenience and snowball sampling techniques (Groves et al., 2009). Figure 6.5 below explains the specific sampling techniques belonging to each type:

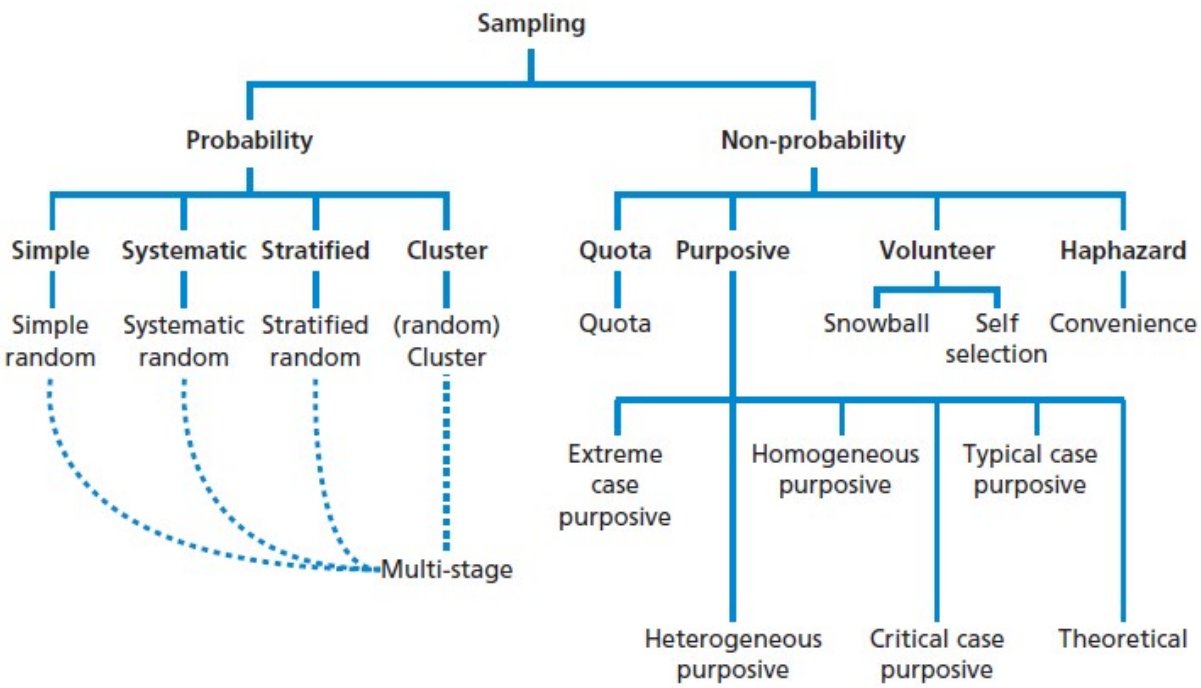


Figure 6.5 Categorisation of sampling techniques (Groves et al., 2009)

The following Figure 6.6 highlights brief definitions, advantages and disadvantages of different sampling techniques:

Technique	Descriptions	Advantages	Disadvantages
Simple random	Random sample from whole population	Highly representative if all subjects participate; the ideal	Not possible without complete list of population members; potentially uneconomical to achieve; can be disruptive to isolate members from a group; time-scale may be too long, data/sample could change
Stratified random	Random sample from identifiable groups (strata), subgroups, etc.	Can ensure that specific groups are represented, even proportionally, in the sample(s) (e.g., by gender), by selecting individuals from strata list	More complex, requires greater effort than simple random; strata must be carefully defined
Cluster	Random samples of successive clusters of subjects (e.g., by institution) until small groups are chosen as units	Possible to select randomly when no single list of population members exists, but local lists do; data collected on groups may avoid introduction of confounding by isolating members	Clusters in a level must be equivalent and some natural ones are not for essential characteristics (e.g., geographic: numbers equal, but unemployment rates differ)
Stage	Combination of cluster (randomly selecting clusters) and random or stratified random sampling of individuals	Can make up probability sample by random at stages and within groups; possible to select random sample when population lists are very localized	Complex, combines limitations of cluster and stratified random sampling
Purposive	Hand-pick subjects on the basis of specific characteristics	Ensures balance of group sizes when multiple groups are to be selected	Samples are not easily defensible as being representative of populations due to potential subjectivity of researcher
Quota	Select individuals as they come to fill a quota by characteristics proportional to populations	Ensures selection of adequate numbers of subjects with appropriate characteristics	Not possible to prove that the sample is representative of designated population
Snowball	Subjects with desired traits or characteristics give names of further appropriate subjects	Possible to include members of groups where no lists or identifiable clusters even exist (e.g., drug abusers, criminals)	No way of knowing whether the sample is representative of the population
Volunteer, accidental, convenience	Either asking for volunteers, or the consequence of not all those selected finally participating, or a set of subjects who just happen to be available	Inexpensive way of ensuring sufficient numbers of a study	Can be highly unrepresentative

Figure 6.6 Sampling techniques: advantages and disadvantages (Black, 1999, p. 118)

6.4.1 Population and Sampling of the Research

The target population in this research represents specific segments within the wider population of stakeholders and organisations. According to the methods employed in this study (questionnaires and interviews), three categories of participants who are targeted within the scope of the research, as outlined below:

1. Residents of the Holy Karbala province.
2. Clients, consultants, contractors, federal and local government departments involved in the projects of the Holy Karbala province.
3. Projects implemented in the Holy Karbala province in the years 2008-2015.

In the next sections the population and samples for each category will be explained and determined.

6.4.1.1 Population and Sampling Middle Management

Middle management deals with goal-setting and department-level decision-making. It includes managers who head specific departments (such as accounting, contracts, and human resources) or project-management units. Middle managers are responsible for implementing the senior management's plans and policies, as well as taking responsibility for executing the aims set by senior management. This level commonly has two lower levels of management below them (Wooldridge and Floyd, 1990).

Table 6.1 shows the size of the population of middle managers who represent the departments working in Karbala project management for both local and federal government.

Table 6.1 Population of middle managers in Karbala project management

Type of Organisation	%	Population
Local Government	62.70%	18
Federal Government	37.30%	12
Total	100.00%	30

6.4.1.2. Population and Sampling of Residents

In scientific research, a sample is a part chosen from the community under investigation (population) that is considered to be representative of the community and is believed to contain the essential qualities of the community for instance: age, gender, level of education, experience. Research sample selection is an important topic and is inevitable, especially in the case of research that cannot gather information from all members of the community. For example, sample selection is key when it is impossible to obtain information for research on a large community, such as the population of a city inhabited by millions.

The research-sample selection process allows the researcher to choose from a group of individuals from whom information can be collected, saving both time and effort. If the sample is selected and properly represents all layers of society, it can be generalised to summarise and present the findings of the study.

According to the Iraqi Ministry of Planning, the population of the province of Karbala in 2014 was 1,135 million, of which 43.38% was under the age of 16 and 56.62% was 16 years old or older; the latter was the target group of the study (Table 6.2). Moreover, 51% of the Karbala population was male and 49% was female (Iraqi Ministry of Planning, 2014; HKPC, 2012).

Table 6.2 Population of Karbala Province by Age Group

No.	Age Group (Years)	Percentage	Population		
			Male	Female	Total
1	0-15	43.38%	251,132	241,284	492,415
2	16-23	10.83%	62,696	60,237	122,934
3	24-30	17.24%	99,804	95,890	195,695
4	31-40	12.50%	72,364	69,526	141,890
5	over 40	16.05%	92,915	89,272	182,187
Total		100.00%	578,912	556,209	1,135,121

Firstly, the population distribution rates were divided by geography in the province of Karbala, namely the rural population and the urban population. These two groups represent 33.5% and 66.5% of the Karbala population respectively, as shown in table 6.3 (Iraqi Ministry of Planning, 2014; HKPC, 2012).

Table 6.3 Population of Karbala: Geographical Distribution

Karbala Geographical Distribution (2013)	Percentage	Population
Rural population	33.50%	380,266
Urban population	66.50%	754,855
Total	100%	1,135,121

Secondly, the population (shown in table 6.4) has been divided into homogeneous strata on the basis of age group to ensure representation of subgroups in the samples. Generally, these subgroups have been devised to reflect the educational and employment in Karbala society. On the other hand, there was no data available in relation to other specifications of the population which should be taken into consideration such as: experience level and type of work.

Table 6.6.4 Population of Karbala residents over 16 years' old

No.	Age Groups	Percentage	Population		
			Rural (33.5%)	Urban (66.5%)	Total
1	16-23	19.10%	41,183	81,751	122,934
2	24-30	30.40%	65,558	130,137	195,695
3	31-40	22.10%	47,533	94,357	141,890
4	over 40	28.30%	61,033	121,154	182,187
Total		100.00%	215,306	427,399	642,706

Stratified random sampling was used to select a sample of people for the questionnaire, to obtain a sample population that best represents the entire population being studied. In stratified sampling, the population is partitioned into non-overlapping groups called strata, and a sample is selected by design within each stratum.

Stratified random sampling was used by the researcher for the following reasons:

1. In this case, the stratification of the study population has taken half of the sample from males and half from females, as it is advantageous to select stratified random samples from within each of the subgroups defined by that variable (De Vaus, 2013).
2. Obtaining a sample that is representative of the population by stratified sampling will reduce the potential for confusion by selecting homogeneous subgroups (Tripepi et al., 2010).
3. Stratified random samples may produce a smaller error of estimation than would be produced by other samples of the same size (Datta, 2007).
4. Stratified samples can have more accurate information inside the subgroup about the variables and raise the reliability of the estimators of the variables of the whole population (Barreiro and Albandoz, 2001).

The target population in this study has been divided into sub groups on the basis of geographical distribution. The sample size of a known population for this section of the study was calculated based on a formula offered by Kish (1965).

The minimum sample size (n) is calculated as follows:

$$n = \frac{N*X}{(X + N - 1)} \ldots\ldots\ldots \text{Equation 6.1}$$

where N = the population size, and

$$X = (Z\alpha/2)^2 * P * \frac{(1-P)}{V^2} \ldots\ldots\ldots \text{Equation 6.2}$$

Zα/2 = The critical value of the normal distribution at α/2 (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96) (Levine et al., 1999) (see Figure 6.7).

V = Acceptable margin of error.

P = The proportion of population elements belonging to the defined class (0.5 is the maximum possible proportion).

Confidence Level	α	$Z_{\alpha/2}$ (critical value)
90%	0.10	1.645
95%	0.05	1.960
98%	0.02	2.326
99%	0.01	2.576
99.8%	0.002	3.08
99.9%	0.001	3.27

Figure 6.7 Za/2 (Levine et al., 1999)

In addition to the purpose of the research and the population size, three criteria will ordinarily need to be specified to determine the appropriate sample size: the level of confidence

(Z), the confidence error or risk (V), and the degree of variability in the attributes being measured (P) (Miaoulis and Michener, 1976).

Equation 6.1 was designed based on a level of confidence of 95% and the researcher is willing to satisfy a 5% margin of error (confidence interval) in the study, which means that the parameters that were applied in the equation have a confidence interval of 5% and a confidence level of 95%. Ultimately, this means that the researcher is 95% confident that the true proportion of the population response will be within ±5% of the research result.

The probability of involvement response (P): since P (1-P) takes its maximum value when P = 0.5. The value of P used in this study is 50%.

The confidence interval is also known as the margin of error (V). In a randomly drawn sample, the sample value has a certain probability of being in a certain range either side of the population value. Most researchers use a 5% confidence interval (Hossein, 2002; Brancato, 2006).

Once the sample sizes for each stratum have been calculated, random samples are then taken from each stratum of the population.

The minimum sample size (n) is calculated as follows:

$$X = (Z\alpha/2)^2 * P * \frac{(1 - P)}{V^2}$$

where $Z\alpha/2 = 2.326$ for a confidence level of 98%, α is 0.02,

p= 0.5 and V= 0.05;

$$X = (2.326)^2 * 0.5 * \frac{(1-0.5)}{0.05^2} = 541.0276$$

$$n = \frac{N * X}{(X + N - 1)}$$

$$n = \frac{(642706)*(541.0276)}{(541.0276 + 642706 - 1)} = 540.573 = 541$$

In this case, the proportional distribution of subgroups in the population is used in the sample, hence this technique is called proportional stratified sampling (Hunt and Tyrrell, 2001). In stratified sampling the sample size for proportional allocation is given by:

$$n_i = n * \frac{N_i}{N} \quad \ldots\ldots\ldots \text{ Equation 6.3}$$

where:

n_i = size of subgroup sample

n = size of sample

N_i = size of subgroup population

N = size of population

The results of the random sampling for each subgroup are given in table 6.5 below:

Table 6.5 Population and sampling of people questionnaire

No.	Age Groups	%	Population			Sample				
			Rural (33.5%)	Urban (66.5%)	Total	%	Rural	%	Urban	Total
1	16-23	19.10%	41,183	81,751	122,934	6.40%	35	12.70%	69	103
2	24-30	30.40%	65,558	130,137	195,695	10.20%	55	20.20%	110	165
3	31-40	22.10%	47,533	94,357	141,890	7.40%	40	14.70%	79	119
4	Over 40	28.30%	61,033	121,154	182,187	9.50%	51	18.90%	102	153
Total		100.00%	215,306	427,399	642,706	33.50%	181	66.50%	360	541

6.4.1.3 Population and Sampling of Clients and Contractors

The target population in this study is the public sector in Iraq, consisting of units of federal and local departments involved in the Regional Development Program (RDP) in the Holy Province of Karbala (HPK). It was difficult to provide the exact number of projects and people

working in this field due to the lack of complete and accurate statistics; however, the rough estimate obtained for the number of projects and people directly or indirectly related to these projects / program management is shown in table 6.6, including contractors and business support units. Different sampling techniques were used for the sample selection, which are described in the next section.

Table 6.6 Population of research area

Type of Organisation	Name of Office	Name of Department	Population	
Local Government (260)	Regional Development Affairs (143)	Office Director	4	Clients and Consultants
		Municipalities Projects	12	Clients
		Roads and Bridges Projects	13	Clients
		Health Projects	11	Clients
		School Buildings Projects	15	Clients
		Water and Sewer Projects	12	Clients
		Electricity and Telecommunication Projects	12	Clients
		Direct Implementation Projects	45	Clients
		Planning and Follow-up	5	Clients
		Technical Committees	14	Clients and Consultants
	General Contracting Department		34	Consultants
	Planning and Follow-up Department		5	Consultants
	Opening and Evaluation Tendering Committees		12	Consultants
	Control and Auditing Department		5	Clients and Consultants
	Technical Affairs	Engineering	35	Clients and Consultants
	Legal Affairs	Legal	6	Consultants
	General Accounts Affairs	Regional Development Accounts	8	Clients
	Administrative Affairs	Human Resources	12	Clients
Federal Government (155)	Ministry of Municipalities	Municipality of the City Centre	10	Clients and Consultants
		Municipality Outside the City Centre	9	Clients and Consultants
		Water	8	Clients and Consultants
		Sewage	9	Clients and Consultants
		Planning and Follow-up Department	16	Clients and Consultants
		Urban Planning	4	Clients and Consultants
	Ministry of Health	Public Health	14	Clients and Consultants
	Ministry of Construction and Housing	Roads and Bridges	13	Clients and Consultants
	Ministry of Education	School Buildings	22	Clients and Consultants
	Ministry of Higher Education	Engineering Affairs	6	Clients and Consultants
	Ministry of Transportation	Transport	3	Clients and Consultants
	Ministry of Electricity	National Electricity	18	Clients and Consultants
	Ministry of Communications	Communications	4	Clients and Consultants
	Ministry of Planning		4	Clients and Consultants
	Ministry of Finance		4	Clients and Consultants
	Other Ministries		11	Clients
Private Sector (255)	Contractors		255	Contractors

The population in this study included clients, consultants and contractors from the RDP departments in HPK. Government clients are the key decision-makers who are responsible for the projects, whether they are local or federal departments. Consultants include consulting engineers acting in the planning phase, contracting and giving technical solutions when mistakes occur during the project (Lo et al., 2006).

Stratified random sampling was used to select samples of the three subgroups under survey: local government, federal government staff and contractors.

The minimum sample size (n) was calculated as follows:

$$X = (Z\alpha/2)^2 * P * \frac{(1 - P)}{V^2}$$

where $Z\alpha/2 = 1.96$ for a confidence level of 95%, α is 0.05, p= 0.5 and V= 0.05;

$$X = (1.96)^2 * 0.5 * \frac{(1-0.5)}{0.05^2} = 384.16$$

$$n = \frac{N * X}{(X + N - 1)}$$

$$n = \frac{(645)*(384.16)}{(384.16+ 645 - 1)} = 240.996 = 241$$

In stratified sampling, the sample size for proportional allocation is given by:

$$n_i = n * \frac{N_i}{N} \text{ …….. Equation 6.3}$$

where:

n_i = size of subgroup sample

n = size of sample

N_i = size of subgroup population

N = size of population

The results of the random sampling for each subgroup are given in table 6.7 below:

Table 6.7 Population and Sampling of Client, Consultant and Contractor Questionnaires

Type of Organisation	%	Population	Sample	Purpose
Local Government	40.30%	260	97	Client and Consultant Questionnaire
Federal Government	24.00%	155	58	Client and Consultant Questionnaire
Contractors	35.70%	230	86	Contractor Questionnaire
Total	100.00%	645	241	

6.4.1.4. Population and Sampling of Projects

The status of projects is typically classified by project management as ongoing, completed and abandoned (Baker, 2000). The researcher decided to reference completed projects for this research.

The reasons for this decision are:

1. Completed projects have the potential for answering all of the questions that the research considers important with regard to organisational project management, project management processes and the output of the projects. Secondly, completed projects provide ample information about the challenges faced and resolved.
2. Completed projects give lessons learnt with the benefit of hindsight. This is a primary reason for selecting it for the study survey. In addition, some aspects of the development model require data-gathering from projects that have already been carried out.

3. It is much more straightforward to measure the success of a completed project than an ongoing project. However, the researcher recognises that it is often difficult to reach team members who worked on completed projects with a survey, because they may be busy with other projects. However, to overcome this obstacle, efforts and several attempts were made to reach them at a convenient time to enable them to respond to the survey.

The population of this study consists entirely of projects which were managed by the local government of Karbala. Particular focus was given to the projects of the regional development programme, which consisted of various types of infrastructure projects, such as those concerning road, water, sewage, health and school buildings. The estimated number of projects that have been implemented during the period from 2008 to 2015 amounted to about 900 projects, distributed between the urban and rural sectors. The researcher was able to obtain some information officially from the Government of Karbala, although this was only available for 579 of the 900 projects (Tables 6.8 and 6.9).

Table 6.8 Categories of Karbala project (by year)

Category of Project (by year)	Frequency of Projects	Total Overall Cost (US $)
2008-2009	217	74,370,191
2010	97	42,809,660
2011-2012	84	51,251,274
2013	74	76,186,057
2014	74	62,817,895
2015	33	75,790,192
Total	**579**	**383,225,269**

Table 6.9 Categories of Karbala project (by type)

Category of Project (by type)	Frequency of Projects	Total Overall Cost (US $)
Roads	206	109,783,061
Building	183	86,775,137
Electricity	91	91,883,001
Water & Sewage	70	80,139,983
Others	29	14,644,088
Total	579	383,225,269

6.5 Primary Data Collection

The exploratory study procedure was adopted for this thesis, which involved questionnaires and interviews. Data were gathered through three phases of questionnaires (quantitative data) and two phases of interviews (qualitative data) related to the main purpose of this study (table 6.12). The phases were arranged chronologically as follows:

1. Personal interview with staff
2. Residents of Karbala' Questionnaire
3. Staff' questionnaire
4. Contractors' questionnaire
5. Focus-group interview with experts

Below is an overview of these phases:

Table 6.10 Link between data-collection strategy and research questions

Question No.	Research Question	Research strategy	Choices (method)
Q1	What are the current organisational structures and processes for engineering project management in Holy Karbala Province?	1. Personal interview with staff 2. Residents of Karbala' Questionnaire 3. Staff' questionnaire 4. Contractors' questionnaire	Qualitative and Quantitative
Q2	What are the key issues in engineering project management in its current form, and causal relationships?	5. Survey (focus-group interview)	Qualitative
Q3	What is the impact of these key issues on project management?		

6.5.1 Action Research and Data Collection

The researcher used a process of action research with its loops to refine the next plan for data-collection methods, as shown in Figure 6.8. The outcome of every action-research process of data collection produced two benefits: firstly, the results of the data collected were obtained; and secondly, it serves as a benchmark from which to plan the next steps.

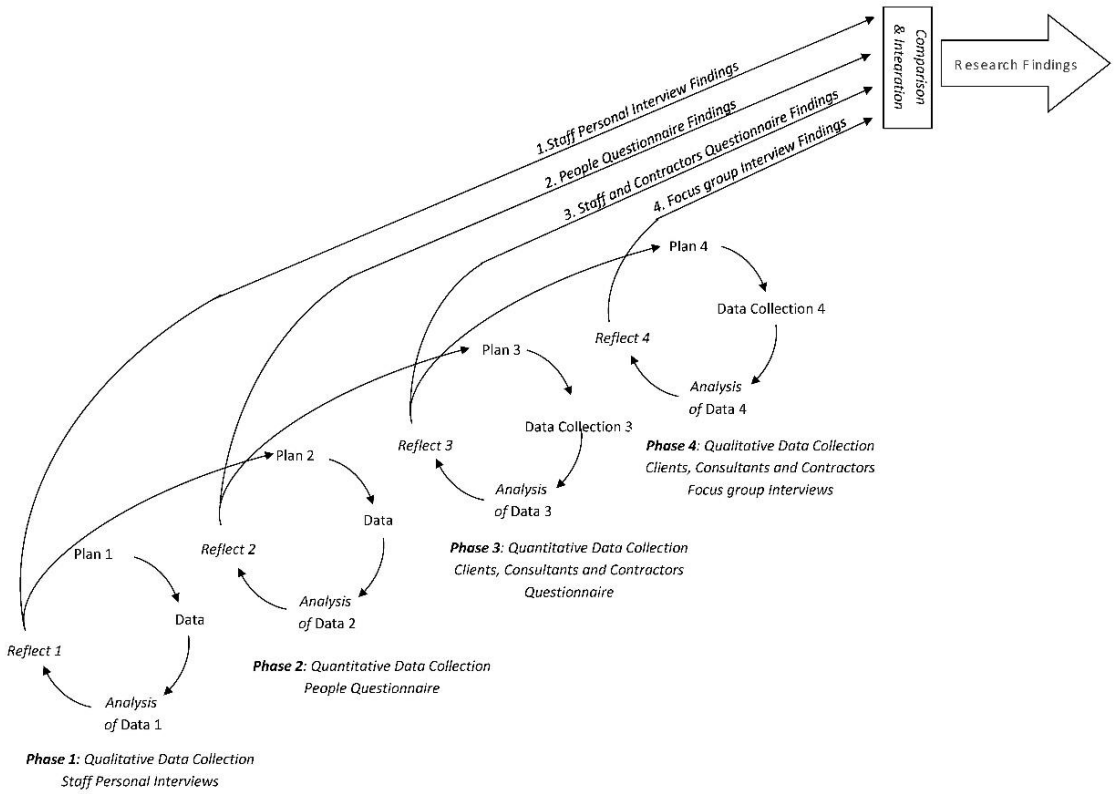


Figure 6.8 Action Research and Data Collection Strategy

6.5.2 Staff Personal Interviews (Qualitative Interviews)

A staff survey, also known as an employee survey, provides researchers in organisational development with a means to improve organisational performance and strategies. Adopting an employee survey helps to understand their strengths and recognise key improvement opportunities. To this end, a range of critical performance and cultural issues may be investigated. For this stage of the study, the middle-management level was chosen. Due to the fact that middle managers are more embroiled in the day-to-day workings of an organisation, they typically have valuable information to help improve its implementation strategies (Darkow, 2015).

Interviews are used to gather data by asking questions. In general, interviews are personal, with the interviewee meeting the respondent face to face (Patel and Davidsson, 2003). This section

of the present study is based on personal semi-structured interviews carried out with 30 middle managers who represent the departments working in project management in Karbala. All of the interviews were carried out face to face with the respondent. Most of the interviews were conducted in the offices of the respondents and were recorded digitally for review later.

The researcher prepared a list of themes and questions that covered the organisational structure of the department concerned and its powers and functions, as well as the main problems and challenges facing the department, although these questions were subject to slight variation from interview to interview. This means that the researcher omitted some questions in particular interviews, given a specific organisational context that was encountered in connection to the research questions. The order of the interview questions was also changed depending on the flow of conversation. Irrelevant information was disregarded and detailed notes were taken by the researcher. Open questions were used for obtaining a wide, in-depth range of answers; this material is useful in the exploratory stage, when a detailed answer or the opportunity to detect what is uppermost in the respondent's mind is required (Saunders et al., 2009).

The main purpose of the interviews was to find an answer for the primary research question: what are the current organisational structures and processes for engineering project management in HPK?

The interview questions set were as below:

1. What is the organisational structure of your department?
2. What are the processes for project management in your department?
3. What are the duties and responsibilities of your department?
4. What authority do you have?
5. What type and size of projects are within your responsibilities?

6. What are the main problems and obstacles that you face?

6.5.3 Questionnaire of Citizens in the Holy Province of Karbala (HPK)

Different stakeholder categories often use different indicators to evaluate the Karbala project management organisation's effectiveness. Profit may be more important to shareholders than to workers or customers. People in the various sectors affected by the products, services and pollution produced by the project management departments of HPK will all have their own opinions on what should be taken into account when evaluating whether or not the process is effective (Hayes, 2014). The questionnaire in general aimed to evaluate the organisational and practice state of project management in HPK and the qualifications of project managers, contractors and consultants, as well as investigating citizen satisfaction and some sustainability issues.

The questionnaire (shown in Appendix 3) was conducted to gather the views of local citizens in the province of Karbala for a sample size of 541 citizens, as detailed in section 6.4.1.2. The questionnaire was divided into two sections:

Part one is related to general information for residents. This part included seven questions requesting information about the participant's educational status, gender, age and employment status. In addition, participants were asked to state where they lived; for example, in a rural or urban area.

Part two consisted of sixteen questions divided into four sections (detailed in Table 6.11):

- Section 1: This section included five questions, which enquired about organisational project management and administrative issues.
- Section 2: Four questions were asked about the project management practice, in

relation to quality, time, and financial and stakeholder management.

- Section 3: This section included three questions to ascertain citizens' satisfaction about engineers, contractors, and the efficiency of projects.
- Section 4: This section included four questions about some sustainability issues of project management, such as environmental impact, clean energy, health, social and financial issues.

Table 6.11 Questionnaire Questions

Section	No	Questions	Key Issues	Objective of Question
Section One	1	Do you think that the organisational status of Karbala project management is good? (In terms of distribution of tasks, authorities and responsibilities)	Organisational, Administrative	To understand the organisational status (distribution of tasks, authorities and responsibilities)
	2	Is the speed of the procedures and decision-making process during the implementation of projects by the government satisfactory?	Organisational, Administrative	To find out the viewpoint of respondents on the speed of the procedures of decision-makers during the implementation of projects
	3	Did the administrative process impact on project time?	Organisational, Administrative	To find out the viewpoint of respondents on the impact of administrative procedures on time and the efficiency of projects
	4	Does the political factor have an effect on Karbala project management?	Organisational, Administrative	To find out the opinion of respondents about the influence of politics on the efficiency of project management
	5	Is there financial and administrative corruption in Karbala project management?	Practice, Financial	To understand the perception of respondents about financial and administrative corruption in the management of projects

Section Three	10	Are you satisfied with the efficiency of the overseeing engineers involved in reconstruction projects in Karbala?	Engineers, Supervision, Human Resources	To find out citizen satisfaction with the engineers
	11	Do you think that contractors are implementing the reconstruction projects in Karbala at an acceptable level?	Contractors, Contracting, Private Sector	To find out citizen satisfaction with the contractors
	12	Are you satisfied with the reconstruction projects in Karbala?	Efficiency of Projects	To find out citizens' satisfaction with the projects and whether they achieved their ambitions
Section Four	13	Does the management of projects in Karbala contribute to preserving the environment?	Sustainability, Environment	To find out the viewpoint of respondents about sustainability issues (project management contribution to preserving the environment)
	14	Does Karbala project management contribute to reducing energy consumption and seek to increase the use of clean energy?	Sustainability, Environment, Energy	To find out the viewpoint of respondents on sustainability issues (project management contribution to reducing energy consumption and seeking to increase the use of clean energy)
	15	Does Karbala project management contribute to improving the health of citizens?	Sustainability, Health, Social	To find out the viewpoint of respondents on sustainability issues (project management contribution to improving the health of citizens)
	16	Does Karbala project management contribute to reducing the cost of projects and finding alternatives?	Sustainability, Financial	To find out the viewpoint of respondents on sustainability issues (project management contribution to reducing the cost of projects and finding alternatives)

List questions were preferred by the researcher to collect residents' opinion data, as these offered the respondent a list of answers, any of which they could choose. The response categories used were 'yes/no' and 'don't know' and were presented to the respondent with a prompt card listing all of the responses. Moreover, at the end of the questionnaire the option of 'other' was offered, which could result in unforeseen responses (Saunders et al., 2009).

At this stage, the reason for using 'list questions' was because it was more straightforward to score, given that there were very few options. In addition, these questions are considered a good screener, as they help to discount any respondents who gave answers out of context or irrelevant

information; alternatively, these respondents could be given a different questionnaire at this stage. However, a potential disadvantage of using 'list questions' is that they generate little useable data and do not specify the extent to which the respondent agrees with the statements. In this sense, it can be considered a very binary approach.

The researcher adopted the method of self-administered questionnaires by the respondents. In this method, respondents receive and submit their questionnaires by post. As a result, they are often known as ‘postal’ or ‘mail’ questionnaires. Conversely, some of the questionnaires were delivered by hand to each respondent and collected later; these are called ‘delivery and collection’ questionnaires (Saunders et al., 2009; Krosnick and Presser, 2010).

6.5.4 Staff Questionnaire

Employee opinions and satisfaction surveys provide the researcher with the knowledge and tools to build important conceptions of the work environment, around topics such as employee relations, employee attitudes, external factors, burnout tendencies, loyalty, satisfaction, workplace climate and productivity (Spector, 1985).

The questionnaire aimed to take the views of 126 managers, consultants and other staff involved in Karbala project management; in general, the aim was to evaluate the organisational and practical state of project management in HPK and the qualifications of the engineers, contractors and consultants. Levels of staff satisfaction and some sustainability issues were also gauged as a by-product of this investigation.

The questionnaire (shown in Appendix 5) was divided into eight parts, as below:

- Part one was related to general information about the staff. It included four questions, and requested information about the participant's specialisation, years of experience,

place of employment and gender.

- Part two consisted of seven questions about administrative issues (listed in Table 6.12). These included decision-making, administrative routine, and corruption issues, as well as the effect of delaying decisions and procedures on the time, cost and quality of projects.

Table 6.12 Questions of administrative issues

Questions	No.	Questions	Key Issues
EQ2	1	What is the speed of decision-making procedures by the project management departments during the implementation stages?	Speed of decision-making
EQ3	2	What is the percentage of the effect of delaying decisions and administrative procedures on **the cost of the project**?	Effect of delay on cost
EQ4	3	What is the percentage of the effect of delaying decisions and administrative procedures on **the duration of the project**?	Effect of delay on time
EQ5	4	What is the percentage of the effect of delaying decisions and administrative procedures on **the quality of the project?**	Effect of delay on quality
EQ9	5	What is the effect of the administrative routine on the Karbala project management departments?	Administrative routine
EQ22	6	What is the flexibility of the decision-making taken by the Karbala project management departments?	Flexibility of decision-making
EQ30	7	What is the percentage of financial and administrative corruption in the Karbala project management departments?	Corruption

- Part three included four questions about administrative issues (detailed in Table 6.13). These related to the efficiency of the organisation, use of IT, organisational structure and culture.

Table 6.13 Questions of organisational issues

Questions	No.	Questions	Key Issues
EQ1	1	What is the efficiency of the organisation of the reconstruction project management departments in Karbala?	Efficiency of organisation
EQ18	2	What is the percentage of the efficiency of the relationship and coordination between the departments involved in Karbala project management?	Organisational structure
EQ27	3	What is the percentage of the use of information technology (IT) in Karbala project management departments?	Use of IT
EQ29	4	Do you think that all staff in the Karbala project management are aiming to achieve one goal?	Organisational culture

- Part four included eight questions about issues faced by engineers and other staff (Table 6.14) as follows: efficiency of supervising, rights, morale and development of engineers, engineers' fear of the Commission of Integrity, knowledge and experience of engineers, as well as about relaying engineers' views to senior management.

Table 6.14 Questions of engineers' issues with other staff

Question code	No.	Questions	Key Issues
EQ7	1	What is the efficiency of the supervising engineers?	Efficiency of supervising
EQ10	2	What is the percentage of the rights given to engineers from the departments?	Rights of engineers
EQ20	3	What is the percentage of the stimulus and encouragement of creativity among engineers by Karbala project management?	Motivation
EQ21	4	What is the percentage of the morale of engineers about the current state of project management in Karbala?	Morale of engineers
EQ23	5	What is the percentage of the impact of engineers' fear of the Commission of Integrity and the judiciary on projects?	Engineers' fear of the Commission of Integrity
EQ6	6	What is the percentage of the opportunities available to train and develop the knowledge and skills of engineers?	Development of engineers
EQ26	7	What is the percentage of experience and knowledge of the engineers?	Engineers' experience and knowledge
EQ11	8	What is the percentage of engineers' views and suggestions for development of project management that are taken on board?	Taking engineers' views

- Part five consisted of four questions about the sustainability of project management issues in HPK (Table 6.15), as follows: preserving the environment, reducing energy use and using clean energy, improving the health of citizens, reducing costs and finding alternatives.

Table 6.15 Questions of sustainability of project management

Question code	No.	Questions	Key Issues
EQ14	1	What is the percentage of contribution of Karbala project management to preserving the environment?	Environment
EQ15	2	What is the percentage of contribution of Karbala project management to reducing energy consumption and increasing the use of clean energy?	Reducing energy consumption and using clean energy
EQ16	3	What is the percentage of contribution of Karbala project management to the improvement of citizens' health?	Improving the health of citizens
EQ17	4	What is the percentage of participation of Karbala project management in reducing the costs of projects and finding alternatives?	Reducing costs and finding alternatives

- Part six consisted of two questions about political issues (Table 6.16), concerning the effect of politics on Karbala project management and leaders' knowledge and experience.

Table 6.16 Questions concerning the influence of politics

Question code	No.	Questions	Key Issues
EQ19	1	What is the percentage of the negative impact of the political factor on project management? (e.g. choice of leaders and managers)	Effect of political factor
EQ25	2	What is the percentage of skills, experience and knowledge of Karbala project management leaders?	Leaders' experience and knowledge

- Part seven consisted of five questions about contracts and legislation issues, like the efficiency of tender documents and project planning, conflict, knowledge and experience of contractors and negative impact of the legislation (Table 6.17).

Table 6.17 Questions of contracts and legislation

Question code	No.	Questions	Key Issues
EQ32	1	What is the efficiency of tender documents of projects before contracting?	Efficiency of tender documents
EQ8	2	What is the efficiency of project planning before contracting?	Efficiency of project planning
EQ28	3	What is the percentage of the conflicts between individuals and agencies responsible for managing the projects in Karbala province?	Conflict
EQ31	4	What is the percentage of experience and knowledge of contractors?	Contractors' experience and knowledge
EQ33	5	What is the percentage of the negative impact of the Iraqi legislation and the law on Karbala project management?	Negative impact of legislation

- Part eight included four questions about citizens' satisfaction, in terms of the perceived quality of projects, as well as the strengths and weaknesses of Karbala project management (Table 6.18).

Table 6.18 Questions of Efficiency of Projects

Question code	No.	Questions	Key Issues
EQ24	1	What is the percentage of citizens' satisfaction with the reconstruction projects in Karbala?	Citizens' satisfaction
EQ34	2	What is the percentage of the quality of projects implemented in Karbala during the last 4 years?	Quality of projects
EQ12	3	What is the percentage of weak points in Karbala project management?	Weaknesses of project management
EQ13	4	What is the percentage of strong points in in Karbala project management?	Strengths of project management

In this questionnaire, the 'rating' style of response was selected by the researcher, and this was used to collect staff's opinions. Rating questions use the Likert-style rating scale in which the respondent is asked to provide one of the following answers: very little = 0%, little = 25%, medium = 50%, great = 75%, extremely = 100% (Dillman, 2000; Saunders et al., 2009).

The main advantages of 'Likert Scale' questions are that they use a universal style of gathering information, they are easy for the respondents to understand, and they also work with quantitative information. Typically, it is easy to draw outcomes, reports, conclusions, and graphs from the responses. Moreover, for the reason that 'Likert Scale' questions use a scale, respondents are not compelled to respond with an either-or opinion; it allows them to be neutral. Once all answers have been given, it is easy to analyse them (Saunders et al., 2009). However, the most important negative of the 'Likert Scale' facing the researcher is that outcomes may be easily faked, where individuals choose to present a false opinion of their attitudes (Bertram, 2007); nonetheless, this can be avoided somewhat by developing an appropriate level of rapport with the respondents and convincing them that honest answers are in their interest. Finally, at the end of the questionnaire offered to respondents, any further comments that are relevant can be written on the of the questionnaire form.

6.5.5 Contractors Questionnaire

This questionnaire aimed to assist in the understanding of the process involved in Karbala management projects by way of an exploration of its problems by evaluating the perspectives of contractors. These contractors are of vital importance to the reconstruction industry and their contribution to the total development and construction of the infrastructure process in HPK can account for as much as 95% of the total of completed projects from 2006 to the time of writing.

The contractors' questionnaire (Appendix 7) differed from the staff questionnaire only in the part which related specifically to the contractors' issues (Table 6.19). It included eight questions related to the efficiency of supervising, rights, morale and development of contractors,

engineers' fear of the Commission of Integrity, and the knowledge and experience of contractors, as well as the extent to which contractor views are consulted by higher management.

Table 6.19 Questions of contractor issues

Questions code	No.	Questions	Key Issues
EQ7	1	What is the efficiency of the supervising engineers?	Efficiency of supervising
EQ10	2	What is the percentage of the rights given to contractors from departments?	Rights of contractors
EQ20	3	What is the percentage of the stimulus and encouragement of creativity among engineers by Karbala project management?	Motivation
EQ21	4	What is the percentage of the morale of contractors concerning the current state of project management in Karbala?	Morale of contractors
EQ23	5	What is the percentage of the impact on the project resulting from engineers' fear of the Commission of Integrity and judiciary?	Engineers' fear of the Commission of Integrity
EQ6	6	What is the percentage of the opportunities available to train and develop the knowledge and skills of contractors?	Development of contractors
EQ26	7	What is the percentage of experience and knowledge of engineers?	Contractors' experience and knowledge
EQ11	8	What is the percentage of contractors' views and suggestions for development that are taken on board by project management?	Taking contractors' views

6.5.6 Levels of Measurement

The term 'levels of measurement' refers to the properties and meaning of numbers assigned to observations for each item. Many statistical methods are only suitable for data measured at specific levels or combinations of levels (Blunch, 2012). Consequently, when possible, the analyses that will be used should be determined before deciding upon the level of measurement to use for each of the study variables.

In order to choose the right statistical test, the measurement type is important (Velleman and Wilkinson, 1993). Figure 6.9 shows a brief review of the properties of levels of measurement. The four major classifications that follow are found in many introductory statistics texts, and are presented beginning with the weakest and ending with those having the strongest measurement properties: these are nominal, ordinal, interval and ratio. Each successive level contains the properties of the preceding types and is able to record information at a higher level (Johnson and Creech, 1983).

Level of Measurement	*Property*			
	Categories	**Ranks**	**Equal Intervals**	**True Zero Point**
Nominal	✓			
Ordinal	✓	✓		
Interval	✓	✓	✓	
Ratio	✓	✓	✓	✓

Figure 6.9 Level of Measurement Properties (SPSS Inc, 2009)

In this questionnaire, a Likert-type question was used to ask respondents to select one of five responses ranked in order of strength. A common scale used in surveys and management research is an ordered rating scale, usually consisting of five- or seven-point scales. Such ordered scales are also called Likert scales and might be coded as follows: 1 (Strongly Agree, or Very Satisfied), 2 (Agree, or Satisfied), 3 (Neither Agree nor Disagree, or Neutral), 4 (Disagree, or Dissatisfied), and 5 (Strongly Disagree, or Very Dissatisfied) (Likert, 1932).

The researcher used ordinal measures by percentage (%) scale response (0% = very poor, 25% = poor, 50% = average, 75% = strong, 100% = extremely strong), to measure the level of

existence of something or the level of the specific effect, according to the nature of the question (Vagias, 2006).

There is an ongoing argument among scientists as to whether such scales should be considered ordinal or interval (Bryman and Cramer, 2011). SPSS Statistics involves procedures capable of handling such variables under either assumption. When suspicious about the measurement scale, some statisticians run their analyses using two separate techniques, since each make different presumptions about the nature of the measurement. If the results agree, conclusion has increased reliability (SPSS Inc, 2009).

6.5.7 Focus Group Interviews (Qualitative Interviews)

Semi-structured group interviews are often the most appropriate technique to collect data in order to gain an in-depth understanding of the phenomenon. As with previous interviews and questionnaires developed by the researcher for this study, data was collected via face-to-face interaction with the practitioners (Belson, 1981). Qualitative studies are useful when collecting data from face-to-face interactions with participants who have experienced the problems in the field or on site (Creswell, 2009).

The final stage of data collection (see Figure 6.34) included focus-group interviews with 50 managers, contractors and consultants, and was used to assess the perceptions of interviewees on the relative importance of causes and effects of delay, poor quality and cost overruns in Karbala projects.

In designing the interview questions, various aspects were taken into consideration; for instance, the researcher planned the exact information that it was necessary to gather, by deducing any gaps in answers from previous surveys, which then needed to be deepened and more focused

in order to achieve the objectives of the research. The main purpose of asking questions in interviews is to extract information from specific people and, in addition to discussions among themselves, determine what is most important to glean from the results. Furthermore, sending information to participants ahead of time with an assurance of confidentiality was another way of improving the interview process (Bradburn and Sudman, 1992).

A semi-structured interview was designed and conducted face-to-face with interviewees who have a relationship with engineering projects in the province of Karbala in Iraq. The primary reason for conducting semi-structured group interviews was to identify the effect of a variety of factors on the time, cost and quality of projects implemented in the Karbala region, specifically in the regional development projects which are managed by the Karbala local government. The process of selecting interviewees began with contacting the Iraqi Engineers Union (IEU), Karbala Development Project Management and Federal Departments of Development Projects to seek their assistance in identifying relevant interviewees.

The interviews lasted 90 minutes; however, sixty minutes is a preferable length of time, because neither interviewer nor interviewee lose their concentration (Laforest, 2009). Therefore, the time was divided into two phases (40 minutes for each), with a break for 10 minutes. Interviews were carried out in Arabic. The translation was done. Figure 6.10 (shown below) illustrates the process of evaluating the factors affecting time, cost and quality of the projects for interview questions.

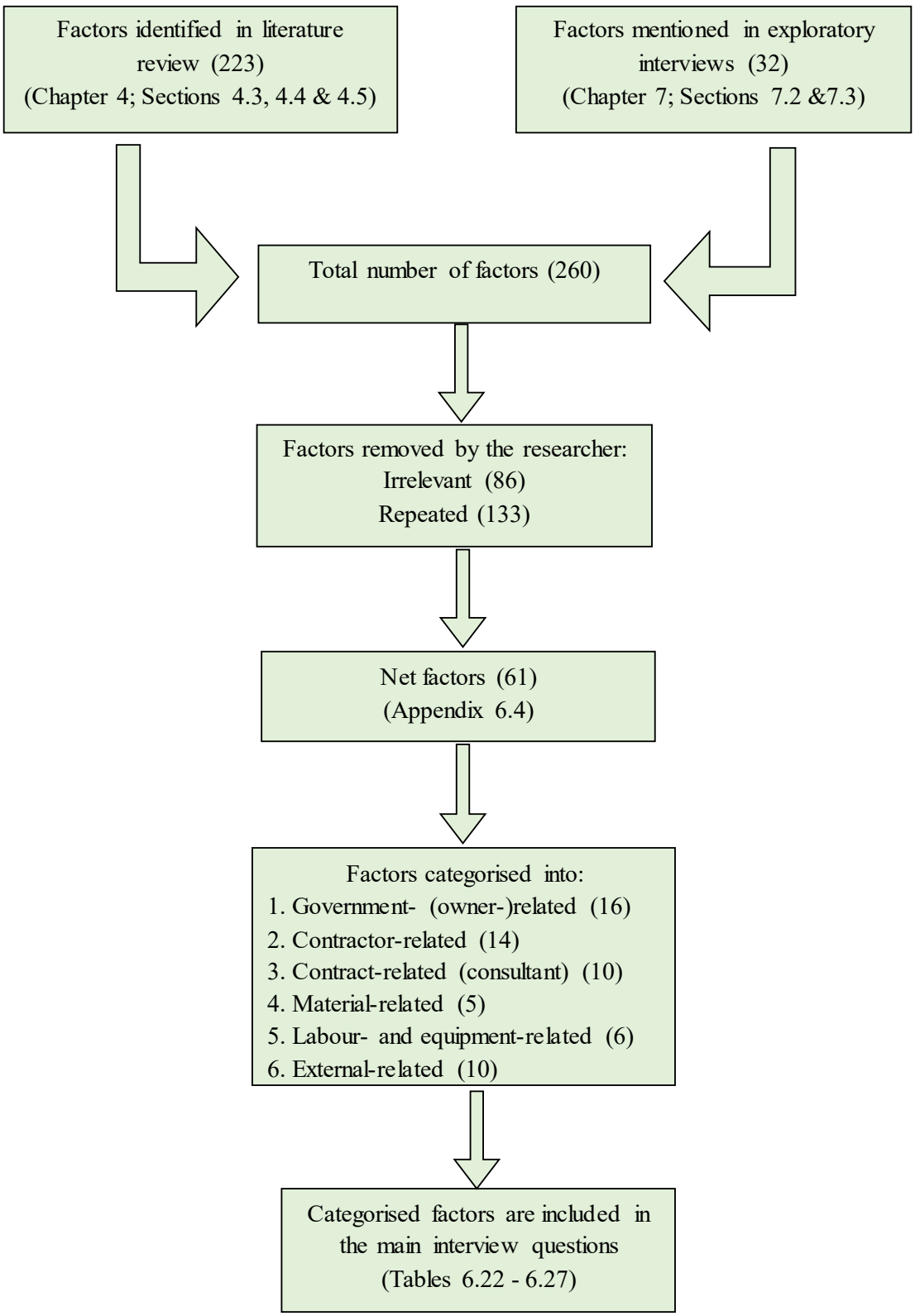


Figure 6.10 Process of evaluating the factors

Interview questions focused on several factors which caused failure or problems in most of Karbala's engineering projects. The interview questions (listed in Appendix 9) were divided into two parts. The first included seven questions concerning general information about the interviewees, such as their educational attainment, roles, specialisms, years of experience, age, sex and workplace. The second part, and the most important one, focused on the causes and effects of delay, poor quality and cost overruns in Karbala engineering projects. The respondents were requested to indicate their response to the degree of severity of 61 well-recognised factors resulting in delay, poor quality and cost overruns. These causes were categorised into the following six groups of factors:

- Group A: Government-(owner-) related causes, as shown in table 6.20, including 16 factors (from factor A1 to factor A16).

Table 6.20 Questions for group interviews / Government-(owner-) related

Government-(owner-) related		TIME					QUALITY					COST				
Code	**Questions**	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
A1	Finance and payments of completed work															
A2	Owner interference															
A3	Slow decision-making															
A4	Lack of staff experience															
A5	Excessive bureaucracy in project owner operation															
A6	Inappropriate overall organisational structure linked to the project															
A7	Lack of appropriate legislation and government laws															
A8	Selection of non-qualified project management leaders for political reasons															
A9	Financial and administrative corruption															
A10	Non-use of information technology															
A11	Weaknesses of quality assurance/control															
A12	Lack of or inadequate experience of consultants															
A13	Underperforming employees															
A14	Lack of trust among employees and government departments															
A15	Lack of motivation and encouragement															
A16	Staff fear of Anti-Corruption Commission															

- Group B: Contractor-related causes (see table 6.21), including 14 factors (from factor B1 to factor B14).

Table 6.21 Questions for group interviews / Contractor-related

Contractor-related		TIME					QUALITY					COST				
Code	Questions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
B1	Subcontractors															
B2	Poor site management and supervision															
B3	Construction methods															
B4	Improper planning															
B5	Delay in the project timetable															
B6	Inadequate contractor experience															
B7	Financing by contractor during construction															
B8	Controlling subcontractors by main contractor in the execution of work															
B9	Mistakes in construction work															
B10	Poor quality of construction work															
B11	The selection of unskilled workers by the contractor to work on site															
B12	Inadequate equipment used															
B13	Personnel safety issues															
B14	Unavailability of engineers on the project's site															

- Group C: Contract-related causes (consultant), as shown in table 6.22, including 10 factors (from factor C1 to factor C10).

Table 6.22 Questions for group interviews / contract-related (consultant)

Contract-related (consultant)		TIME					QUALITY					COST				
Code	Questions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
C1	Change orders															
C2	Mistakes and discrepancies in contract document															
C3	Lack of contract document															
C4	Lack of communication and coordination between parties															
C5	Maladministration in disputes and negotiations															
C6	Unrealistic contract duration and requirements imposed															
C7	Tendering system that obligates the choice of the lowest bidding value															
C8	Delays in obtaining permits from municipality or related bodies															
C9	Lack of preparation of work site															
C10	Insufficient data collection and survey before design															

- Group D: Material-related causes (table 6.23), including 5 factors (from factor D1 to factor D5).

Table 6.23 Questions for group interviews / material-related

Material-related		TIME					QUALITY					COST				
Code	Questions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
D1	Quality of material															
D2	Shortage of material															
D3	Material transfer problems															
D4	Inaccurate material testing															
D5	Delays in the test material															

- Group E: Labour and equipment category causes (table 6.24), including 6 factors (from factor E1 to factor E6).

Table 6.24 Questions for group interviews / labour- and equipment-related

Labour- and equipment-related		TIME					QUALITY					COST				
Code	Questions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
E1	Lack of local labour supply															
E2	Lack of labour productivity															
E3	Lack of modern equipment															
E4	Unskilled local operators															
E5	Lack of commitment and discipline by local labourers															
E6	Lack of foreign labour because of the security factor															

- Group F: External causes (Table 6.25), including 10 factors (from factor F1 to factor F10).

Table 6.25 Questions for group interviews / external-related

External-related		TIME					QUALITY					COST				
Code	Questions	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
F1	Weather conditions															
F2	Regulatory changes															
F3	Problems with neighbours															
F4	Unforeseen site conditions															
F5	Social and cultural factors															
F6	Security factor															
F7	Political changes															
F8	Public holidays															
F9	Unavailability of utilities on site (such as water, electricity, etc.)															
F10	Effects of subsurface conditions (e.g. soil, high water table, etc.)															

In these interview questions, the ‘rating questions’ response style was preferred by the researcher, and was used to collect staff's opinions, as in the previous set of interviews. Focus-group discussions were conducted to draw out the opinions and assessments of 50 managers, consultants and contractors regarding Karbala project management. Participants were divided into seven groups with five to eight interviewees in each group. In each of the selected groups, discussions were organised with senior staff to understand their perception of the projects’ performance. It must be recalled that most of them had more than 20 years of experience and were working in engineering and administrative functions at the time of interview.

After finalising the factors to be measured, a second visit was conducted to the same interviewees and they were asked to assign a frequency rate. This rate was used to rank causes based on the frequency of occurrence of each cause, as identified by the participants.

6.6 Summary

In this chapter the data and information have been presented, including primary, secondary, qualitative and quantitative data. Furthermore, primary and secondary data collection techniques, data quality, missing data and measuring instruments have been discussed. As this research is of a mixed method, the importance of data triangulation and how to develop a model of data collection has also been explored. The next part of the chapter reviewed the population sample and calculated all sampling of Karbala project management required for data collection.

In the last part of this chapter, the interviews and questionnaire questions and forms were mapped to the research objectives. An explanation was also outlined as to how the questionnaires and interviews conducted on-site answer the research questions and achieved the purposes of the study. The following chapter will proceed to explore the quantitative data-analysis stage.

Chapter 7 : Quantitative Data Analysis

7.1 Interdiction

This chapter focuses on explaining and analysing the collected quantitative data, for which several methods and equations have been used. This chapter is divided into three stages: stage I consists of general statistical analysis of the collected data, which presents the breakdown of the questionnaire and response rate, in addition to the respondents' personal information. Stage II entails analysis of practitioners' responses to the resident questionnaire, which includes respondents' personal information and the primary questions, separated into four sections with 16 questions. Stage III involves the analysis of practitioners' responses from staff (clients and consultants) and the contractors' questionnaire, which presents the breakdown of the questionnaire and the response rate. Comparison of the responses from staff and contractors is also included. This involves the ranking of the presented various Karbala project management issues in each category of participants along with the responses.

The objective of this chapter is to present the study data based on responses gathered from the survey technique (questionnaires) and analyse it statistically. To achieve the objective of this quantitative and exploratory co-related research study, the analysis of questionnaire data was directed towards determining the project management practitioners' perception of Karbala projects and the impact of various factors on the outcome of projects.

Again, the survey analysis looks at the project management practitioners' perceived use of certain PM tools and techniques. The focus of the research was limited to three main stakeholder groups: people (the beneficiaries), staff (clients and consultants), and contractors. The

questionnaires were analysed using the software programs Microsoft Excel and SPSS. The findings, as well as the statistical analysis of these questionnaires, are presented in tables and graphs.

7.2 Stage I: General Statistical Analysis

7.2.1 Questionnaire Distribution Breakdown: Response Rates and Completion Rate

This part of the study details the distribution breakdown, response rates and completion rate for residents', staff and contractors' questionnaires.

Below are the calculation formulae used to ascertain the response rate and completion rate:

Response rate: when it comes to self-completion questionnaires, a response rate refers to the number of people who completed the questionnaires (questionnaires received) divided by the number of questionnaires distributed (Johnson and Wislar, 2012).

Completion rate: the number of usable questionnaires divided by the number of questionnaires received which were filled out by respondents (Punch, 2003).

- **Residents' Questionnaire Distribution and Response Rates**

It was decided that the questionnaires would be distributed to two groups, one in an urban and another in a rural area, in order to obtain the perspectives of different residents and their perception of the main factors and types of issues which affect Karbala reconstruction projects. The number of questionnaires to be completed by these two categories was set at 550 (see section 6.4.1.2), and with the estimation of the response rate at greater than 60%, this number was considered to be sufficient to represent the opinions of people who live in the Karbala province in

Iraq. A potentially low response rate is a serious and common problem with self-completion questionnaires; however, careful planning can increase the response rate (Robson, 2002). Consequently, 920 questionnaires were distributed (611 in urban districts and 309 in rural districts). Out of a total of 920 questionnaires, 718 respondents participated and 202 refused to participate in answering the survey. The frequencies of response are offered in Table 7.1 and indicate a population response rate of 79.71%, which is considered good (Saunders et al., 2009).

Table 7.1 Residents' questionnaire distribution breakdown - Karbala

Karbala residents	Urban	Rural	Total/Average
Population	754,855	380,266	1,135,121
Target sample size	360	181	541
Estimated response rate	60%		
Questionnaires distributed	611	309	920
Responses received	456	262	718
Response rate	74.63%	84.79%	79.71%
Usable responses	444	240	684
Usable response rate (completion rate)	97.37%	91.60%	94.49%

- **Staff and Contractors' Questionnaire Distribution and Response Rates**

The total number of KPM staff and contractors who were invited to participate in the study was 333, consisting of 210 staff and 123 contractors, as mentioned previously. The calculated minimum representative sample of clients, consultants and contractors was 241; from local government, federal government and contractors, these figures were 97, 58 and 86 respectively. Only 140 responses were received, but 126 of these were usable responses. Table 7.2 shows that the highest response rate was obtained from the contractor participants, at 76.42%, followed by the federal government staff at 73.61%. The lowest response rate was from local government staff (63.04%).

Table 7.2 Staff and contractors' questionnaire distribution and response rates, Karbala

Karbala	Government staff			Contractors	Total/Average
	Local	Federal	Total		
Population	260	155	415	230	645
Target sample size	97	58	155	86	241
Estimated response rate	70%				
Questionnaires distributed	138	72	210	123	333
Responses received	87	53	140	94	234
Response rate	63.04%	73.61%	68.33%	76.42%	72.38%
Usable responses	78	48	126	78	204
Usable response rate (completion rate)	89.66%	90.57%	90.11%	82.98%	86.54%

7.2.2 Stages of Data-processing

1. Data-encoding (coding): In other words, the substitution of symbols or signs anywhere words and attributes are named; for example, the replacement of specialisation: (civil) =1, (mechanical) = 2, (electrical) = 3, or sexual categories: (male) = 1, (female) = 2 (Allan et al., 2006).
2. Statistical data dump (data entry): The validity and efficiency of the input data and its meaning are then tested using the data-dump program on Microsoft Excel and SPSS (Stern et al., 2004).
3. Display data (data view): In this step, data are presented depending on their nature: they may be presented in the text, in a table, or pictorially as a graph or chart, or diagram (Allan et al., 2006).
4. Writing the report (report writing): In this step, the results and conclusions reached by the researcher are recorded. The report is typically written in two phases: the first phase of the draft report is subject to final review, which involves ensuring that the steps and information are accurate and comprehensive; the final report of the outcomes of the

research can then be written (Stern et al., 2004).

7.2.3 Pre-processing Stage

This preliminary stage is one of the most important stages of data analysis. This phase is also called the data-cleaning stage, as it aims to prepare data for processing in the next stages by scheduling data and dealing with missing data and errors. It also involves checking the quality of data and removal of any inappropriate or corrected data. As is known, usually data are obtained in a raw format and are not always arranged in a manageable, useful way. For example, data are often uncoordinated, as responses are obtained from various answers and information is arranged in different ways or under different names for some of the fields. As such, labels often require standardisation, along with a unifying structure of files and the extraction of fields that need values.

7.2.4 Coding Missing Data

Each variable for each case in a data set should have a code. The choice of code may vary according to the statistical analysis software in use, although SPSS has a code that is utilised by default. A missing data code is applied to reference why data are missing. The main reasons for missing data have been identified by De Vaus (2013) as follows: the answer is refused by the respondent, the participant's answer may be unclear, or perhaps they did not have an idea in response to the question. In addition, it may be that an answer has been missed by mistake.

In this survey, the data set contains some missing values where respondents did not answer some questions on the questionnaires. It was therefore proposed that it might be more suitable to calculate mean scores instead, based on the number of answers given by each participant. Alternatively, in this instance some census scientists recommend replacing missing values with

the respondents' mean score before data-processing in order to calculate a total score (Elwell, 2012). The SPSS software (V.20) offers two options to deal with missing data, labelled system- and user-missing data. The researcher has selected system-missing data, because this option uses one of the logical solutions, replacement the missing values with the average value of the responses to fill in the missing value (Ibid).

7.2.5 Descriptive Analysis Stage

The main objective of this phase is to describe and summarise the basic characteristics of the data so that in order to have an idea of the distribution of data and to observe some of the relationships between variables. Some theories can then be developed on how to form the data. The descriptive analysis stage does not allow for the formation of conclusions or validation of the assertions of some existing theories increase from the description of the statistical data.

Despite the apparent simplicity of this stage, it is of great importance as it allows the researcher to visualise the data and to understand their behaviour. Furthermore, it enables the researcher to know which data values are concentrated where, the dispersion of data, the anomalous values, and other valuable characteristics of the data set.

Numerous statistical methods can be used to describe data; these are summarised in the points listed below.

7.2.6 Reliability Test (Cronbach's coefficient alpha)

As mentioned in section 6.2.5.2, several techniques are available to examine the reliability of data. The coefficient of reliability (Cronbach's alpha) was used in this research. Experts like

Miles and Huberman (1994) have recommended using the level of 0.80 as a rule of thumb for reasonable reliability, as cited in Creswell (2009) and Bradley et al. (2007).

Cronbach's alpha was calculated for each stage of the questionnaire. The most similar values of alpha showed negligible difference in the means and variances of the original scales. Table 7.3 explains the values of Cronbach's alpha for each stage of the questionnaire and the total Cronbach's alpha.

Table 7.3 Cronbach's alpha for each field of the questionnaire

Reliability statistic	Questionnaire		
	People	Staff	Contractors
Cronbach's alpha	0.727	0.831	0.848
Cronbach's alpha (total)	0.802		

A rule of thumb that applies to most situations is:

$0.9 \leq \alpha \leq 1.0$ = Excellent

$0.8 \leq \alpha \leq 0.9$ = Good

$0.7 \leq \alpha \leq 0.8$ = Acceptable

$0.6 \leq \alpha \leq 0.7$ = Questionable

$0.5 \leq \alpha \leq 0.6$ = Poor

$0.0 \leq \alpha \leq 0.5$ = Unacceptable.

7.2.7 Kolmogorov-Smirnov (K-S) Normality Test

In statistics, one of the non-parametric tests for normality is the Kolmogorov–Smirnov test. This test compares the statistical distribution of the population through two independent samples taken from this population. The test can be applied to compare either the frequency distribution of

one group against a theoretical distribution, or the frequency distribution of two independent groups against each other (Frude, 1990).

Data is normally distributed at sig. > 0.05 or close to 0.05. Table 7.4 below illustrates the results of the Kolmogorov-Smirnov test.

Table 7.4 Values of Kolmogorov-Smirnov and Shapiro-Wilk tests

Questionnaire	Kolmogorov-Smirnov[a]			Shapiro-Wilk			Skewness
	Statistic	df	Sig.	Statistic	df	Sig.	
Engineers	0.32	19.8	0.002	0.766	19.8	0.005	0.1
Contractors	0.291	53	0	0.794	53	0	0.173
People	0.294	39.5	0	0.801	39.5	0.0001	0.646
Average			0.001			0.002	0.306

The table above shows that the value of Sig (refers if the two condition Means are statistically different). is either close to normality (Sig. = 0.002) or it is normally distributed (Sig. = 0.005). Moreover, in normal distribution the value of skewness is approximately zero.

7.3 Stage II: Residents' Questionnaire

The following summarises the results of the questionnaire responses of Karbala's residents concerning the identification of a "main problem" for the assessment of the project management practices. The total number of respondents was 684. The analysis of this questionnaire was divided into two parts: the first part concerned participants' general personal information, and the second contained the primary questions; the latter was divided into four sections with 16 questions in total.

7.3.1 Part One: Respondents' Personal Information

The first part of the questionnaire asked for the respondents' details, including general personal information about the 684 participants, such as their educational status, gender, age and employment status. Other information, such as their place of residence in rural or urban areas, was also taken, as described below.

7.3.1.1 Distribution of Respondents' Educational Status

This section represents information regarding the participants' highest level of completed education, such as secondary school or earlier, high school, undergraduate and postgraduate studies. Figure 7.1 shows that the largest group of participants have an undergraduate degree, at 42.4%, slightly higher than the number of participants who attended education until high school (37.1%). 18.7% of participants left the education system at secondary school or earlier. The smallest group of participants were those with advanced degrees, at 1.8%.

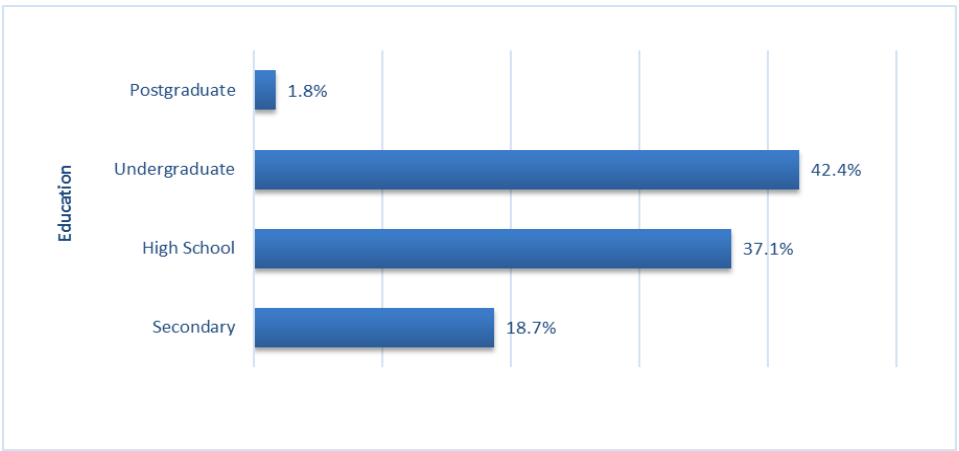


Figure 7.7.1 Distribution of respondents according to educational status

Table 7.5 illustrates a distinct similarity between the proportion of participants with each level of education in both urban and rural areas. The only exception to this trend was the number

of postgraduate degree-holders, which in urban areas was three times that of those living in rural areas.

Table 7.5 Participants' educational status by place of residence

Education	Place of Residence					
	Urban		Rural		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Secondary or earlier	85	19.10%	43	17.90%	128	18.70%
High School	165	37.20%	89	37.10%	254	37.10%
Undergraduate	185	41.70%	105	43.80%	290	42.40%
Postgraduate	9	2.00%	3	1.30%	12	1.80%
Total	444	100.00%	240	100.00%	684	100.00%

Table 7.6 clearly evidences that, among the participants, a greater proportion of women have completed secondary and high school than men. Conversely, the university graduates participating in the questionnaire were predominantly male.

Table 7.6 Participants' educational status by gender

Education	Gender					
	Male		Female		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Secondary or earlier	85	17.50%	43	21.70%	128	18.70%
High School	170	35.00%	84	42.40%	254	37.10%
Undergraduate	222	45.70%	68	34.30%	290	42.40%
Postgraduate	9	1.90%	3	1.50%	12	1.80%
Total	486	100.00%	198	100.00%	684	100.00%

7.3.1.2. Distribution of Respondents' Gender

Table 7.7 shows that there a greater proportion of the participants in this questionnaire were male (71.05%) than female (28.95%).

Table 7.7 Respondents' gender

Gender	Male		Female		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Total	486	71.05%	198	28.95%	684	100.00%

Moreover, the proportion of women who participated in the questionnaire in urban areas (32.66%) was higher than in rural locations (22.08%). Conversely, the proportion of male participants in the urban environment (67.34%) was lower than in rural areas (77.92%), that may be due to some social and cultural differences that exist between people of those areas, as illustrated in Figure 7.2.

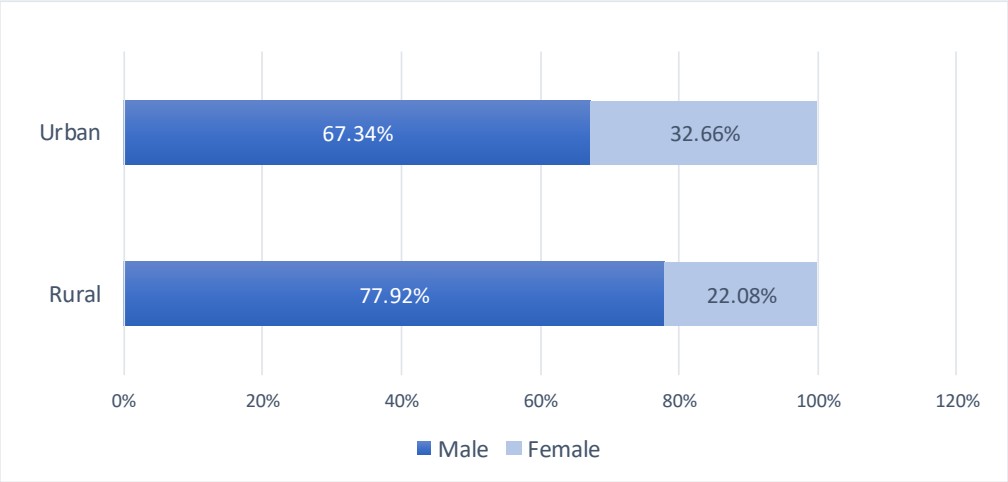


Figure 7.2 Distribution of the respondents according to gender and area

7.3.1.3 Distribution of Respondents' Employment Status

The bar chart (Figure 7.3) gives information on respondents' employment status. In general, the proportions of participants in employment were significant in both the government and private sector, at 34.2% and 22.5% respectively. The proportion of students was much lower (13.3%), while the number of unemployed participants stood at 30%.

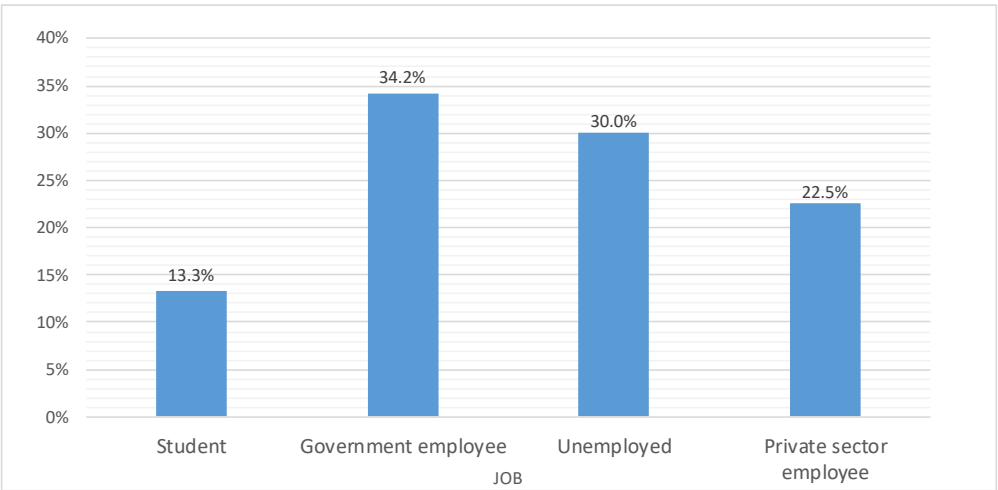


Figure 7.3 Distribution of respondents according to employment status

7.3.1.4 Distribution of Respondents' Ages

This section represents information on the participants' highest level of education completed, including secondary or earlier, high school, undergraduate and postgraduate degrees. Figure 7.4 shows that the two categories comprising those aged over 40 years and 31-40 years were the largest in this questionnaire, at 31.6% and 30.6% respectively, followed by the group aged 23-30 (25.3%). Finally, the smallest group of participants was made up of those aged 16-22, at 12.6%.

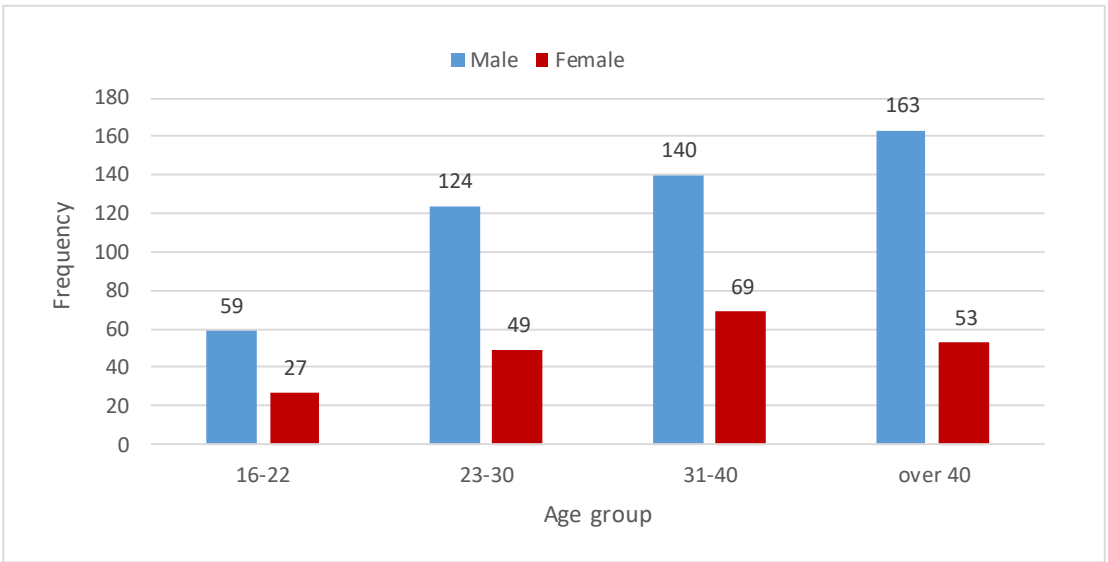


Figure 7.4 Distribution of respondents according to age group and gender

As shown in Table 7.8, there were fairly similar participation rates for both sexes for the age groups under 30. However, in the group of 31-40-year-olds the percentage of women participants (34.8%) was higher than the equivalent percentage of men (28.8%); conversely, the percentage of women participants aged over 40 (26.8%) was lower than the percentage of their male counterparts (33.5%). Overall, the number of participants of both genders in each group gradually increased with age; the only exception to this trend was that the number of women participants decreased slightly in the age bracket aged over forty years.

Table 7.8 Respondents' age groups by gender

Age (Years)	Gender					
	Male		Female		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
16-22	59	12.10%	27	13.60%	86	12.60%
23-30	124	25.50%	49	24.70%	173	25.30%
31-40	140	28.80%	69	34.80%	209	30.60%
Over 40	163	33.50%	53	26.80%	216	31.60%
Total	486	100.00%	198	100.00%	684	100.00%

7.3.1.5 Distribution of Respondents' Place of Residence

The participants in this survey were divided according to their home areas. These areas were split into two categories: the first was urban areas, representing the largest part of Karbala, including the centre of the Karbala province. The second category comprised rural areas, which included most of the outskirts of the Karbala province. The pie chart (Figure 7.5) indicates that 64.9% of respondents were classed as living in urban areas and 35.1% were from rural areas.

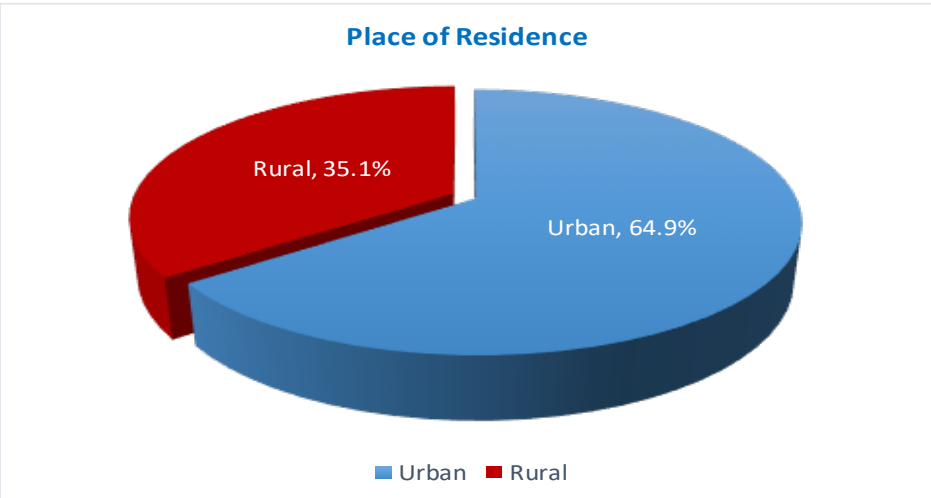


Figure 7.5 Distribution of respondents according to place of residence

7.3.2 Part Two: Respondents' Answers to the Main Questionnaire

This part consisted of sixteen questions divided into four sections: organisational and administrative issues, current practices, citizen satisfaction, and sustainability issues.

7.3.2.1 Section 1: Organisational Project Management and Administrative Questions

This section consisted of five questions, shown in Table 7.9, which asked residents about organisational project management and administrative issues. Overall, the findings show that 87.1% of participants described conventional organisational and administrative project management as poor, whereas only 6.0% were satisfied. A further 6.8% of participants selected the "Don't know" response.

Table 7.9 Section 1: organisational project management and administrative questions

No.	Question	YES		NO		DON'T KNOW	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Q1	Do you think that the organisational status of Karbala project management is good?	47	6.90%	579	84.60%	58	8.50%
Q2	Is the speed of the procedures and decision-making during the implementation of projects by the government good?	34	5.00%	616	90.10%	34	5.00%
Q3	Does the administrative structure influence project timings?	570	83.30%	67	9.80%	47	6.90%
Q5	Do you think that the process of planning projects meets citizens' needs in Karbala?	22	3.20%	638	93.30%	24	3.50%
Q15	Does the political factor have an effect on Karbala project management?	36	5.30%	577	84.40%	71	10.40%

Further analysis of the answers to the questions in this section can be found below.

Q1: Do you think that the organisational status of Karbala project management is good?

84% of respondents said "NO", the organisational status of Karbala project management is not good. Only 9.6 percent of participants answered "YES" to this question, while 8.5 percent of participants responded with "DON'T KNOW", as shown in Figure 7.6.

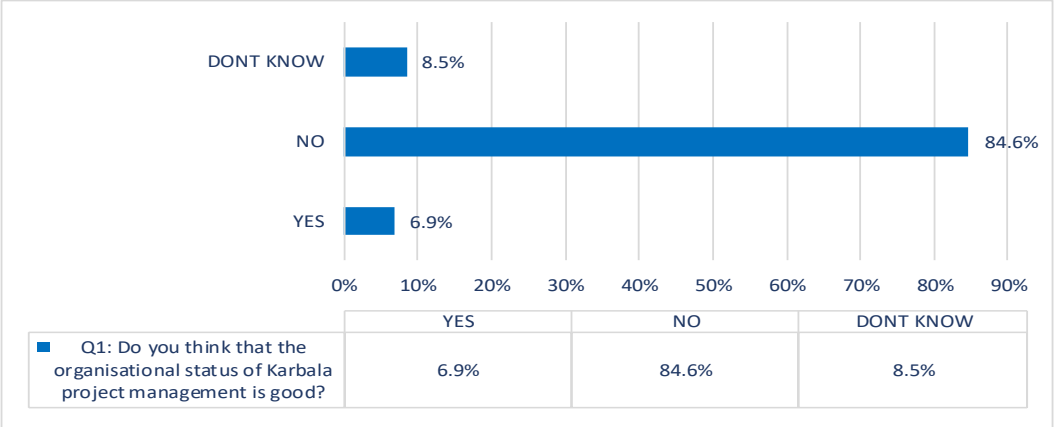


Figure 7.6 Q1: Do you think that the organisational status of KPM is good?

Q2: Is the speed of the procedures and decision-making during the implementation of projects by the government good?

In this question the respondents seemed to be very negative: 90% chose "NO" when asked about the speed of the procedures and decision-making of Karbala project management. The remaining 10% answered "YES" and "DON'T KNOW", as shown in Figure 7.7.

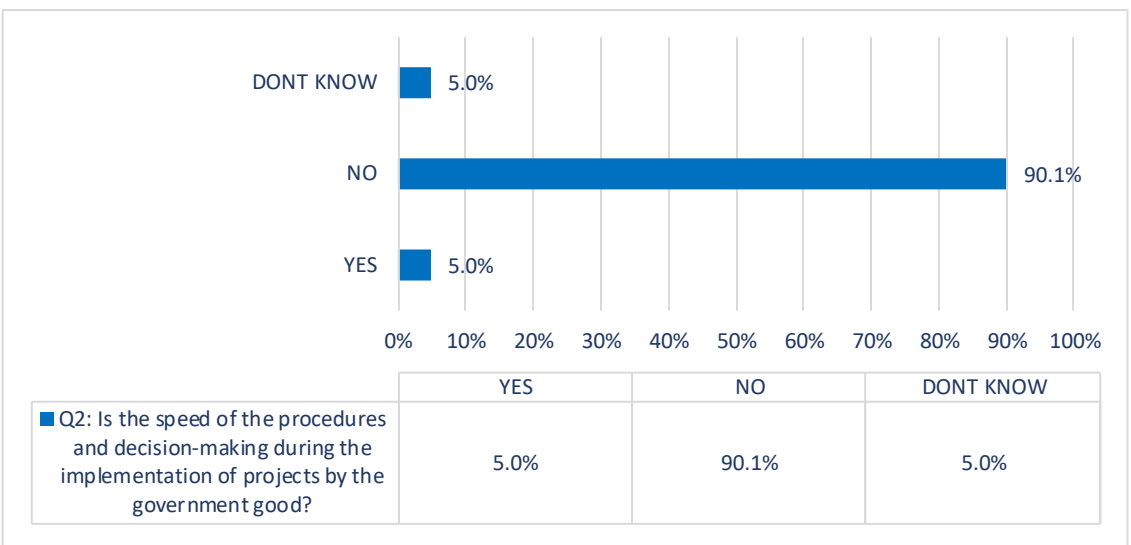


Figure 7.7 Q2: Is the speed of the procedures and decision-making during the implementation of projects by the government good?

Q3: Does the administrative structure influence project timings?

Figure 7.8 shows that most respondents (83.3%) answered “YES” regarding the impact of administrative structure on project management in Karbala. 9.8% chose “NO” and 6.9% said “DON’T KNOW”.

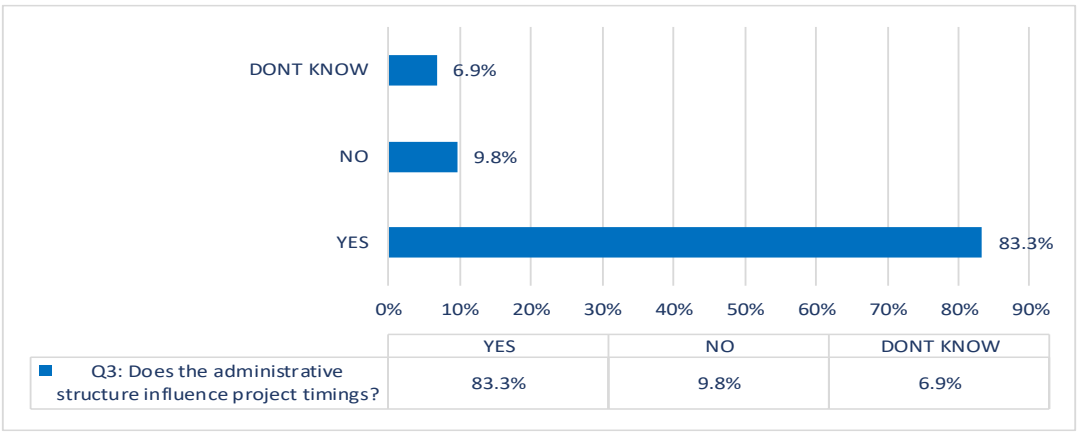


Figure 7.8 Q3: Does the administrative structure influence project timings?

Q5: Do you think that the process of planning projects meets citizens' needs in Karbala?

The participants in the survey demonstrated that they strongly believe that project planning in Karbala does not meet their needs, with 93.3% of them answering “NO”. Only 3.2% said “YES” and 3.5% chose “DON’T KNOW”, as can be seen in Figure 7.9.

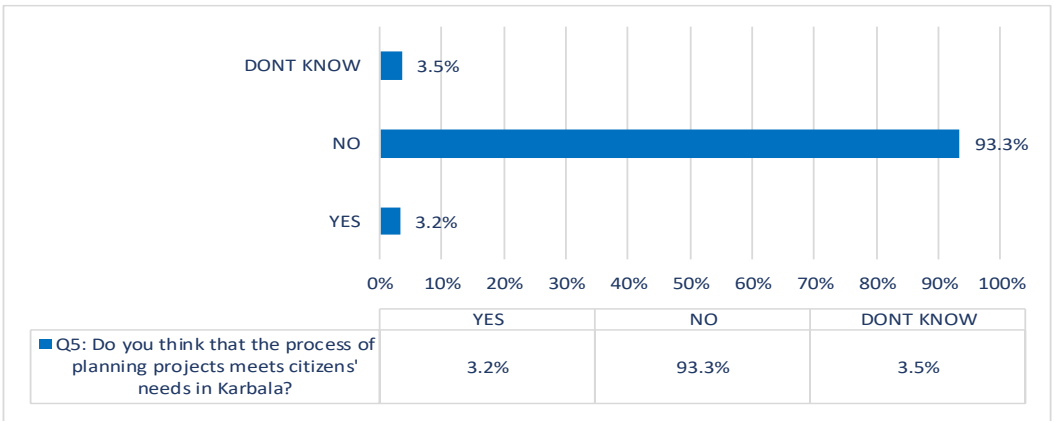


Figure 7.9 Q5: Do you think that the process of planning projects meets citizens' needs in Karbala?

Q15: Does the political factor have an effect on Karbala project management?

84.4% of respondents said that "YES", the political factor has impacted on the efficiency of Karbala project management. Only 9.8 percent of participants answered "NO", while 6.9 percent of participants said "DON'T KNOW", as shown in Figure 7.10.

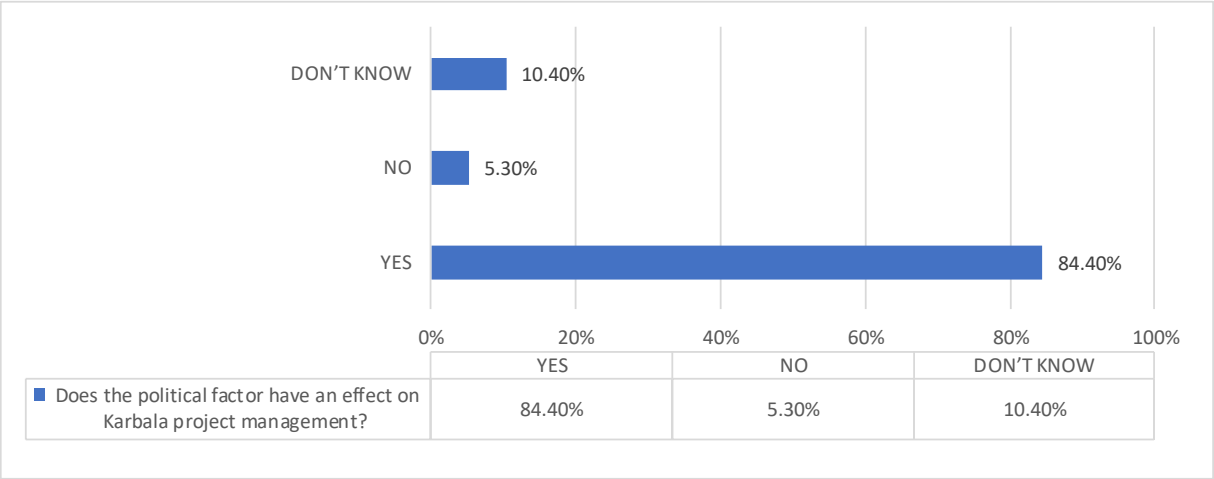


Figure 7.10 Q15: Does the political factor have an effect on Karbala project management?

Furthermore, the respondents recorded 65 comments in relation to this section of the questionnaire (organisational project management and administrative questions). The key issues raised include:

- Poor organisational structure of Karbala project management.
- A lack of collaboration between organisational sections or departments.
- Overlapping job responsibilities.
- Centralised authority by Governor.

7.3.2.2 Section 2: Project Management Practice

This section of the study sought to determine participants' opinions with regard to time, financial aspects, quality and stakeholder management. To this end, participants' views were required to indicate whether they agreed with selected statements: "yes", "no" or "don't know". This section consisted of four questions.

The findings of this section show that overall, almost eight out of ten residents in the province of Karbala (79.8%) were not satisfied with project implementation or outcome, compared with 8.6% who were satisfied. The remaining 11.6% of Karbala citizens responded that they did not know, as shown in Table 7.10.

Table 7.10 Section 2: Project management practice

No.	Question	YES		NO		DON'T KNOW	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Q8	Do you think that the implementation of reconstruction projects in Karbala is of good quality?	68	9.90%	571	83.50%	45	6.60%
Q9	Is the period of implementation of reconstruction projects in Karbala acceptable?	55	8.00%	530	77.50%	99	14.50%
Q10	Does the local government take views and suggestions of people for the development of project management?	36	5.30%	525	76.80%	123	18.00%
Q16	Is there financial and administrative corruption in Karbala project management?	556	81.30%	77	11.30%	51	7.50%

Q8: Do you think that the implementation of reconstruction projects in Karbala is of good quality?

In this question, the respondents seemed to hold negative views, as 83.5% of them said that the projects implemented in Karbala were of poor quality. Only 9.9% of them viewed the quality as good, and 6.6% answered that they did not know (as shown in Figure 7.11).

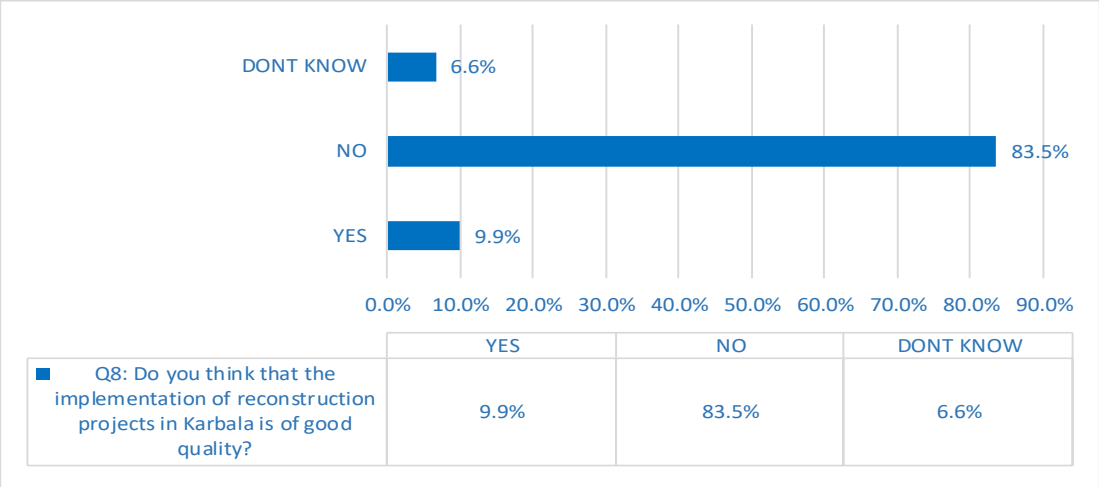


Figure 7.11 Q8: Do you think that the implementation of reconstruction projects in Karbala is of good quality?

Q9: Is the period of implementation of reconstruction projects in Karbala acceptable?

The bar chart (Figure 7.12) shows that most respondents (77.5%) answered that the projects implemented in Karbala were often delayed. Only 8.0% of them said that the timescales were acceptable; the remaining percentage (14.5%) said that they did not know.

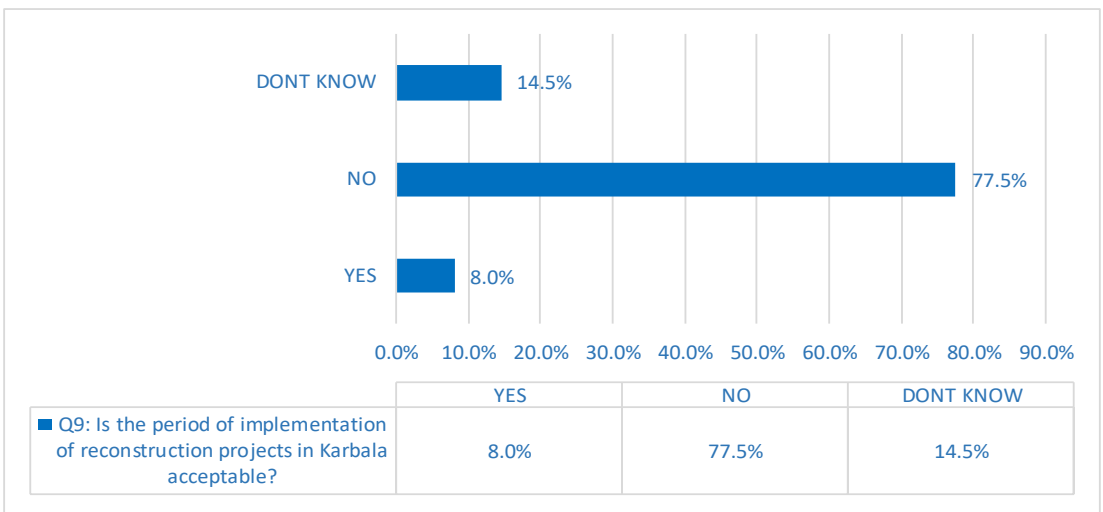


Figure 7.12 Q9: Is the period of implementation of reconstruction projects in Karbala acceptable?

Q10: Does the local government take views and suggestions of people for the development of project management?

Most participants in the survey (76.8%) indicated their perception that Karbala local government did not take their views and suggestions into consideration regarding the development of project management. On the other hand, a very small proportion of respondents (5.3%) answered "YES". 18.0% of them selected "DON'T KNOW", as shown in Figure 7.13.

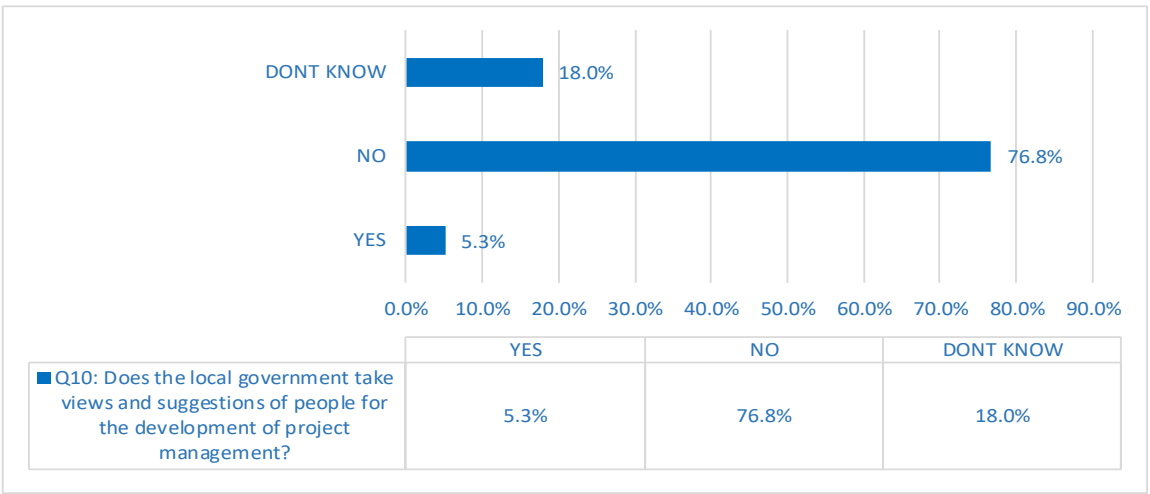


Figure 7.13 Q10: Does the local government take views and suggestions of people for the development of project management?

Q16: Is there financial and administrative corruption in Karbala project management?

The participants in the survey demonstrated their belief that there is financial and administrative corruption, so 81.3% of them answered "YES". On the other hand, a number of respondents (11.3%) said "NO" and 7.5% chose "DON'T KNOW", as shown in Figure 7.14.

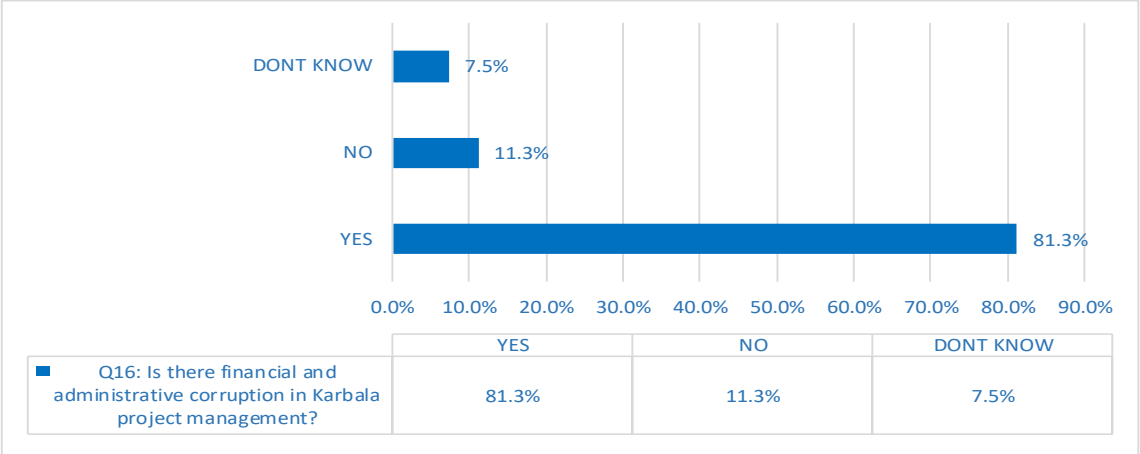


Figure 7.14 Q16: Is there financial and administrative corruption in KPM?

Further to the data shown above, the respondents recorded 54 comments in relation to this section of the questionnaire (concerning project-management practices). The key issues raised included:

1. Most of the projects carried out are not of good quality
2. Most of the projects were delayed for longer than the contractual period
3. We believe that there is financial and administrative corruption in the projects
4. The local government in Karbala did not carry out any periodic evaluation of projects
5. The local government in Karbala do not care about the opinions of people regarding the development of project management.

7.3.2.3 Section 3: Citizen Satisfaction

This section includes three questions, as shown in Table 7.11, about citizens' satisfaction, with regard to engineers, contractors, and projects. Overall, the findings show that 86.5% of participants were not satisfied with the performance of engineers or contractors, or indeed the

overall efficiency of the projects. However, a small percentage of them (3.8%) stated that they were satisfied and 9.7% of participants said that they did not know.

Table 7.11 Frequencies and percentages of citizen satisfaction questions

No.	Question	YES		NO		DON'T KNOW	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Q4	Are you satisfied with the efficiency of the overseeing engineers on reconstruction projects in Karbala?	27	3.90%	586	85.70%	71	10.40%
Q6	Do you think that contractors are implementing the reconstruction projects in Karbala at an acceptable level?	18	2.60%	577	84.40%	89	13.00%
Q7	Are you satisfied with the reconstruction projects in Karbala?	34	5.00%	611	89.30%	39	5.70%
Total		26	3.80%	591	86.50%	66	9.70%

Q4: Are you satisfied with the efficiency of the overseeing engineers on reconstruction projects in Karbala?

85.7% of respondents said that "NO", they were not satisfied with the efficiency of engineering supervision on the projects. Only 3.9 per cent of them said that they were satisfied, while 10.4 per cent of participants answered "DON'T KNOW", as shown in Figure 7.15.

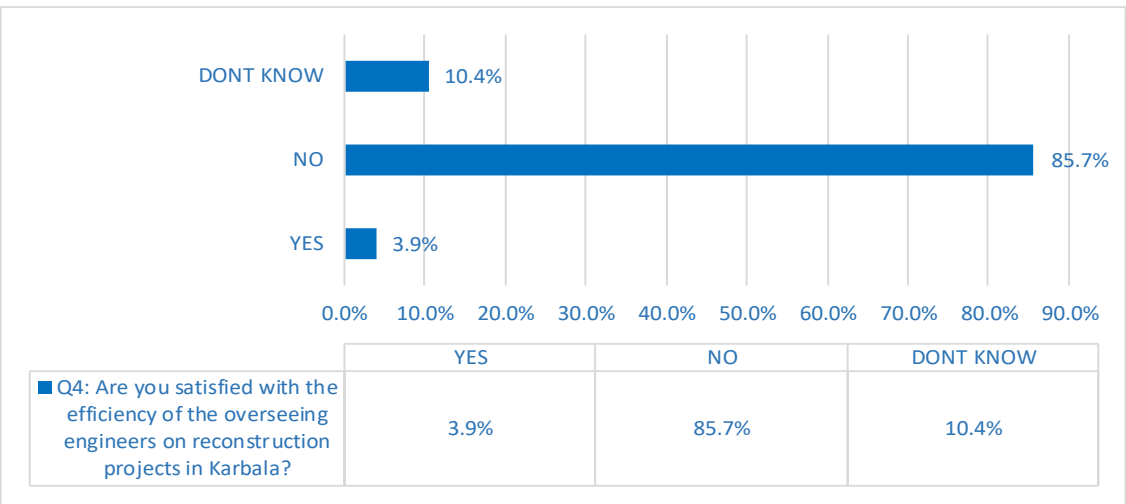


Figure 7.15 Q4: Are you satisfied with the efficiency of the overseeing engineers on reconstruction projects in Karbala?

Q6: Do you think that contractors are implementing the reconstruction projects in Karbala at an acceptable level?

The bar chart (Figure 7.16) shows that most respondents (84.4%) answered that the contractors were implementing the reconstruction projects in Karbala at an unacceptable level. A very small number of the respondents (2.6%) believed that they had an acceptable level of expertise. In addition, 13.0% of them answered that they did not know.

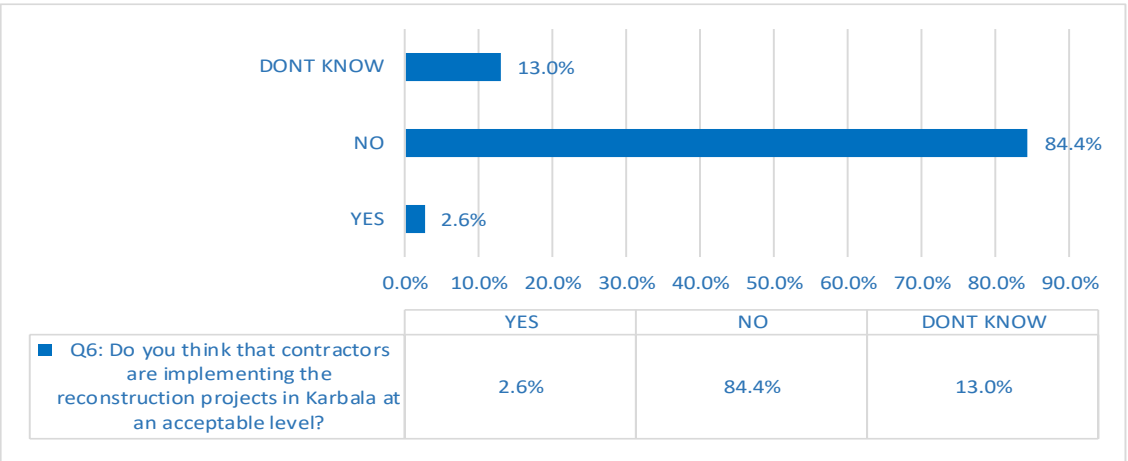


Figure 7.16 Q6: Do you think that contractors are implementing the reconstruction projects in Karbala at an acceptable level?

Q7: Are you satisfied with the reconstruction projects in Karbala?

The findings of this question show that almost nine out of ten respondents (89.3%) were not satisfied with the reconstruction projects in Karbala (see Table 7.17). One out of every ten participants said that either they were satisfied or had no idea (5.0% and 5.7% respectively).

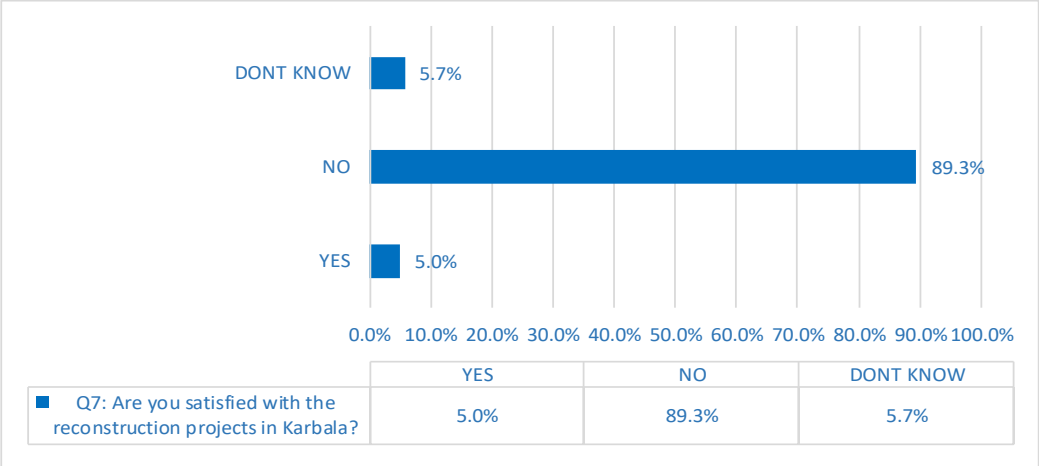


Figure 7.17 Q7: Are you satisfied with the reconstruction projects in Karbala?

In addition to the above information, the participants recorded 72 comments in relation to this section of the questionnaire (citizen satisfaction). The key issues raised included:

1. We believe that there are weaknesses in the supervision and monitoring of projects
2. Most engineers do not have experience in supervision
3. High cost of projects implemented
4. Most contractors are non-professionals
5. Most contractors do not have the financial capacity.

7.3.2.4 Section 4: Sustainability Issues of Project Management

This section contained four questions, as shown in Table 7.12; these addressed topics such as the environment, clean energy, health, and social and financial issues. In general, the findings of this section show that 78.1% of participants remarked upon the lack of sustainability of Karbala's project management systems; however, a small percentage (9.2%) believed Karbala's project management to be effective with regard to sustainability. The remaining 12.7% of participants said that they did not know.

Table 7.12 Frequencies and percentages of sustainability issues

No.	Question	YES		NO		DON'T KNOW	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Q11	Does the management of projects in Karbala contribute to preserving the environment?	75	11.00%	522	76.30%	87	12.70%
Q12	Does Karbala project management contribute to reducing energy consumption and seek to increase the use of clean energy?	47	6.90%	537	78.50%	100	14.60%
Q13	Does Karbala project management contribute to improving the health of citizens?	80	11.70%	514	75.10%	90	13.20%
Q14	Does Karbala project management contribute to reducing the cost of projects and finding alternatives?	49	7.20%	565	82.60%	70	10.20%
Total		63	9.20%	535	78.10%	87	12.70%

Q11: Does the management of projects in Karbala contribute to preserving the environment?

76.3% of respondents said that" NO", believing that Karbala project management caused environmental pollution. Conversely, 11.0% of respondents said that "YES", it is preserving the environment, whereas 12.7% of participants answered that they did not know (as shown in Figure 7.18).

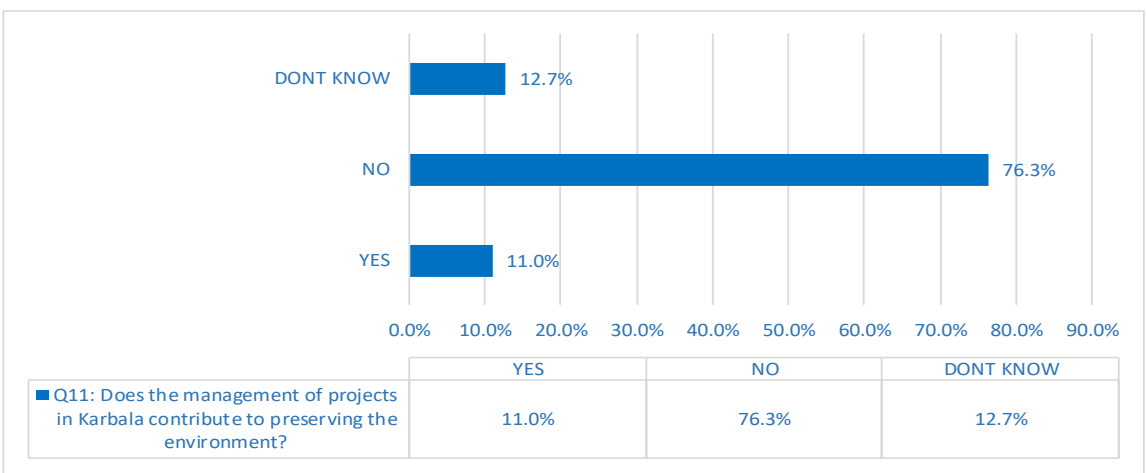


Figure 7.18 Q11: Does the management of projects in Karbala contribute to preserving the environment?

Q12: Does Karbala project management contribute to reducing energy consumption and seek to increase the use of clean energy?

The bar chart (Figure 7.19) shows that most respondents (78.5%) answered that Karbala project management does not contribute to reducing energy consumption or seek to increase the use of clean energy, but 6.9% of them argued that it did. The remaining percentage (14.6%) said that they did not know.

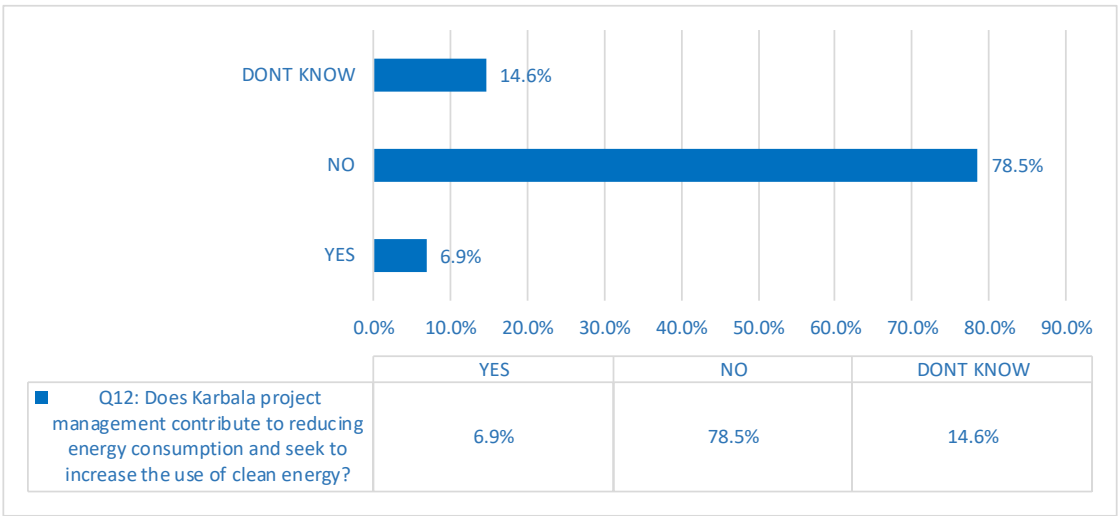


Figure 7.19 Q12: Does Karbala project management contribute to reducing energy consumption and seek to increase the use of clean energy?

Q13: Does Karbala project management contribute to improving the health of citizens?

Figure 7.20 shows that most respondents (75.1%) answered that Karbala project management does not contribute to improving the health of citizens. Nonetheless, a few of the respondents (11.7%) said that "YES", it is contributing to improving the health of citizens. Even more of the respondents (13.2%) answered "DON'T KNOW".

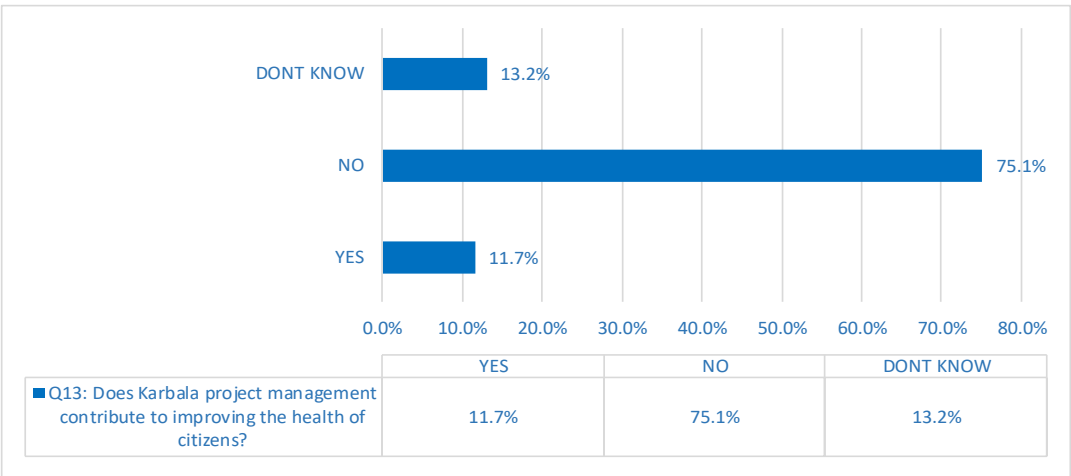


Figure 7.20 Q13: Does Karbala project management contribute to improving the health of citizens?

Q14: Does Karbala project management contribute to reducing the cost of projects and finding alternatives?

In this question the respondents seemed to be negative, as 82.6% said that Karbala project management does not contribute to reducing the cost of projects and finding alternatives. Only 7.2% of them answered that it does contribute and 10.2% of them said that they did not know, as shown in Figure 7.21.

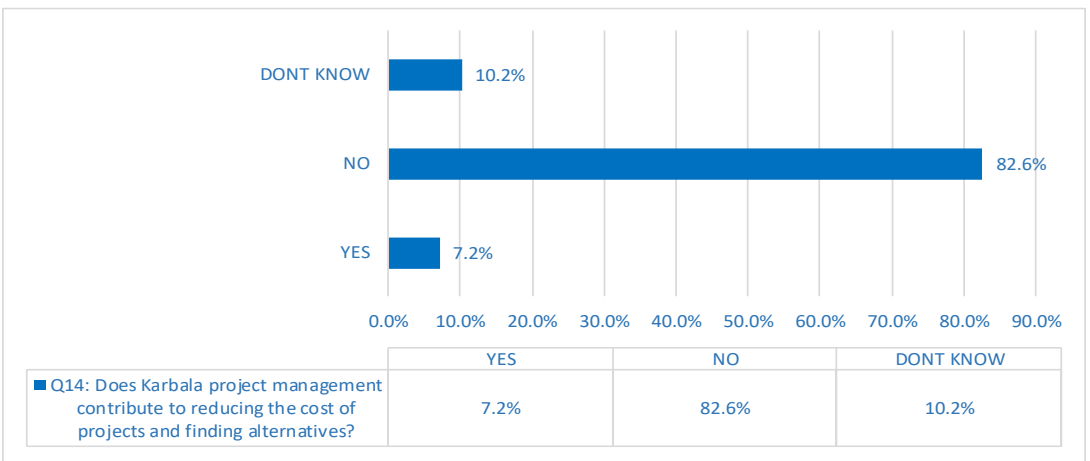


Figure 7.21 Q14: Does Karbala project management contribute to reducing the cost of projects and finding alternatives?

Furthermore, the participants recorded 48 comments in relation to this section of the questionnaire (sustainability issues of Karbala project management). The key issues raised included:

Impact of the implementation of projects in the city centre and densely populated residential areas:

1. Air pollution from thick dust
2. Diggings works without fences or warning signs
3. Main and ancillary transport roads closed without alternatives
4. The high cost of construction (also the result of an unjustified increase in the quantity of material consumption and power).

7.4 Stage III: Staff and Contractors' Questionnaire Analysis

The following summarises the findings of the clients', consultants' and contractors' responses to the questionnaires in Karbala PM, concerning the identification of a "main problem" for the assessment of project management practices. The total number of respondents was 204; 126 were government staff (clients and consultants) and 78 were contractors. The analysis of this questionnaire was divided into two parts: the first part concerned the general personal information of the participants. The second part contains the primary questions, which were divided into seven sections with 34 questions (see appendices 5 and 7).

7.4.1 Part One: Respondents' Personal Information

The first part of the questionnaire asked for the respondents' details, including general personal information of 204 participants, such as the participant's specialisation, years of experience, place of work and gender, as described below.

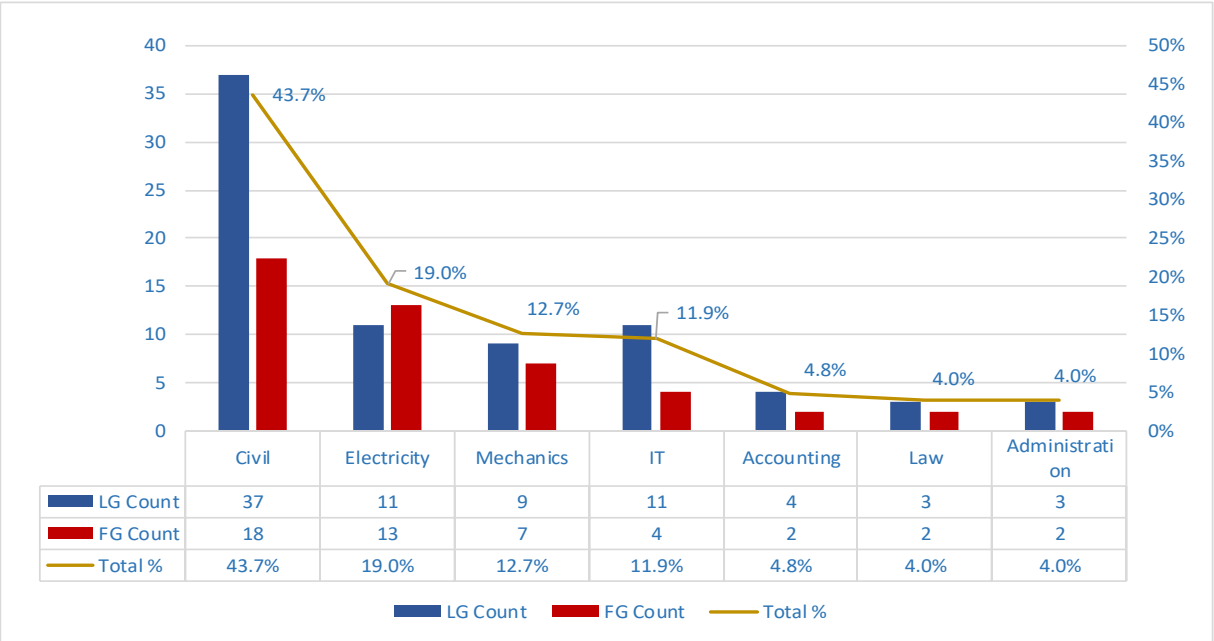
7.4.1.1 Distribution of Respondents' Specialisations and Classifications

Firstly, this section presents information on the distribution of the respondents' specialisation with regard to employees of both local and federal government working in Karbala projects within the limits of the study period. The fields in question included civil, electrical, and mechanical engineering; IT; accounting; law; and administration. Table 7.13 shows that 61.9% of the respondents were local government employees and 38.1% were federal government employees.

Table 7.13 Participants' specialisation (government employees)

Specialisation	Employer			
	LG	FG	Total	
	Count	Count	Count	%
Civil Engineering	37	18	55	43.70%
Electrical Engineering	11	13	24	19.00%
Mechanical Engineering	9	7	16	12.70%
IT	11	4	15	11.90%
Account	4	2	6	4.80%
Law	3	2	5	4.00%
Administration	3	2	5	4.00%
Total	78	48	126	100.00%
Total %	61.90%	38.10%		

Overall, Figure 7.22 shows that most participants have a civil engineering degree (43.7%), followed by the number of participants qualified in electrical engineering, mechanical engineering, and IT (19.0%, 12.7% and 11.9% respectively). Conversely, the lowest rate of participants had accounting, law and administration degrees (4.8%, 4.0% and 4.0% respectively), as shown in Table 7.13.



	Civil	Electricity	Mechanics	IT	Accounting	Law	Administration
LG Count	37	11	9	11	4	3	3
FG Count	18	13	7	4	2	2	2
Total %	43.7%	19.0%	12.7%	11.9%	4.8%	4.0%	4.0%

Figure 7.22 The distribution of the respondents' specialization for local and federal government employees

Secondly, the classification of the contractors was investigated. The bar chart in Figure 7.23 shows that most contractors (57.69%) who participated in the questionnaire were of the third, fourth and fifth classes, in accordance with instruction number 3 for the recording and classification of companies and contractors issued in 2009 by the Iraqi Ministry of Planning (IMP, 2009). 32.05% of respondents were within the limits of the premier, first and second classes, while the lowest proportion (10.26%) were from the sixth to tenth classes.

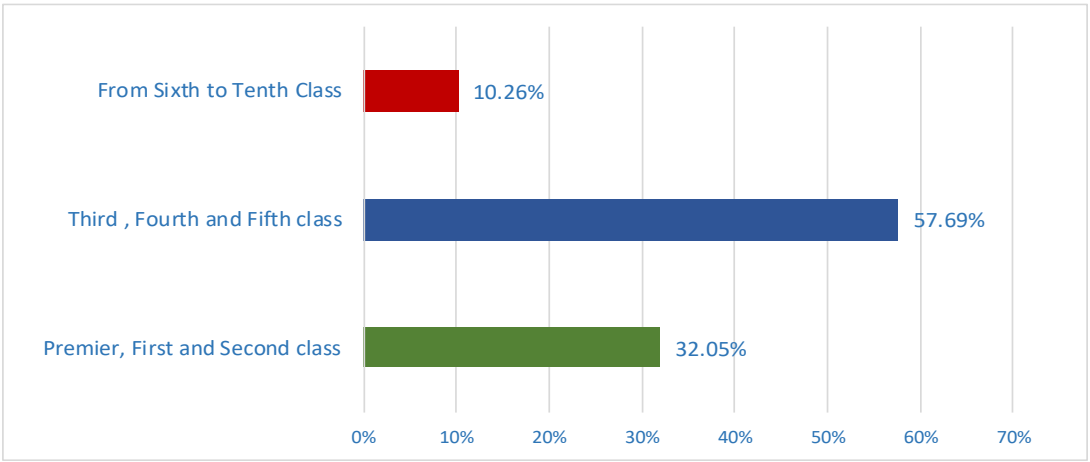


Figure 7.23 Distribution of contractors' classifications

7.4.1.2 Distribution of Respondents' Years of Experience

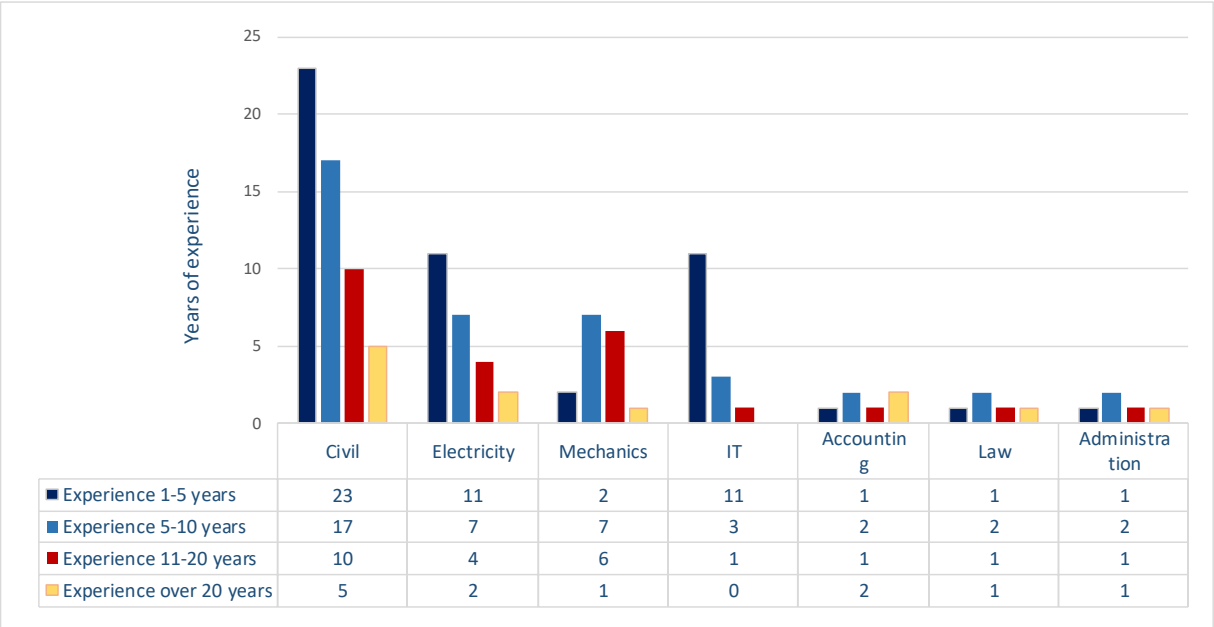
Where staff are concerned, in general, Table 7.14 illustrates that two out of every three participants have experience equal to or less than ten years. There were also 19.4% of respondents with experience ranging from eleven to twenty years and 13.9% of respondents with over twenty years' experience.

Table 7.14 Respondents' years of experience

Experience	Percentage
1-5 years	32.90%
5-10 years	33.90%
11-20 years	19.40%
Over 20 years	13.90%
Total	100.00%

Figure 7.24 compares the percentage of employees' specialisation and their years of experience. On the whole, civil engineers were much more experienced than staff from all other specialisations for all of the categories. Almost all of the information technology engineers had

ten years' experience or less. Moreover, the proportion of civil and electrical engineers decreased gradually with increasing years of experience, with the highest percentage of them being placed in the 1-5 years' group. The proportion of mechanical engineers increased up to a level of experience of 5-10 years, then it fell to the lowest rate at the level of experience of over 20 years. Exhibiting a different pattern, the levels of experience in the specialisations of accounting, law and administration were evenly distributed.



	Civil	Electricity	Mechanics	IT	Accounting	Law	Administration
Experience 1-5 years	23	11	2	11	1	1	1
Experience 5-10 years	17	7	7	3	2	2	2
Experience 11-20 years	10	4	6	1	1	1	1
Experience over 20 years	5	2	1	0	2	1	1

Figure 7.24 Distribution of respondents' years of experience for government employees by specialisation

For contractors, Table 7.15 shows that the largest category of participants (44.9%) were those with experience of 5-10 years. There were also 28.2% of respondents with experience of 11-20 years and 20.5% of respondents had experience of 1-5 years. The minority (6.4%) had over twenty years of experience.

Table 7.15 Distribution of respondents' years of experience for contractors

Years of experience	Count	Percentage
1-5 years	16	20.5%
5-10 years	35	44.9%
11-20 years	22	28.2%
Over 20 years	5	6.4%
Total	78	100.0%

7.3.1.3 Distribution of respondents' place of work and gender

Table 7.16 gives information about the workplace of participants, listed as either Local Government (LG) or Federal Government (FG) departments, for both genders.

Table 7.16 Distribution of respondents' place of work by gender

Employer	Gender					
	Male		Female		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
LG	51	40.50%	27	21.40%	78	61.90%
FG	34	27.00%	14	11.10%	48	38.10%
Total	85	67.50%	41	32.50%	126	100.00%

The pie chart (Figure 7.25) indicates that the percentage of participants from the local government was 61.9%, whereas the employees of federal government amounted to 38.1%.

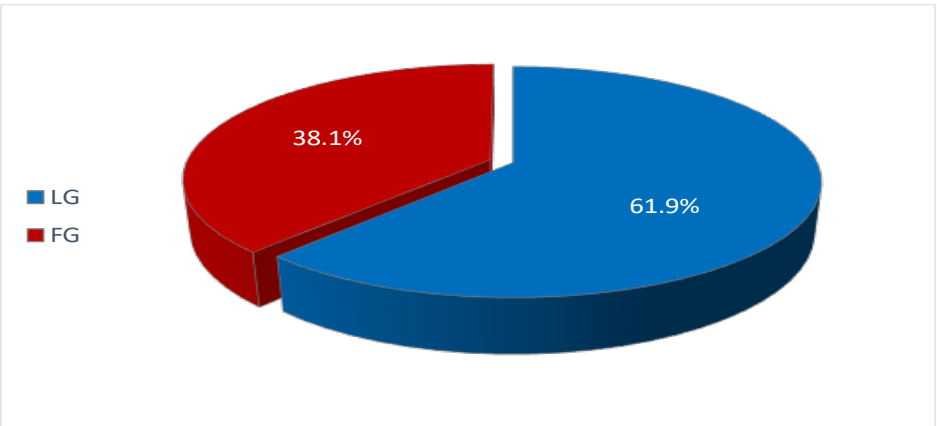


Figure 7.25 Distribution of respondents' place of work

Furthermore, 67.5% of the participants in this questionnaire were men, while only 32.5% were women, as shown in the pie chart below (Figure 7.26). Moreover, the contractor participants were all male.

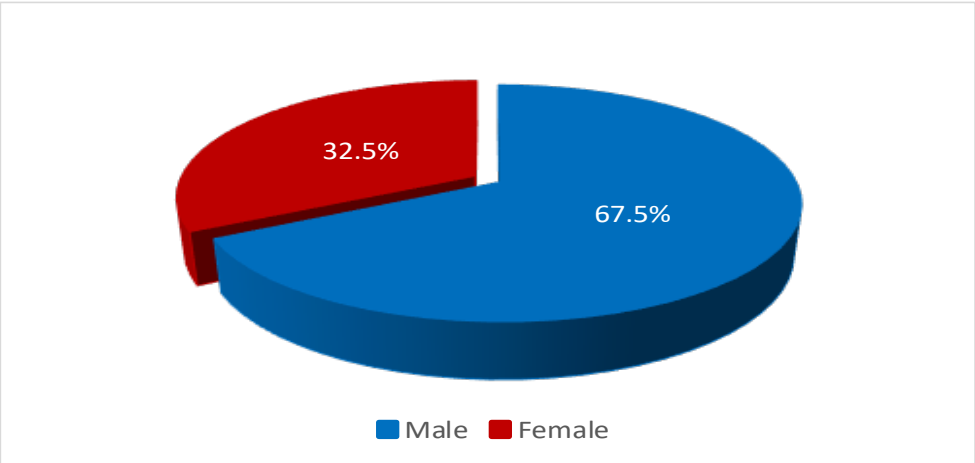


Figure 7.26 Distribution of respondents' gender

Overall, the demographics of the participants were as follows:

- Base: 204 survey respondents; 126 public sector staff and 78 contractors.
- All staff respondents were university-educated. The majority had a civil engineering degree (43.7%), 33% had an electrical engineering degree, 12.7% had a degree in mechanics, and 24.7% had another degree, in fields such as IT, accounting, law and administration.
- Average years of experience: 9 years of project work (33.9% of staff and 49.9% contractors had between 5 and 10 years' experience).
- Place of work: local government 61.9% and federal government 38.1%.
- Gender: 32.5% of the staff were female, 67.5% were male, and all of the contractor respondents were male.

7.4.2 Part Two: Primary Questions

The second part contains the 34 primary questions, which were divided into seven sections, as will be detailed below.

7.4.2.1. Administrative Issues

Table 7.17 explains the average of the means and standard deviation for administrative issues which included seven questions regarding decision-making, administrative routine, and corruption issues. In addition, the effect of delaying decisions and procedures on the time, cost and quality of projects was raised.

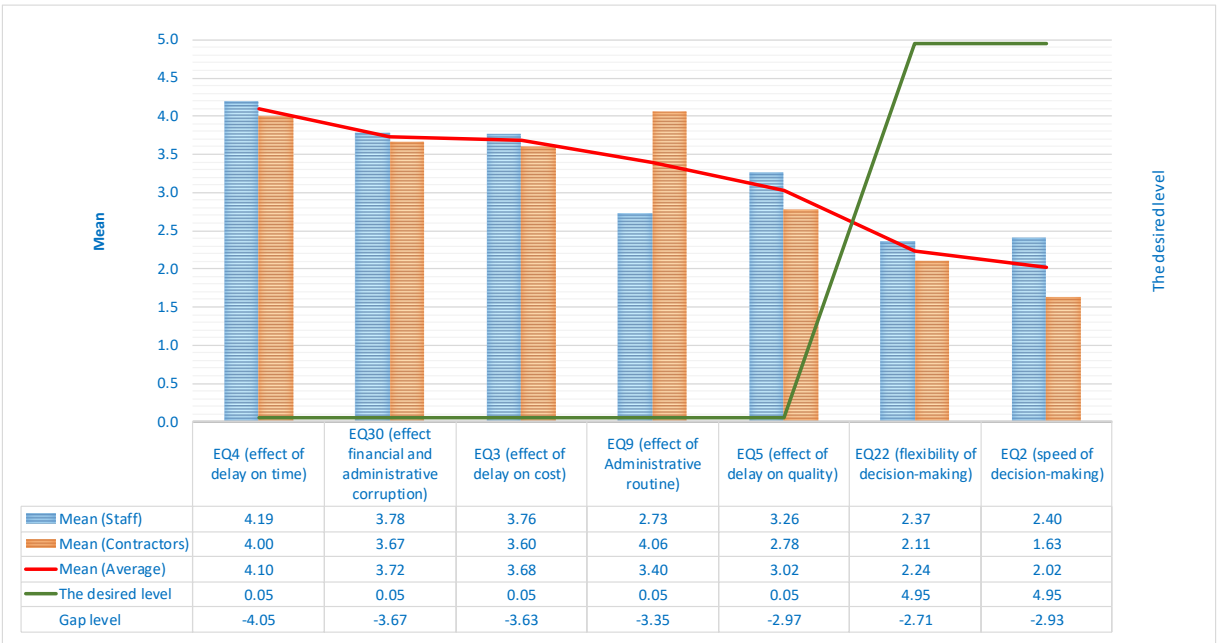
Table 7.17 Average of means and standard deviation for administrative issues

Ques.	Questions	Staff		Contractors		Average		
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Key Issues
EQ4	What is the percentage of the effect of delaying decisions and administrative procedures on the duration of the project?	4.19	0.807	4	0.773	4.095	0.79	Effect of delay on time
EQ30	What is the percentage of financial and administrative corruption in Karbala project management departments?	3.78	0.853	3.67	0.8	3.724	0.827	Corruption
EQ3	What is the percentage of the effect of delaying decisions and administrative procedures on the cost of the project?	3.764	0.93	3.6	0.818	3.683	0.874	Effect of delay on cost
EQ5	What is the percentage of the effect of delaying decisions and administrative procedures on the quality of the project?	3.26	1.021	2.78	0.777	3.021	0.899	Effect of delay on quality
EQ9	What is the percentage of the effect of the administrative routine on Karbala project management?	2.733	0.817	4.06	0.69	3.399	0.754	Administrative routine
EQ2	What is the speed of decision-making procedures by the project management departments during the implementation stages?	2.403	0.7146	1.63	0.584	2.016	0.649	Speed of decision-making
EQ22	What is the flexibility of decision-making taken by the Karbala project management departments?	2.369	0.792	2.11	0.624	2.349	0.751	Flexibility of decision-making

The graph (Figure 7.27) shows the comparison between the average of the means of the answers and the desired level for administrative issues. It is clear from the data that the desired level is far greater than the average of the means of the respondents' answers.

Of the 204 that participated, almost 70% of staff and contractors stated that delaying decisions and procedures has a significant effect on the time, cost and quality of projects. However, with regard to the effect of the administrative routine, there was a clear difference between the views of employees and contractors (2.733 and 4.06 respectively). The average of the means for the speed of decision-making was relatively low amongst both employees and contractors, although it still differed slightly, at 2.369 for employees and 2.11 for contractors.

Overall, the gaps between the means (average) and the desired level remained significant for most questions, which gradually decreased from -4.05 regarding the effect of delaying administrative procedures on the duration of the projects to -2.93 for the speed of decision-making during the implementation stages.



	EQ4 (effect of delay on time)	EQ30 (effect financial and administrative corruption)	EQ3 (effect of delay on cost)	EQ9 (effect of Administrative routine)	EQ5 (effect of delay on quality)	EQ22 (flexibility of decision-making)	EQ2 (speed of decision-making)
Mean (Staff)	4.19	3.78	3.76	2.73	3.26	2.37	2.40
Mean (Contractors)	4.00	3.67	3.60	4.06	2.78	2.11	1.63
Mean (Average)	4.10	3.72	3.68	3.40	3.02	2.24	2.02
The desired level	0.05	0.05	0.05	0.05	0.05	4.95	4.95
Gap level	-4.05	-3.67	-3.63	-3.35	-2.97	-2.71	-2.93

Figure 7.27 Comparison of average of the means and the desired level for administrative issues

7.3.2.2. Organisational issues

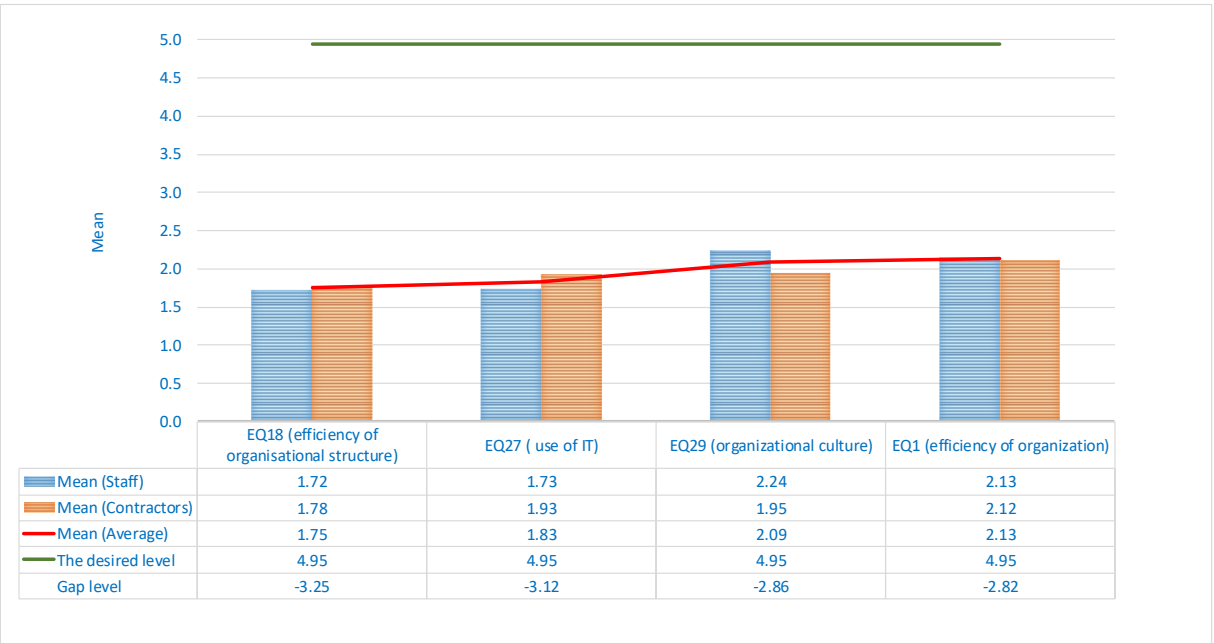
The table below (7.18) gives information about the average of the means and standard deviation for organisational issues. This section included four questions concerning the efficiency of organisation, use of IT, organisational structure and culture.

Table 7.18 Average of mean and standard deviation for organisational issues

Ques.	Question	Staff		Contractors		Average		Key Issues
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
EQ1	What is the efficiency of the organisation of the reconstruction of project management departments in Karbala?	2.13	0.66	2.12	0.711	2.127	0.686	Efficiency of organisation
EQ18	What is the percentage of the efficiency of the relationship and coordination between departments of Karbala project management?	1.72	0.68	1.78	0.7	1.75	0.69	Efficiency of organisational structure
EQ27	What is the percentage of the use of information technology (IT) in Karbala project management departments?	1.726	0.6851	1.93	0.827	1.83	0.756	Use of IT
EQ29	Do you think that all the staff in the Karbala project management are aiming to achieve one goal?	2.236	0.8107	1.95	0.771	2.092	0.791	Organisational culture

The graph (Figure 7.28) offers participants' opinions for four questions concerning the efficiency of organisation, use of IT, organisational structure and culture. The figure also compares the average of the means of the answers and the desired level of the organisational issues. The average of the mean answers for both employees and contractors gradually increased through the questions on organisational structure (1.83) and organisational culture (2.09), then stabilised for the question concerning the efficiency of the organisation (2.13). Furthermore, the figure shows that there are no significant differences between the answers given by employees and contractors.

Overall, there were large gaps between the mean and the target level for most questions, the largest of which was for answers regarding organisational culture (-3.25), while the smallest difference was observed for the efficiency of organisation (-2.82).



	EQ18 (efficiency of organisational structure)	EQ27 (use of IT)	EQ29 (organizational culture)	EQ1 (efficiency of organization)
Mean (Staff)	1.72	1.73	2.24	2.13
Mean (Contractors)	1.78	1.93	1.95	2.12
Mean (Average)	1.75	1.83	2.09	2.13
The desired level	4.95	4.95	4.95	4.95
Gap level	-3.25	-3.12	-2.86	-2.82

Figure 7.28 Comparison of average of the means and the desired level for organisational issues

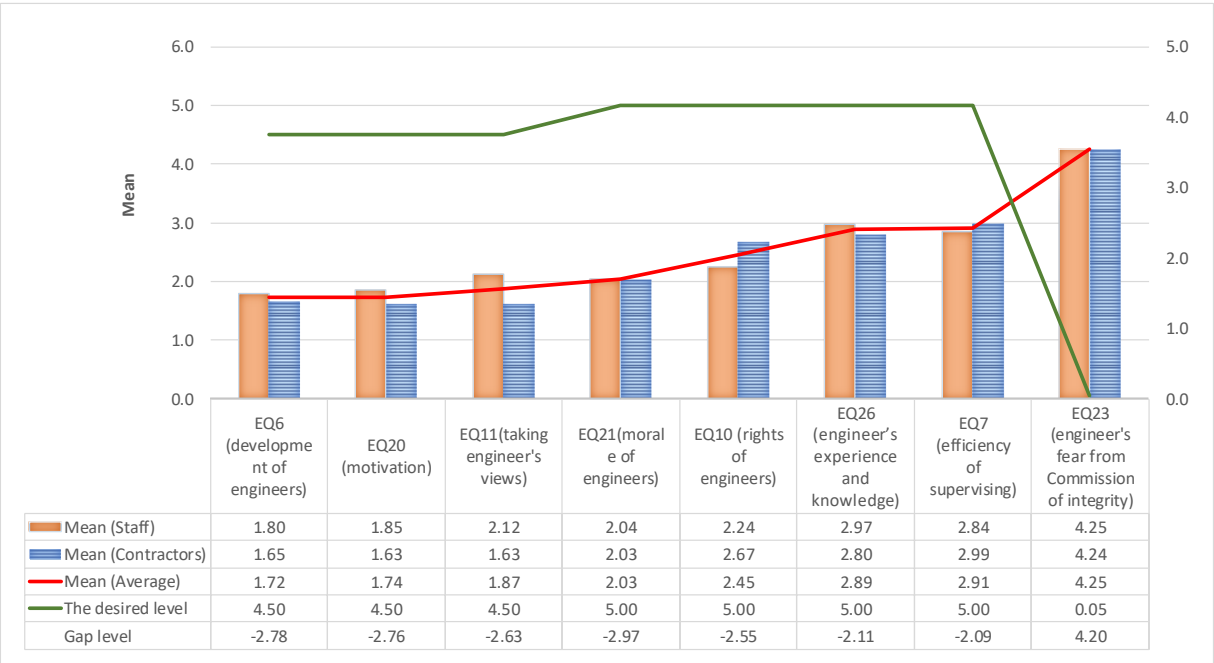
7.4.2.3. Human Resources Issues (engineers and other staff)

Table 7.19 shows the average of the means and standard deviation for engineers and other staff issues. The eight questions covered aspects such as the motivation and development of engineers, shear engineer's views, morale of engineers, rights of engineers, engineers' experience and knowledge and efficiency of supervising. In addition, the engineers' fear with respect to the Commission of Integrity was taken into account.

Table 7.19 Average of the means and standard deviation for engineers and other staff issues

Ques.	Questions	Staff		Contractors		Total		Key Issues
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
EQ6	What is the percentage of the opportunities available to train and develop the knowledge and skills of engineers?	1.8	0.78	1.65	0.619	1.72	0.7	Development of engineers
EQ20	What is the percentage of the stimulus and encouragement of creativity for engineers by Karbala project management?	1.85	0.77	1.63	0.758	1.74	0.764	Motivation
EQ11	What is the percentage of taking engineers' points of view and suggestions for the development of project management?	2.12	0.796	1.63	0.705	1.87	0.75	Taking engineers' views
EQ21	What is the percentage of the morale of engineers concerning the current state of project management in Karbala?	2.04	0.674	2.03	0.581	2.03	0.627	Morale of engineers
EQ10	What is the percentage of the rights given to engineers from the departments?	2.24	0.915	2.67	0.75	2.45	0.833	Rights of engineers
EQ26	What is the percentage of experience and knowledge of the engineers?	2.97	0.799	2.8	0.684	2.89	0.742	Engineers' experience and knowledge
EQ7	What is the efficiency of the supervision of engineers?	2.84	0.697	2.99	0.674	2.91	0.686	Efficiency of supervision
EQ23	What is the percentage of the impact on the project resulting from engineers' fear of the Commission of Integrity and Judiciary?	4.25	0.819	4.24	0.825	4.25	0.822	Engineers' fear of Commission of Integrity

The graph (Figure 7.29) shows the percentage difference between the average of the means with respect to the answers versus the desired level for engineers and other staff issues. Overall, the desired level is far greater than the average of the mean answers given by respondents, with a difference of about -2.55. For the question concerning engineers' fear of the Commission of Integrity, there was a particularly significant difference, equal to -4.2 of the mean answers of the respondents. Additionally, in this part, there was no significant difference between the average answers given by employees and contractors for most of the questions.



	EQ6 (development of engineers)	EQ20 (motivation)	EQ11(taking engineer's views)	EQ21(morale of engineers)	EQ10 (rights of engineers)	EQ26 (engineer's experience and knowledge)	EQ7 (efficiency of supervising)	EQ23 (engineer's fear from Commission of integrity)
Mean (Staff)	1.80	1.85	2.12	2.04	2.24	2.97	2.84	4.25
Mean (Contractors)	1.65	1.63	1.63	2.03	2.67	2.80	2.99	4.24
Mean (Average)	1.72	1.74	1.87	2.03	2.45	2.89	2.91	4.25
The desired level	4.50	4.50	4.50	5.00	5.00	5.00	5.00	0.05
Gap level	-2.78	-2.76	-2.63	-2.97	-2.55	-2.11	-2.09	4.20

Figure 7.29 Comparison of average of the means and the desired level for engineers' issues

7.4.2.4. Sustainability Issues of Karbala Project Management

Table 7.20 compares the mean of responses concerning sustainability issues of Karbala project management, including preserving the environment, reducing energy consumption and the use of clean energy, and improving the health of citizens, in addition to reducing costs and finding alternatives.

Table 7.20 Average of the means and standard deviation for sustainability issues

Q. No.	Questions	Staff		Contractors		Total		Key Issues
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
Q14	What is the percentage of participation of Karbala project management in preserving the environment?	1.94	0.735	1.87	0.779	1.9	0.757	Environment
Q15	What is the percentage of participation of Karbala project management in reducing energy consumption and the use of clean energy?	1.82	0.76	1.77	0.867	1.8	0.813	Clean energy
Q16	What is the percentage of participation of Karbala project management in improving the health of citizens?	2.06	0.883	2.18	0.849	2.12	0.866	Health
Q17	What is the percentage of participation of Karbala project management in reducing the cost of projects and finding alternatives in order to provide better services for citizens?	2.03	0.779	1.97	0.789	2	0.784	Reducing costs
Average		1.96	0.79	1.95	0.82	1.96	0.81	

The line graphs in Figure 7.30 show the average of the means of the answers and the desired level for sustainability issues of Karbala project management for both respondent categories (employees and contractors). In general, the gap remains consistent for all questions, with an average of -2.30. It is clear that reducing energy consumption and the use of clean energy was the smallest gap (1.80). Nevertheless, improving the health of citizens had the highest average (2.12). As a result, according to the respondents' views, interest in sustainability issues appears to be very low in Karbala project management.

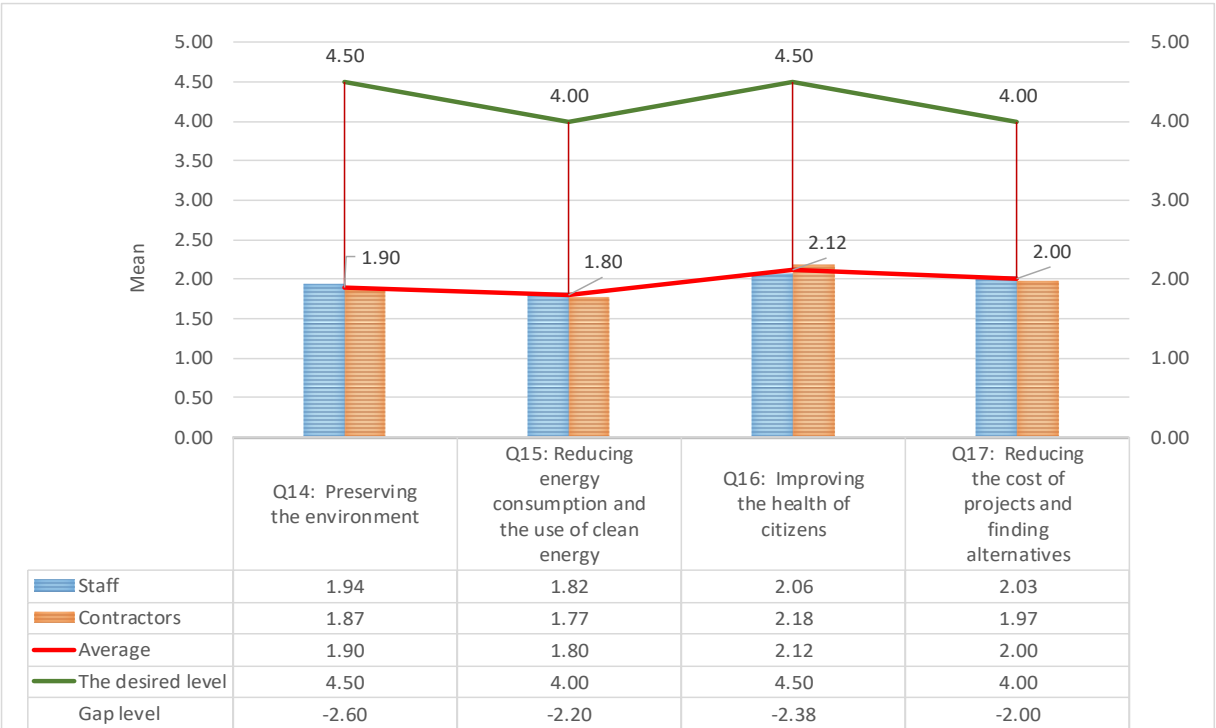


Figure 7.30 Comparison of average of means and the desired level for sustainability issues

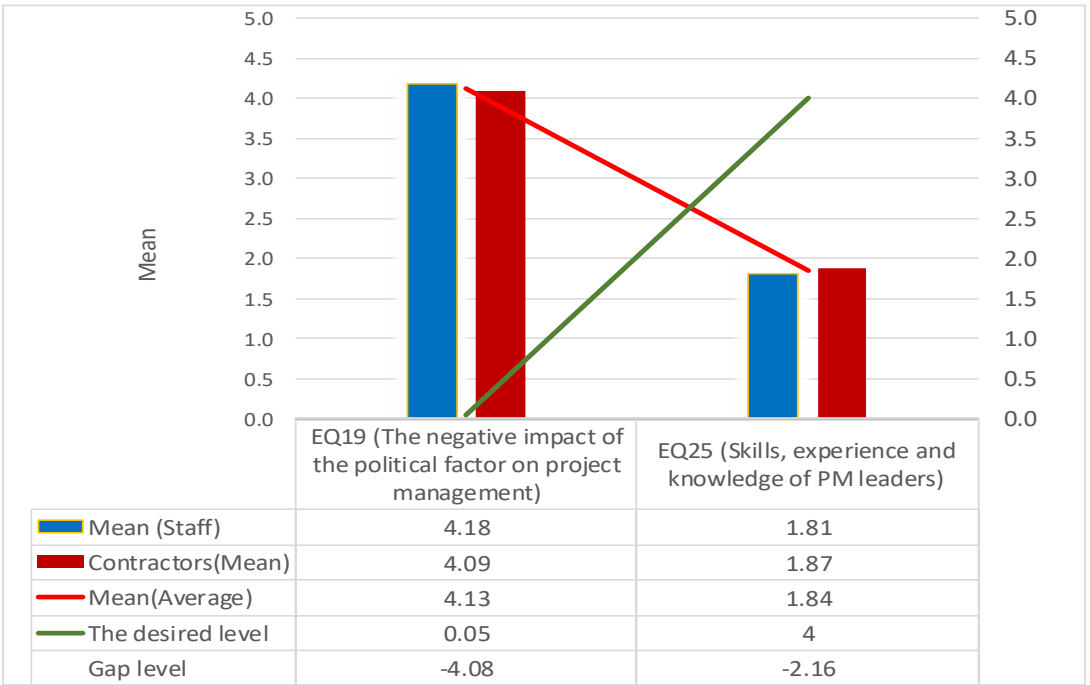
7.4.2.5 Effect of Political Factor, Leaders' Knowledge and Experience

Table 7.21 indicates the mean of responses relating to the negative impact of the political factor on project management, knowledge and experience of Karbala project management leaders.

Table 7.21 Average of means and standard deviation for the effect of political factor on leaders' knowledge and experience

Ques.	Questions	Staff		Contractors		Average		Key Issues
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
EQ19	What is the percentage of the negative impact of the political factor on project management? (e.g. choice of leaders and managers)	4.18	0.8	4.09	0.1	4.13	0.45	Effect of political factor
EQ25	What is the percentage of skills, experience and knowledge of Karbala project management leaders?	1.81	0.77	1.87	0.1	1.84	0.43	Leaders' experience and knowledge

Figure 7.31 illustrates the comparison between the average of the means of the answers and the desired level for the political factor, knowledge and experience of leaders. It is clear from the data that the desired level is far higher than the average of the means of the respondents' answers. According to the responses of participants from both categories (employees and contractors), it can be seen that not only is there a sizeable negative effect of political leaders on the organisation and management of projects in Karbala (4.13), but that they also lack sufficient knowledge and experience to manage the projects (1.84).



	EQ19 (The negative impact of the political factor on project management)	EQ25 (Skills, experience and knowledge of PM leaders)
Mean (Staff)	4.18	1.81
Contractors(Mean)	4.09	1.87
Mean(Average)	4.13	1.84
The desired level	0.05	4
Gap level	-4.08	-2.16

Figure 7.31 Comparison of the average of the means and the desired level for effect of political factor, leaders' knowledge and experience

7.4.2.6. Contracts and Legislation Issues

Table 7.22 gives information about the mean and standard deviation of the responses for five questions regarding contracts and legislation.

Table 7.22 Average of means and standard deviation for contracts and legislation issues

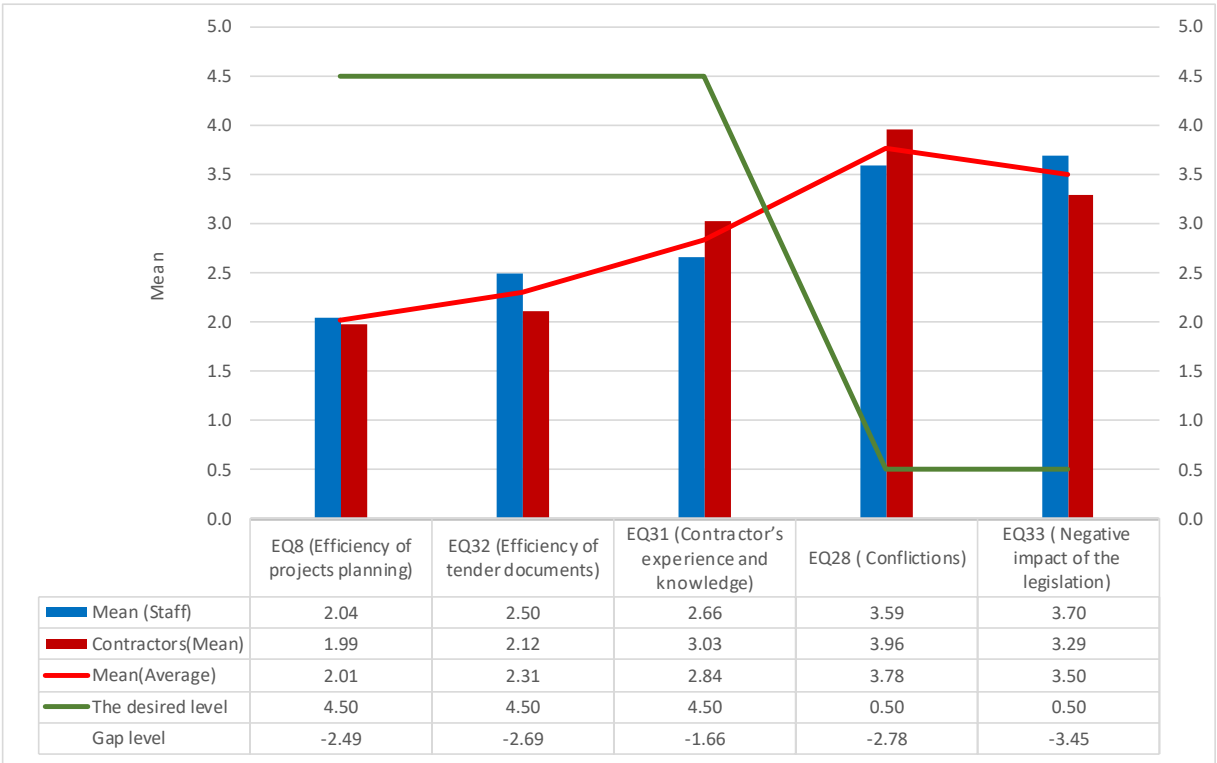
No.	Questions	Staff		Contractors		Average		Key Issues
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
EQ8	What is the efficiency of project planning before contracting?	2.04	0.7	1.99	0.09	2.01	0.39	Efficiency of project planning
EQ31	What is the percentage of experience and knowledge of contractors?	2.66	0.72	3.03	0.08	2.84	0.4	Contractors' experience and knowledge
EQ32	What is the efficiency of tender documents of projects before contracting?	2.5	0.87	2.12	0.08	2.31	0.48	Efficiency of tender documents
EQ28	What is the percentage of conflicts between individuals and agencies responsible for managing projects in Karbala province?	3.59	0.92	3.96	0.09	3.78	0.51	Conflict
EQ33	What is the percentage of the negative impact of Iraqi legislation and laws on Karbala project management?	3.7	0.84	3.29	0.08	3.5	0.46	Negative impact of legislation

The line graphs in Figure 7.32 show the average of the means of the answers and the desired level of contracts and legislation issues of Karbala project management for both respondent categories.

Looking at the planning stage first, the respondents indicated that efficiency of planning was extremely weak (2.01). Furthermore, the efficiency of tender documents, contractors' experience and knowledge were also considered to be weak (2.31 and 2.84 respectively). Weaknesses deriving from conflict and legislative issues were fairly high, at 3.78 and 3.50 respectively.

Overall, the desired level is far above the average of the mean answers, with a difference of about -2.61. However, for the answers concerning the contractors' experience and knowledge,

the gap was lower than the other answers (-1.66). Conversely, the highest gap was observed in the answers concerning legislative weakness, at about -3.45. Generally, in most of the questions in this section, there was a slight difference between the average answers given by employees and



	EQ8 (Efficiency of projects planning)	EQ32 (Efficiency of tender documents)	EQ31 (Contractor's experience and knowledge)	EQ28 (Conflictions)	EQ33 (Negative impact of the legislation)
Mean (Staff)	2.04	2.50	2.66	3.59	3.70
Contractors(Mean)	1.99	2.12	3.03	3.96	3.29
Mean(Average)	2.01	2.31	2.84	3.78	3.50
The desired level	4.50	4.50	4.50	0.50	0.50
Gap level	-2.49	-2.69	-1.66	-2.78	-3.45

contractors.

Figure 7.32 Comparison of average of the means and the desired level for contracts and legislation issues

7.4.2.7. Citizens' Satisfaction, Quality of Projects, Strengths and Weaknesses

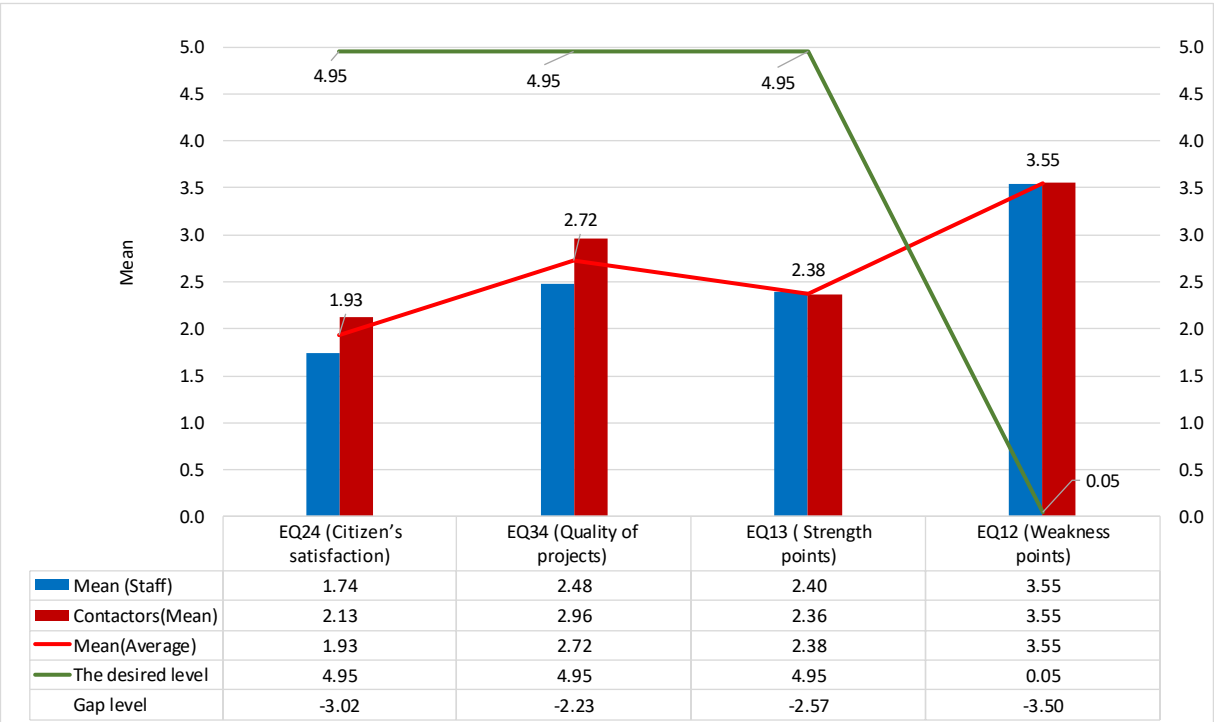
Table 7.23 illustrates the mean and standard deviation of the responses to this part of the questionnaire, which includes four questions about residents' satisfaction, quality, and strengths and weaknesses of Karbala project management.

Table 7.23 Average of the means and standard deviation for citizens' satisfaction, quality of projects, and strengths and weaknesses

No.	Questions	Staff		Contractors		Average		Key Issues
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
EQ24	What is the percentage of citizens' satisfaction with reconstruction projects in Karbala?	1.74	0.68	2.13	0.1	1.93	0.39	Citizens' satisfaction
EQ34	What is the percentage of the quality of projects implemented in Karbala during the last 4 years?	2.48	0.69	2.96	0.08	2.72	0.38	Quality of projects
EQ12	What is the percentage of weaknesses in Karbala project management?	3.55	0.84	3.55	0.09	3.55	0.47	Weaknesses of project management
EQ13	What is the percentage of strengths in Karbala project management?	2.4	0.71	2.36	0.1	2.38	0.41	Strengths of project management

Figure 7.33 shows the average of the means of the answers and the desired level for both respondent categories.

No significant variation was observed by category of respondents. The density of the gap between the mean and the desired level remained at a similar level for both questions; the quality of projects had increased according to the contractors' opinions, but had decreased in the employees' answers.



	EQ24 (Citizen's satisfaction)	EQ34 (Quality of projects)	EQ13 (Strength points)	EQ12 (Weakness points)
Mean (Staff)	1.74	2.48	2.40	3.55
Contactors(Mean)	2.13	2.96	2.36	3.55
Mean(Average)	1.93	2.72	2.38	3.55
The desired level	4.95	4.95	4.95	0.05
Gap level	-3.02	-2.23	-2.57	-3.50

Figure 7.33 Comparison of the average of the means and the desired level for efficiency, quality of projects, and strengths and weaknesses

7.4.2.8 Summary of Staff and Contractors' Questionnaire Analysis

To enable us to gain a better understanding of respondents' views, the gap level was adopted as a basis to list the top ten results in order to show a clear pattern of priority. These results are listed in the following table (7.24):

Table 7.24 Top ten results of staff and contractors' questionnaire

Rank	Question code	Mean (Staff)	Mean (Contractors)	Mean (Average)	The desired level	Gap level	Issues
1	EQ23 (Engineers' fear of Commission of Integrity)	4.25	4.24	4.25	0.05	-4.2	Human resources
2	EQ19 (Negative impact of the political factor on project management)	4.18	4.09	4.13	0.05	-4.08	Politics
3	EQ4 (Effect of delaying decisions and administrative procedures on time)	4.19	4	4.1	0.05	-4.05	Administrative
4	EQ30 (Effect of financial and administrative corruption)	3.78	3.67	3.72	0.05	-3.67	Administrative
5	EQ3 (Effect of delaying decisions and administrative procedures on cost)	3.76	3.6	3.68	0.05	-3.63	Administrative
6	EQ33 (Negative impact of legislation)	3.7	3.29	3.5	0.5	-3.45	Contracts and legislation
7	EQ9 (Effect of administrative routine)	2.73	4.06	3.4	0.05	-3.35	Administrative
8	EQ18 (Efficiency of organisational structure)	1.72	1.78	1.75	4.95	-3.25	Organisational
9	EQ27 (Use of IT)	1.73	1.93	1.83	4.95	-3.12	IT
10	EQ24 (Citizens' satisfaction)	1.74	2.13	1.93	4.95	-3.02	Citizens' satisfaction

- Engineers' fear of the Commission of Integrity (Rank 1) yielded the highest score of all human resources issues. This factor was ranked the highest across both respondent categories.
- The negative impact of the political factor on the recruitment of unqualified leaders and department managers of Karbala project management (Rank 2).
- Effect of delaying decisions and administrative procedures on the duration of projects (Rank 3), followed by the effects of financial and administrative corruption (Rank 4). These were followed by the effects of delaying decisions and administrative procedures on cost (Rank 5), as the highest-scoring concerns among administrative issues.
- Negative impact of legislation, administrative routine, efficiency of organisational

structure, use of IT and citizen satisfaction occupied the ranks of six to ten respectively.

7.5 Summary

This chapter has focused on quantitative data analysis, and has presented the analysis of residents, staff and contractors' questionnaires. The aim of this data analysis was determining the beneficiaries and practitioners' perception of Karbala projects and the impact of various factors on the outcome of projects. These questionnaires were analysed with a view to identifying the most important factors which contribute to the deterioration of the results of reconstruction projects in the province of Karbala. The main findings of the investigation were summarised in each section. The next chapter will present qualitative data analysis of staff personal interviews and focus-group interviews.

Chapter 8 : Qualitative Data Analysis

8.1 Introduction

This chapter is designated for analysis of the qualitative data collected from the interviews, beginning with that gathered from the personal interviews with staff. The aim of these interviews was to explore current organisational structures and processes, responsibilities, relevant authorities, and the types and sizes of completed projects, as well as the main problems and obstacles perceived by department managers in the directorates contributing to KPM. The analysis of the interview transcripts will then be presented in the form of tables and charts.

Focus-group interview analysis was also conducted using the Statistical Package for the Social Sciences (SPSS) software. The group interviews were conducted with 50 clients, consultants and contractors. The motivation for conducting semi-structured group interviews was to identify the effect of a variety of factors on the time, cost and quality of projects implemented in the Karbala region. The results of the quantitative data analysis will show the reality of project management in the province of Karbala in terms of its organisational processes and the most important factors affecting the results of the projects.

8.2 Staff Personal Interviews (Qualitative Interviews)

The first step in a series of data collection and analysis for the purposes of this study consisted of personal interviews with several managers who represent the major shareholders in KPM. This section analyses the data recorded from semi-structured interviews with these participants. The objective of the interviews was to identify current organisational structures and

processes, aspects concerning the nature of completed projects, and the principal hindrances perceived by respondents, as outlined previously.

In terms of the exploration process, the purpose of the interviews was intended as a technique with which to identify conventional processes in KPM. To this end, the questions in the interviews focused on the organisational situation in which the staff carry out their work, the limitations of their authority, and their role in KPM. In this part of the data analysis, the researcher did not intend to separate the interviews and their analysis into particular case studies, as the analyses of the interviews was then merged and contributed to the identification of generic themes. In other words, the analysis of these interviews is seen as a complementary technique used to develop the next stage of data analysis, thus functioning as a preliminary method; the interviews can also be seen as functioning as an exploratory stage of the research (see Figure 6.6).

During the first phase of data collection, 30 personal interviews were carried out. Details of the interviewees can be seen in Table 8.1. The guideline followed for semi-structured interviews can be found in Appendix 2.

Table 8.1 Details of interviewees

No.	Date	Time	Location	Current Job	Specialisation	Organisation Name	LG or FG	General Experience (years)	Experience in PM (years)
1	07/12/2014	13:30	His office	HoPD	Civil Engineering	The City Centre Municipality Directorate	FG	15	12
2	07/12/2014	10:15	His office	HoPD	Civil Engineering	The Outside City Centre Municipal Directorate	FG	12	8
3	08/12/2014	11:45	His office	HoPD	Mechanical Engineering	Water Directorate	FG	20	15
4	08/12/2014	09:45	His office	HoPD	Mechanical Engineering	Sewage Directorate	FG	16	12
5	10/12/2014	12:30	His office	HoPD	Civil Engineering	Planning and Follow-up Directorate	FG	22	12
6	11/12/2014	14:30	His office	HoPD	Architectural Engineering	Urban Planning Directorate	FG	26	22
7	10/12/2014	13:30	His office	HoPD	Electrical Engineering	Public Health Directorate	FG	22	16
8	12/12/2014	11:45	His office	HoPD	Civil Engineering	Roads and Bridges Directorate	FG	22	20
9	11/12/2014	10:15	His office	HoPD	Civil Engineering	Buildings Directorate	FG	28	25
10	14/12/2014	12:45	His office	HoPD	Civil Engineering	Construction Laboratories Directorate	FG	22	12
11	14/12/2014	09:45	His office	HoPD	Civil Engineering	School Buildings Directorate	FG	12	10
12	15/12/2014	14:30	His office	HoPD	Electrical Engineering	National Electricity Directorate	FG	23	14
13	16/12/2014	10:15	His office	HoPD	Communication Engineering	Communications Directorate	FG	18	8
14	17/12/2014	12:30	His office	HoD	Civil Engineering	Department of Municipal Projects (KPM)	LG	10	7
15	16/12/2014	13:30	His office	HoD	Civil Engineering	Department of Road Projects (KPM)	LG	8	6
16	18/12/2014	12:30	His office	HoD	Electrical Engineering	Department of Health Projects (KPM)	LG	7	5
17	15/12/2014	11:45	His office	HoD	Civil Engineering	Department of School Buildings Projects (KPM)	LG	12	6
18	21/12/2014	12:30	His office	HoD	Mechanical Engineering	Department of Water and Sewer Projects (KPM)	LG	7	6
19	17/12/2014	09:45	His office	HoD	Electrical Engineering	Department of Electricity and Telecom. Projects (KPM)	LG	8	6
20	18/12/2014	10:15	His office	HoD	Mechanical Engineering	Department of Direct Implementation Projects (KPM)	LG	15	4
21	21/12/2014	14:30	His office	HoD	Civil Engineering	Department of Planning and Follow-up (KPM)	LG	26	20
22	22/12/2014	11:45	His office	HoD	Civil Engineering	General Contracting Department (KPM)	LG	27	22
23	24/12/2014	13:30	His office	HoC	Electrical Engineering	Opening and Evaluation Tendering Committees (KPM)	LG	22	12
24	23/12/2014	12:30	His office	HoD	Accounting	Control and Auditing Department (KPM)	LG	27	6
25	24/12/2014	09:45	His office	HoD	Civil Engineering	Engineering Department (KPM)	LG	8	6
26	02/12/2014	12:30	His office	HoD	Legal	Legal Department (KPM)	LG	12	2
27	03/12/2014	13:30	His office	HoD	Administration	Human Resources Department (KPM)	LG	6	1
28	22/12/2014	14:30	His office	AG	Civil Engineering	Assistant Governor of Technical Affairs (KPM)	LG	12	6
29	23/12/2014	10:15	His office	AG	Accounting	Assistant Governor of Account Affairs (KPM)	LG	27	6
30	04/12/2014	11:45	His office	HoPD	Mechanical Engineering	Reconstruction Committee (PC)	LG	7	6

Assistant Governor = AG Head of Department = HoD Head of Projects Department = HoPD Head of Committee = HoC Local Government = LG Federal Government = FG

8.2.1. General Participant Information

As mentioned in chapter 3 (Methodology), all participants chosen for these interviews were implementing public government projects – as such, the manager in these projects was part of a government organisation. Interviews were conducted with 30 government managers, of which 17 were from LG and 13 were from FG. As shown in Figure 8.1, most of them were directorates or department managers of local government and federal agencies in the Holy City of Karbala. The pie chart below shows the distribution of the participants according to their personal information.

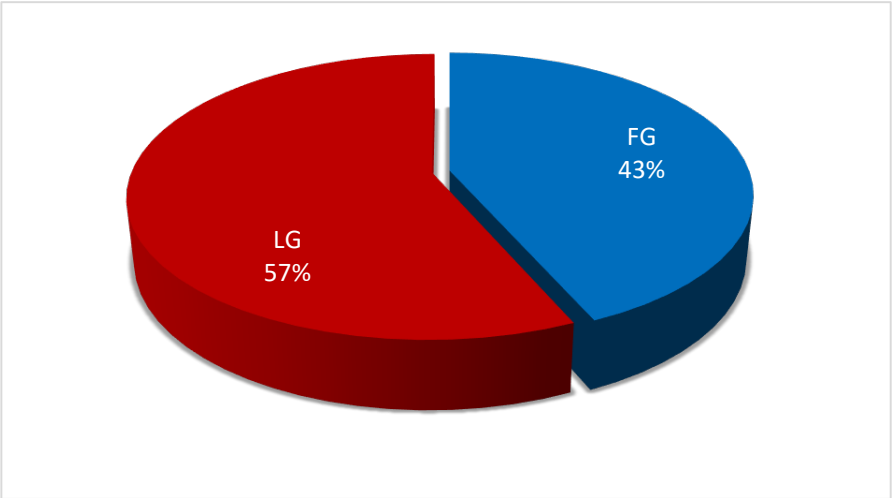


Figure 8.1 Workplace of interviewees

8.2.1.1 Distribution of Interviewees by Specialisation

Table 8.2 illustrates the specialisation of interviewees. 86.7% are engineers; civil, electrical, mechanical and architectural engineers represent 46.7%, 20%, 16.7% and 3.3% of the population sample respectively. The remaining 13.3% comprise administrators, legal professionals and accountants.

Table 8.2 Distribution of interviewees by specialisation

Specialisation	Frequency	Percentage	Cumulative %
Civil Engineering	14	46.70%	46.70%
Electrical Engineering	6	20.00%	66.70%
Mechanical Engineering	5	16.70%	83.30%
Architectural Engineering	1	3.30%	86.70%
Administration, Accounting & Law	4	13.30%	100.00%
Total	30	100.00%	

8.2.1.2 Distribution of Interviewees by Years of Experience

The bar chart in Figure 8.2 shows that federal government employees have more experience than local government employees in terms of both general expertise and experience in PM, with an average of 20 years of general experience and 14 years in project management. By comparison, the average number of years of general experience held by LG managers was 14, and only 7 years in the PM field.

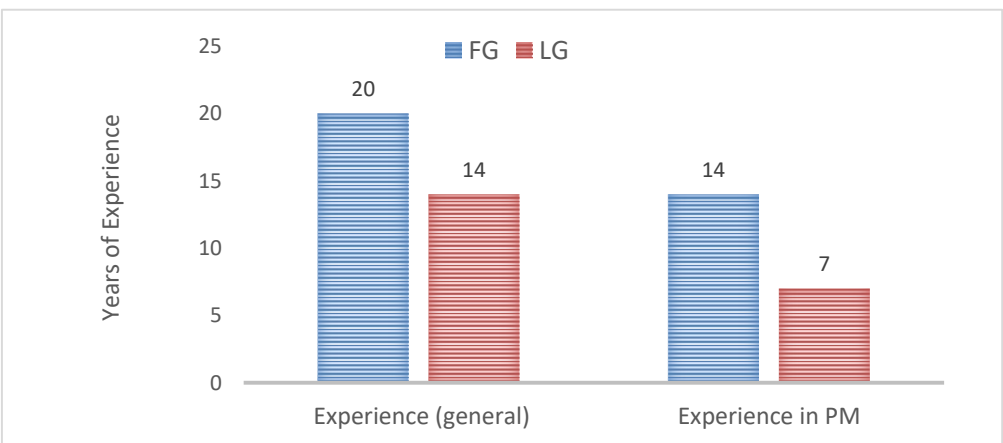


Figure 8.2 Distribution of interviewees by years of experience

8.2.2 Analysis of Staff Personal Interview Questions

The interview questions related to Regional Development (RD) projects in the Holy Province of Karbala were as below:

Q1. What is the organisational structure of your department?

Q2. What are the processes of project management in your department?

Q3. What are the duties and responsibilities of your department?

Q4. What authority do you have?

Q5. What type and size of projects are under your responsibility?

Q6. What are the main problems and obstacles that you face?

8.2.2.1 Organisational Structure, Responsibilities and Authority Analysis

By 2009, the Provincial Powers Act became Law 21. This Parliamentary Act decentralised authority over the functions of: 1. Regional planning; 2. Budgeting; 3. Delivery monitoring and; 4. Organisational development, devolving authority to LG. Previously, when these functions were controlled by the central government, there was no local control over regional planning, government contracts or public funds - all of these functions were performed by the central government. This situation meant that there was no local monitoring, valuation or control over local reconstruction projects and service delivery issues until the implementation of Law 21.

The Project Management Directorate of Regional Development in the Holy Province of Karbala (henceforth referred to as KPM) was established in 2006, at the same time as each of Iraq's provinces received this devolved level of control. KPM’s organisational structure and its divisions are in most part like the directorates for project management of regional development in Iraq’s other provinces. Some of the key conditions which relate to KPM in the same way as in other provinces include:

1. The budget is allocated annually by FG for regional development in proportion to the population of each province and its degree of importance.
2. Commitment to the laws, legislation and instructions issued by FG relating to managerial, financial and technical aspects is required.
3. Planning and implementation of infrastructure and service projects for local areas located within the administrative boundaries of each province fall under their own jurisdiction.
4. Engagement and coordination with central federal agencies is expected.
5. The directorate staff is comprised of political leaders and local professionals.

Karbala Province's Local Administration organisational structure consists of 950 employees organised into 18 'Departments' and 7 District Offices. Each of the 18 Departments is placed within one of six Divisions. All Departments and District Offices are managed by Karbala's Governor. However, Karbala's Governor operates under the supervision of the Karbala Provincial Council (PC). The Governor has direct-line authority over 2 Deputy Governors, 5 Assistant Governors, 7 Governor's Consultants, and 13 Departments, as outlined in Table 8.3 below.

Table 8.3 Levels of Management

Levels of Management	Quantity	Position	Functional Class	Total
1st Level Manager	1*	Governor	Deputy Minister	1
2nd Level Manager	1	Governor's Office	Manager	33
	2*	Deputy Governor	Director General	
	3	Town Manager	Director General	
	4	District Manager	Deputy Director General	
	5*	Assistant Governor	Deputy Director General	
	7*	Governor's Consultants	Deputy Director General	
	11	Head of the Department	Manager	
3rd Level Manager	28	Manager of the Division	Deputy Manager	28
Total				62
* Law 21 (Provincial Powers Act, 2008)				

As the Deputies and District Managers of Karbala's Governor are subject to appointment and removal by the Karbala Provincial Council or through a change every election cycle (every 4 years), it was essential that this examination should focus on two levels within the organisation directly or indirectly related to the province's projects and management. These two levels should be deemed necessary for increasing the potential for effective, efficient, and sustainable change, even through a period of turnover in senior management. This organisational evaluation focused on the following levels of management clarified in the following table.

Iraqi legislation grants significant exclusive authority to a governor (Iraqi Parliament, 2008), and considers this individual to be the highest executive authority in the province. Examples of the administrative and technical responsibilities typically granted to the governor are as follows:

1) Submission of an annual reconstruction plan to the provincial council for approval.
2) Announcement of tenders, approval of referrals and signing of contracts with contractors.
3) Approval of contracting workers, technicians, engineers and consultants.
4) Adjudicating on complaints made by contractors, suppliers and consultants regarding the decisions issued by the relevant departments.
5) Extending the duration of the contracts.
6) Pulling contracted works from the contractor in case of breach of contractual obligations.
7) Approval of changes to or deletion of clauses of tender during implementation.
8) Approval of the transfer of machinery and equipment between projects or work sites.
9) Mediating contractual issues with technicians and specialists.
10) Approval of promotions granted to employees.
11) Approval of the transfer of staff between projects and work sites.

12) Handling issues related to vocational training programs.

Secondly, the following are the financial powers granted to the governor:

1) Approval to grant the contractor a cash advance.
2) Ability to increase the cost of a contract within the total cost of a project.
3) Interpolation of delay penalties from contractors.
4) Approval of payment for overtime hours, meals and transport expenses for employees.
5) Approval of the purchase of supplies and engineering equipment needed to oversee and audit during the stages of implementation.
6) Approval of the payment of wages.
7) Approval of employee bonuses.

The authority to sell any excess or defective material belonging to the projects. The organisational structure of Karbala Province's Local Administration is shown in Figure 8.3.

Regarding the organisational relationship between the directorates of FG and Karbala's LG, the managers who were interviewed said: "We are working in the directorates affiliated to the general directorates in the Federal Ministries. At the same time, we are working with the LG in regional development projects, according to the specialisation, functions and needs of our directorates". The managers clarified that they did not have any authority relating to regional development projects, where all powers are concentrated at the governor. On the other hand, they confirmed that they had limited powers over routine work performed by their directorates, which were granted by the federal ministries in order to carry out daily work and deliver services to citizens.

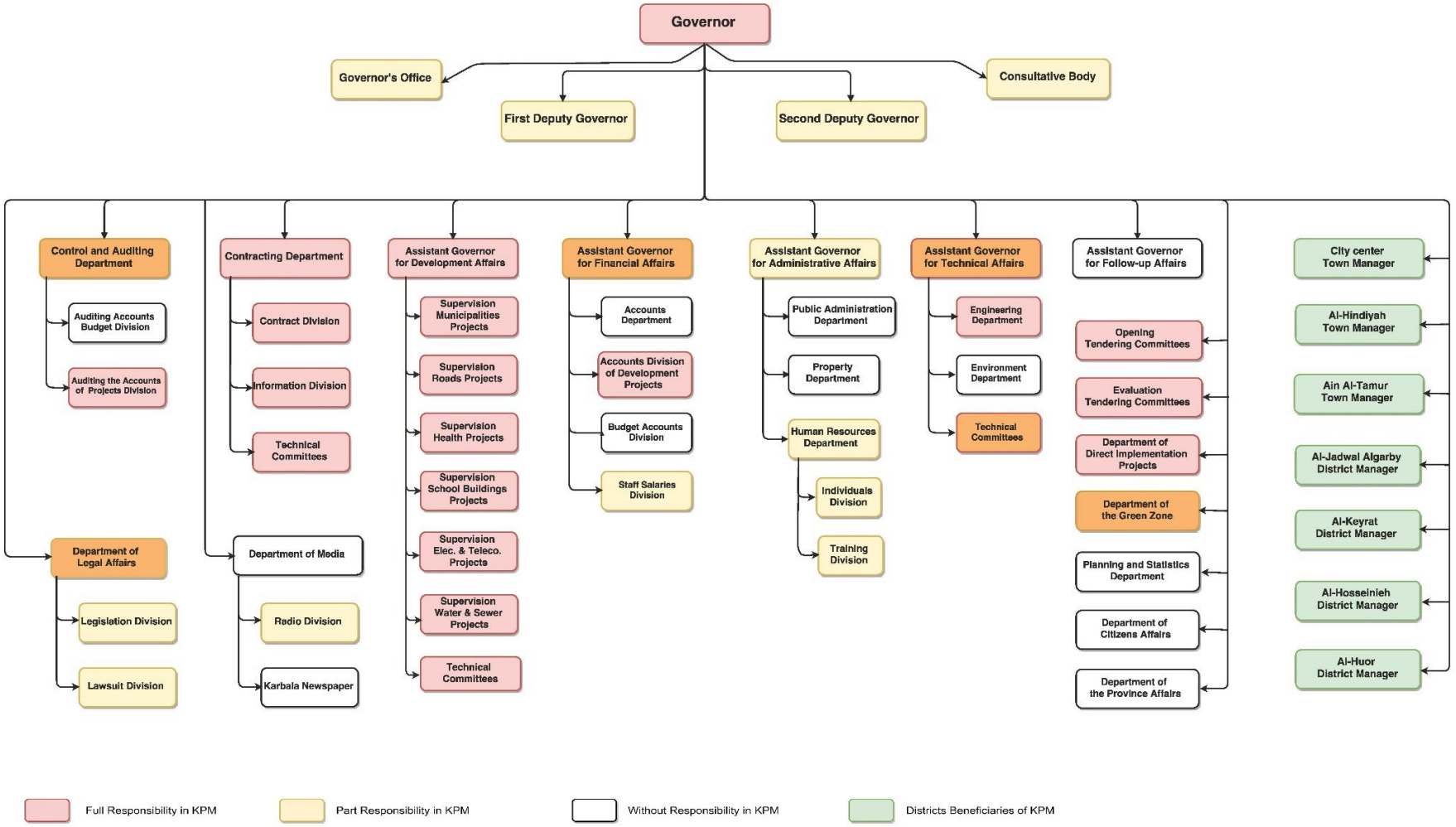


Figure 8.3 Organisational Structure of Karbala Province's Local Administration

As an example, the Sewage Directorate of Karbala is one of the directorates of the Ministry of Municipalities. Firstly, the Ministry prepares and submits an annual list of projects needed by the directorate for the purpose of providing public services to citizens. After approval by the PC for the purpose of inclusion in the annual conservation development plan, the Ministry of Planning is then required to approve the plan. Lastly, at the request of KPM, the directorate nominates an engineer(s) to participate in a supervisory committee or other committees working on the project(s). The majority of directorate managers who were interviewed said, "most of our engineers who are not full-time work in regional development projects, because they have other duties within the context of our directorate".

Regarding the answer to Question 5 (What type and size of RD projects are under your responsibility?), most participants said: "we do not have accurate data based on the projects in which they participated with LG because they are outside of our control, and we are taking part in RD projects only within the specialty of our directorates".

Figure 8.4 illustrates the network of bodies (local and federal) and the nature of the relationship with LG in relation to KPM. The directorates and departments that are involved in the implementation of the regional development plan in the province of Karbala are divided into three categories according to type of authority: the first includes Directorates or Departments that are only under the LG's authority, executive departments (called the Local Administration) that are under the Governor, and the legislative authority (Provincial Council) that is under the Head Council. The second category consists of those Directorates or Departments that are under multiple authorities, typically both LG and FG. The third includes Directorates or Departments that are under the ministries and agencies of the Federal Government's authority.

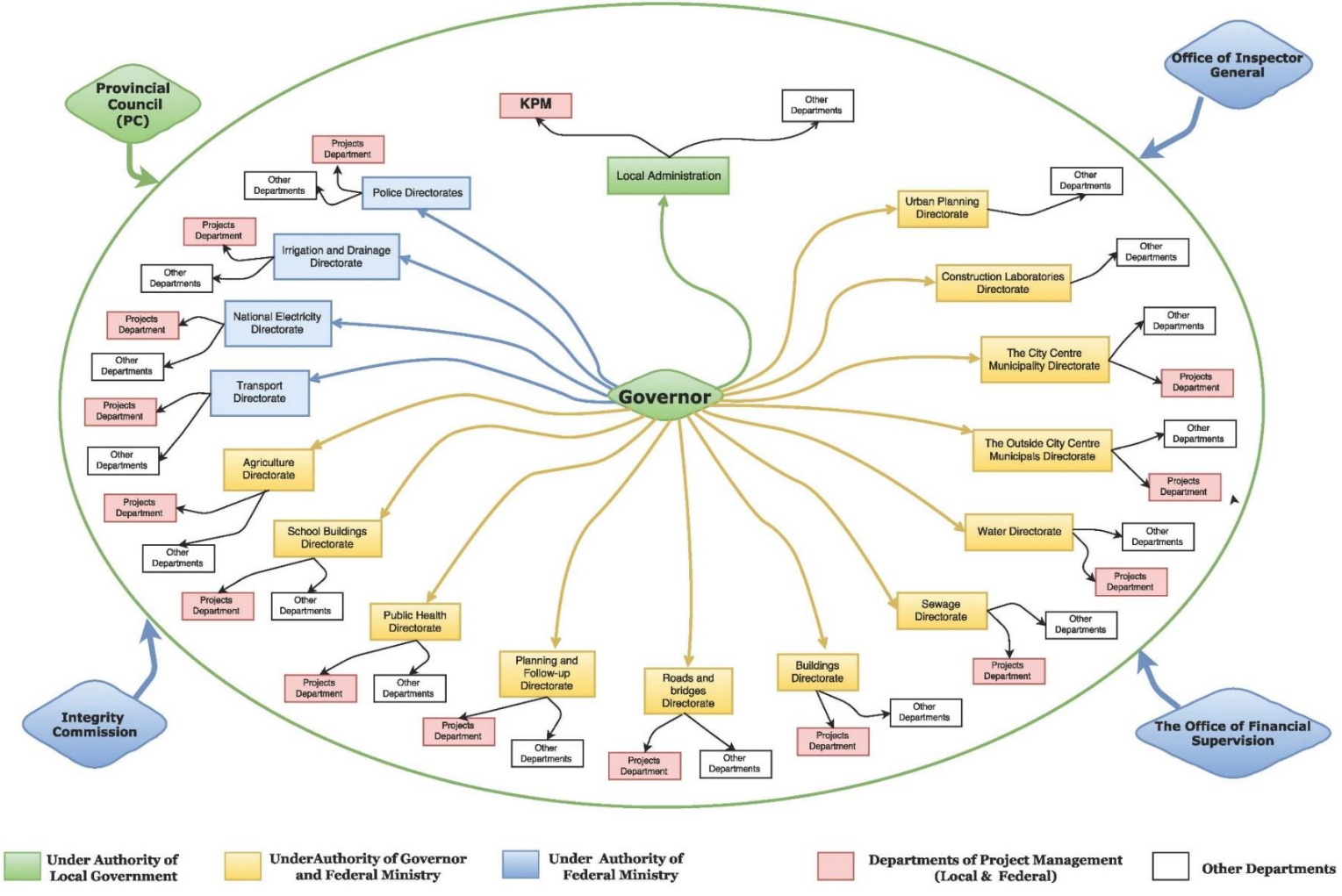


Figure 8.4 The network of KPM bodies and nature of the relationship between local and federal directorates

- **Direct Reports and Span of Control**

The distribution of responsibilities and overall span of control (how many direct reports each manager is responsible for) appears inefficient for both the Karbala Governor and Deputy Governors. Internally, within the organisational structure of Karbala's local administration, the Governor currently has 34 individuals who report directly to him. In addition, externally, he has (at least) 28 Federal Directorates operating within the province which report directly to him. This creates problems up and down the management structure as individuals needed on decision-making are increasingly unavailable for communication and collaboration. Quality of work is threatened, work backlogs and is often left incomplete. Moreover, managers become physically and emotionally overwhelmed (burnt out) over time, regardless of their knowledge, experience and training.

With regard to Karbala's Deputy Governors, the Iraqi legislation did not specify a clear role or authority for them, nor whether their remit should be within the general administration of the province, or regarding project management. On occasion, the governor delegates some of his authorities and functions to them; however, this scenario is usually temporary and fluctuates depending on the political attitudes of their parties.

Importantly, the roles of the Local Administration Departments, Federal Directorates and District Managers, and specifically the functions and authority assignment of these teams need to be re-examined and workflow distributed more effectively.

KPM's organisation has centralised decision-making, structuring it according to a strict hierarchy of authority, where most decisions are made at the top management by the Governor or a few individuals. However, information from lower levels is liable to flow up significantly and

influence the decision-maker. Thus, the employees do not have much discretion over their work and carry out their work based on decisions from senior management.

8.2.2.2 Process and Procedure Analysis

The assessment outlined above highlights a general lack of clarity regarding who performs key processes such as initiation, planning, feasibility analysis, and referral to contractors. It is also as yet unclear as to how these processes are carried out because of the absence of efficient communication and information systems.

Several department managers claim that:

1) Key processes are usually entrusted to one of the federal agencies or local departments in the province, such as municipalities, health or roads and bridges, without a unified management for all processes.
2) There is an overlap in most processes between the roles of the directorates or departments and individuals.
3) They are often expected to perform a variety of finance, planning, implementation, information, and human resource functions without clear guidelines, policies or procedures.
4) The processes are not informed by any standards or guides of global professional bodies.
5) Procedures followed are not written down; rather, they appear to be “legacy” procedures which haven’t been carefully re-evaluated to determine who should perform those functions – or whether the functions themselves need to be changed.
6) There is an absence of a map of key processes which should be viewed both as a method to educate and the means to create policies that lead to effective and efficient performance.

7) When departments were asked about operating procedures (OPs), the overwhelming response reflected that they do use them. But when given a detailed list of financial, HR, planning or supervision functions and asked the same question, the number of departments confirming the presence of OPs dropped dramatically. Too many managers appear to follow an "unwritten" procedure, and written OPs are rarely documented.
8) Several managers are disenfranchised with the current planning and budget process, and some managers are unclear as to what planning functions are required by their directorate, department or district. Managers indicate an ambiguous relationship between directorates and districts when it comes to the annual project-planning process. The planning and budgeting processes are considered by many to be vague, ineffective and in need of improvement.
9) Some managers do not share a common understanding of the planning process and the planning instrument (documents) which guide decision-making. Most managers do not have a written and approved plan. Managers indicate that they plan and have a plan, but most plans are no more than an idea. As they are not comprehensive, they do not guide comprehensive, collaborative decision-making. A comprehensive plan with multiple elements is missing.
10) The degree of complexity and delays in the decision-making process is not consistent with the of the progress schedule of projects. For example, some of the decisions lasted for the duration of the project period.

The flow chart in Figure 8.5 shows the processes and main stages of KPM within the life cycle of decision-making.

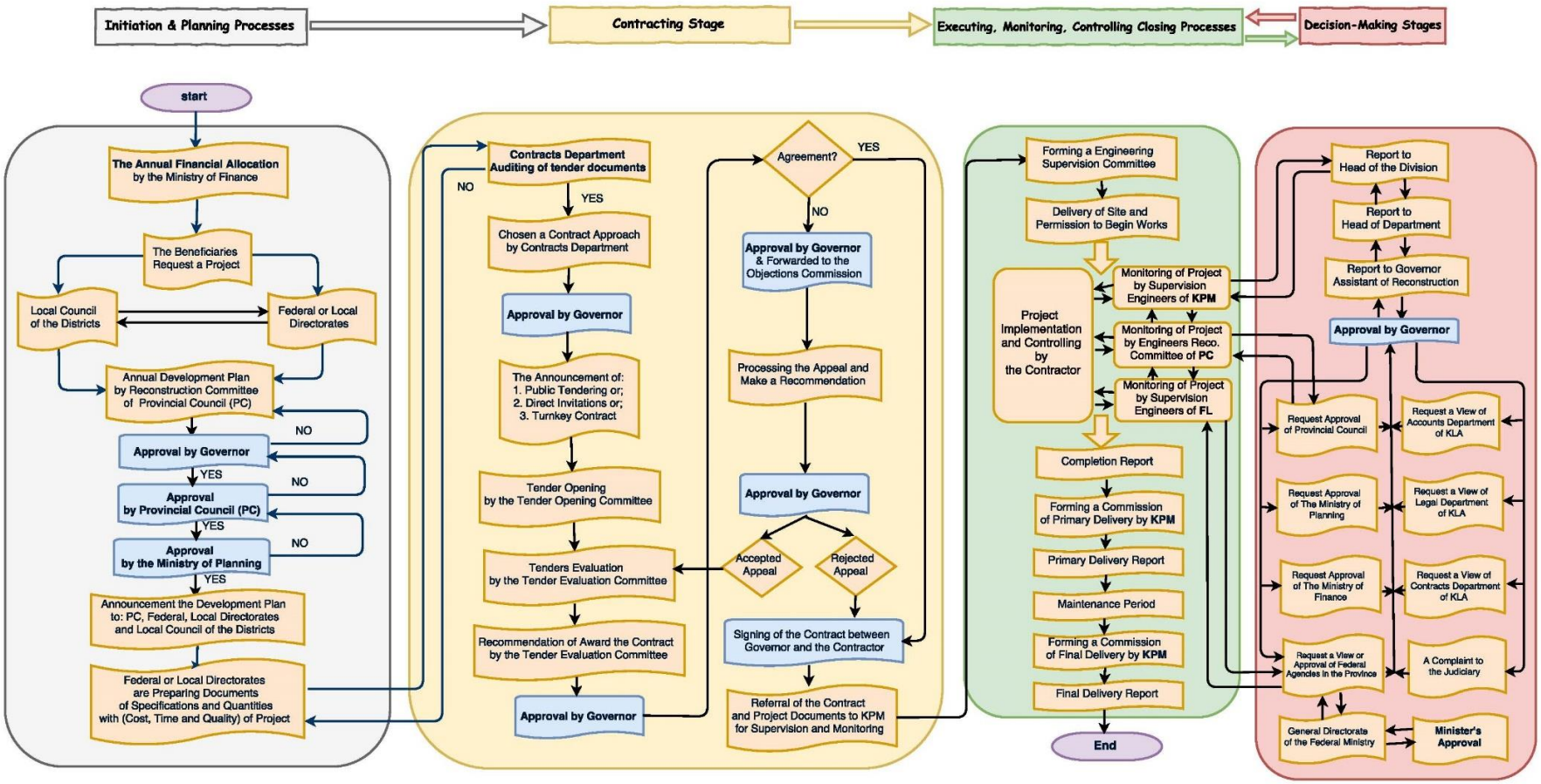


Figure 8.5 Processes and Procedures of KPM

8.3 Group Interview Analysis

Interviews were conducted for the period from October to November 2015 with the participants who had a greater degree of knowledge, experience and skills than the general population (Flanagan, 1993). Several techniques were used to analyse the data from the semi-structured interviews. The first phase was to write up the voice-recorded information and examine the notes taken throughout the interviews. The information extracted from the interviews was then categorised by identifying the factors in order to measure their effect on the PM triple constraint (time, cost and quality) and classify them based on their group and source. Following this process, the coding procedure (table 4.14) and transcripts were then checked. To confirm the end results, a second visit was paid to the participants to review the result of the interviews and validate their perceptions.

The collected data were analysed and ranked using a number of statistical techniques and indices includes: Frequency Index (F.I), Severity Index (S.I) and Importance Index (I.I) (Larsen et al., 2015; Doloi et al., 2012; Assaf and Al-Hejji, 2006; Frimpong et al., 2003; Zakeri, 1996; Babbie, 1989):

Frequency index: A formula is used to rank factors affecting time overrun in public construction, based on frequency of occurrence as identified by the participants:

Frequency Index (F.I) (%) = $\sum$ a (n/N) *100/5

where a is the constant expressing weighting given to each response (ranges from 1, for very rarely, to 5 for always), n is the frequency of the responses, and N is the total number of responses.

Severity index: A formula is used to rank the identified factors based on their severity as indicated by the participants.

Severity Index (S.I) (%) = ∑ a (n/N) *100/5

where a is the constant expressing weighting given to each response (ranges from 1, for very low, to 5 for very high), n is the frequency of the responses, and N is the total number of responses.

Importance index: The importance index of each factor is calculated as a function of both frequency index and severity index, as follows:

Importance Index (I.I) (%) = [(F.I) (%) * (S.I) (%)] /100

8.3.1 General Information about the Participants

Interviews were conducted with 30 government employees, 10 consultants and 10 contractors. The following section examines the distribution of the participants according to their personal information.

8.3.1.1 Distribution of Interviewees' Academic Achievement

Most of the participants (72%) held a bachelor's degree. 22% of interviewees had postgraduate qualifications and 6% of participants left full-time education after high school (Figure 8.6).

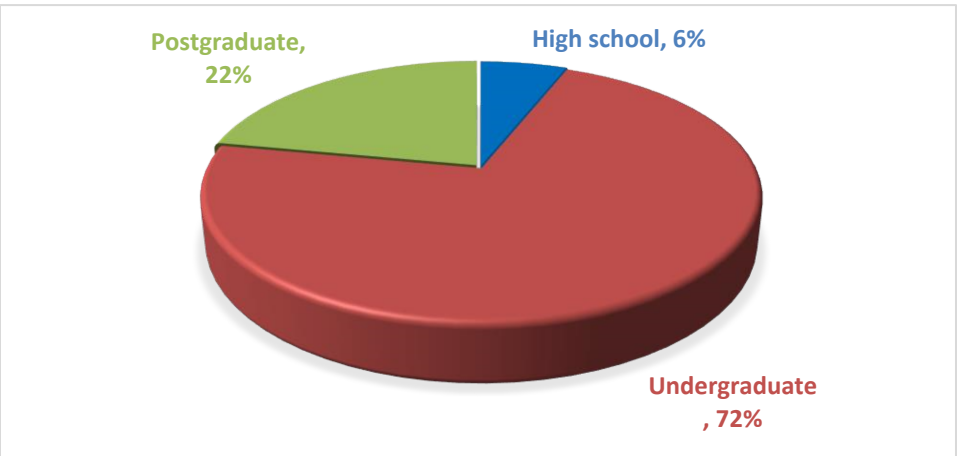


Figure 8.6 Distribution of interviewees' academic achievement

8.3.1.2 Distribution of Interviewees' Specialisation

Table 8.4 illustrates the majority of the specialisations of the interviewees; about 82% are engineers (civil, electrical, mechanical and IT engineers make up 38%, 22%, 14% and 8% respectively), while 18% are administrators, legal professionals and accountants.

Table 8.4 Specialisation of interviewees

Specialisation	Frequency	Percentage	Cumulative Percentage
Civil Engineering	19	38%	38%
Electrical Engineering	11	22%	60%
Mechanical Engineering	7	14%	74%
IT	4	8%	82%
Administration	3	6%	88%
Law	2	4%	92%
Accounts	4	8%	100%
Total	50	100%	

8.3.1.3 Distribution of Interviewees' Roles

The study in question focused on public sector projects in Karbala. 60% of the people who participated in the interviews were government employees (see Figure 8.7), including employees of local and federal government ministries (municipalities, housing and public work, health, governorate of Karbala, etc.). 20% were consultants, either former project managers or experienced owners from the private sector who were chartered by the Iraqi Engineers Union. In addition, approximately 20% of the contractors were placed in the top three classes by the Iraqi Ministry of Planning.

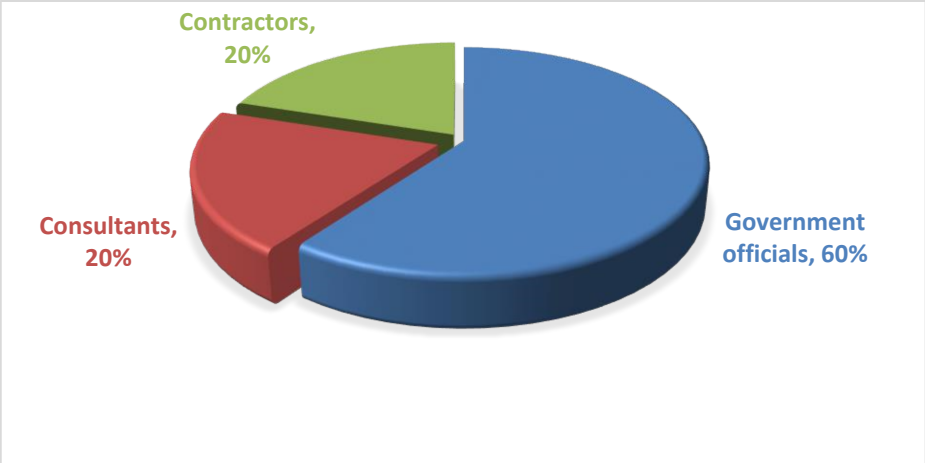


Figure 8.7 Distribution of interviewees' roles

8.3.1.4 Distribution of Interviewees by Years of Experience

The pie chart in Figure 8.8 shows that the most common amount of expertise were 11-20 years (46% of participants), followed, by a small margin (40%), by the group with experience of over 20 years. The smallest percentage of interviewees (14%) had less than ten years' experience.

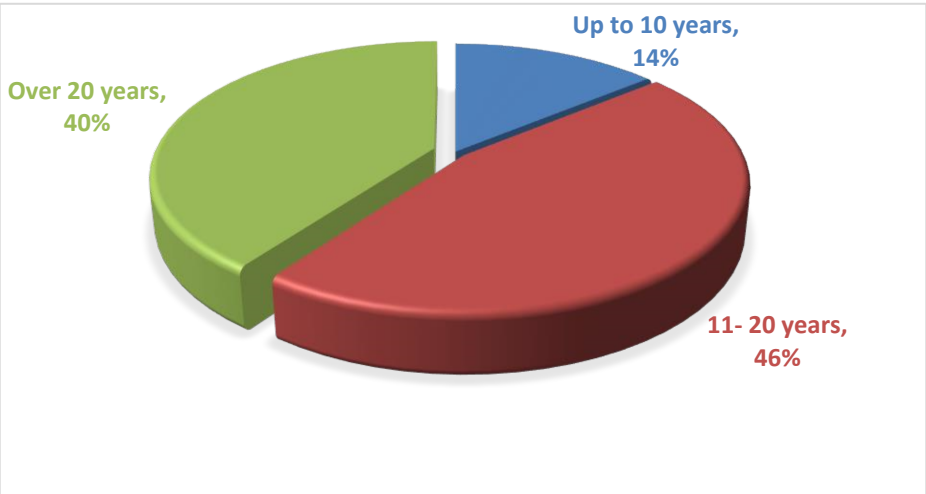


Figure 8.8 Distribution of interviewees by years of experience

8.3.1.5 Distribution of Interviewees' Age and Gender

Table 8.5 displays that the majority of participants were male (88%) in comparison to the number of female participants (12%).

Table 8.5 Distribution of interviewees' age and gender

Age groups (years)	Gender		
	Male %	Female %	Total
16-22	0%	0%	0%
23-30	10%	6%	16%
31-40	46%	2%	48%
Over 40	32%	4%	36%
Total	88%	12%	100%

The age distribution of the participants fluctuated slightly; 16% of participants fell under the age group from 23 to 30 years, whereas significantly more participants (48%) were placed in the category 31-40 years old, making this the largest group by age. The number of participants over 40 years old was slightly lower, at 36%. As can be seen from the table, the number of women remained substantially lower in all age groups. These results are represented in a bar chart in Figure 8.9.

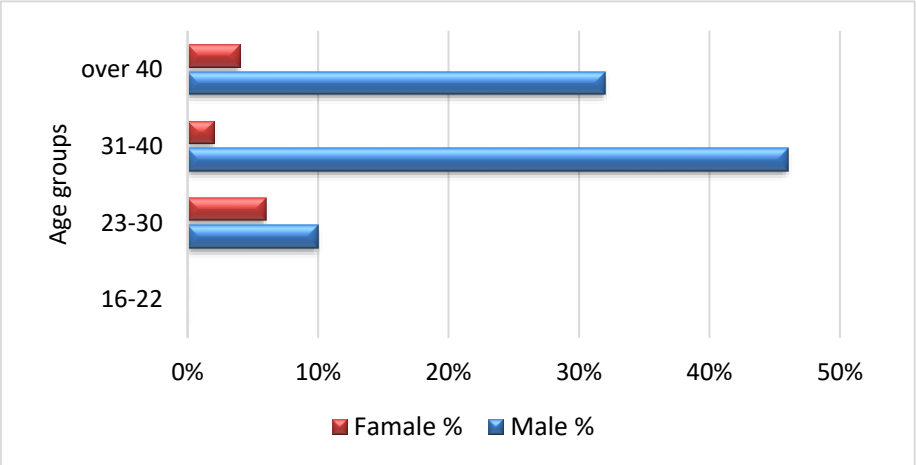


Figure 8.9 Distribution of interviewees' age groups by gender

8.3.2 Interview Primary Questions Analysis by Related Group

This section is divided into six cause-related groups as following:

8.3.2.1 Government- (owner-) related Causes

This section of interview questions referred to 16 government-related causes. Table 8.6 presents the results based on frequency, severity and importance indices and ranking for each of the constraints of project management: time, cost, and quality, according to participants' evaluation.

The most crucial factor related to the government (owner) was deemed to be "recruiting unqualified project management leaders for political reasons". This factor was ranked in first place, as indicated by an important index rate of 75.07 (92.00 for frequency index and 81.60 for severity index).

Table 8.6 Frequency, severity, and importance indices and ranking for government- (owner-) related causes

Code	Factors	F.I.	Time			Cost			Quality			Average of group			Overall rank
			S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	
A8	Recruitment of unqualified project management leaders for political reasons	92	78.4	72.13	3	82.4	75.81	1	84	77.28	3	81.6	75.07	1	2
A9	Financial and administrative corruption	90	81.6	73.44	1	82	73.8	3	81.2	73.08	4	81.6	73.44	2	3
A5	Excessive bureaucracy in project owner operation	88.8	82.4	73.17	2	77.6	68.91	4	80.8	71.75	5	80.27	71.28	3	5
A16	Staff fear of Anti-Corruption Commission	89.2	76	67.79	7	82.8	73.86	6	66.4	59.23	18	75.07	66.96	4	6
A6	Inappropriate overall organisational structure linked to the project	84.4	77.2	65.16	8	78.8	66.51	10	75.6	63.81	11	77.2	65.16	5	9
A7	Lack of appropriate legislation and government laws	82	78.8	64.62	6	73.6	60.35	5	81.2	66.58	9	77.87	63.85	6	10
A15	Lack of motivation and encouragement	83.6	76	63.54	9	64.4	53.84	9	77.6	64.87	10	72.67	60.75	7	11
A3	Slow decision-making	81.2	83.6	67.88	5	71.6	58.14	2	66.8	54.24	27	74	60.09	8	14
A2	Owner interference	74.4	80.8	60.12	11	72.4	53.87	8	81.6	60.71	16	78.27	58.23	9	18
A14	Lack of trust among employees and government departments	82.8	67.6	55.97	4	68	56.3	7	71.2	58.95	19	68.93	57.08	10	20
A4	Lack of staff experience	62	67.6	41.91	15	77.6	48.11	12	78.8	48.86	31	74.67	46.29	11	39
A12	Lack of or inadequate experience of consultants	60.8	64.4	39.16	13	77.2	46.94	11	85.2	51.8	28	75.6	45.96	12	41
A1	Finance and payments of completed work	73.6	76.4	56.23	16	53.2	39.16	15	41.2	30.32	50	56.93	41.9	13	44
A10	Non-use of information technology	65.2	64.4	41.99	14	60.4	39.38	16	46.8	30.51	49	57.2	37.29	14	48
A13	Underperforming employees	76	53.2	40.43	12	45.2	34.35	13	46.8	35.57	41	48.4	36.78	15	50
A11	Weaknesses in quality assurance/control	58.8	42	24.7	10	65.2	38.34	48	79.2	46.57	32	62.13	36.53	16	51

Additionally, other important key factors related to the government which are causing problems were found to be: financial and administrative corruption, excessive bureaucracy in project owner operations, staff fear of the Anti-Corruption Commission and inappropriate overall organisational structure linked to the project, with importance indices of 73.44, 71.28, 66.96 and 65.16 respectively. The respondents believed that "weaknesses in quality assurance/control" was the least influential factor in this category, with an importance index of 36.53.

Figure 8.10 shows that both staff fear of Anti-Corruption Commissions and slow decision-making were considered the most influential factors on time, compared to the rest of the constraints concerning cost and quality. Furthermore, according to the participants' views, the negative impact of the anti-corruption bodies significantly influenced the cost of a project. The overall effect of this group was the greatest on the time of projects, followed by its impact on the quality. The area on which it had the least effect was the cost.

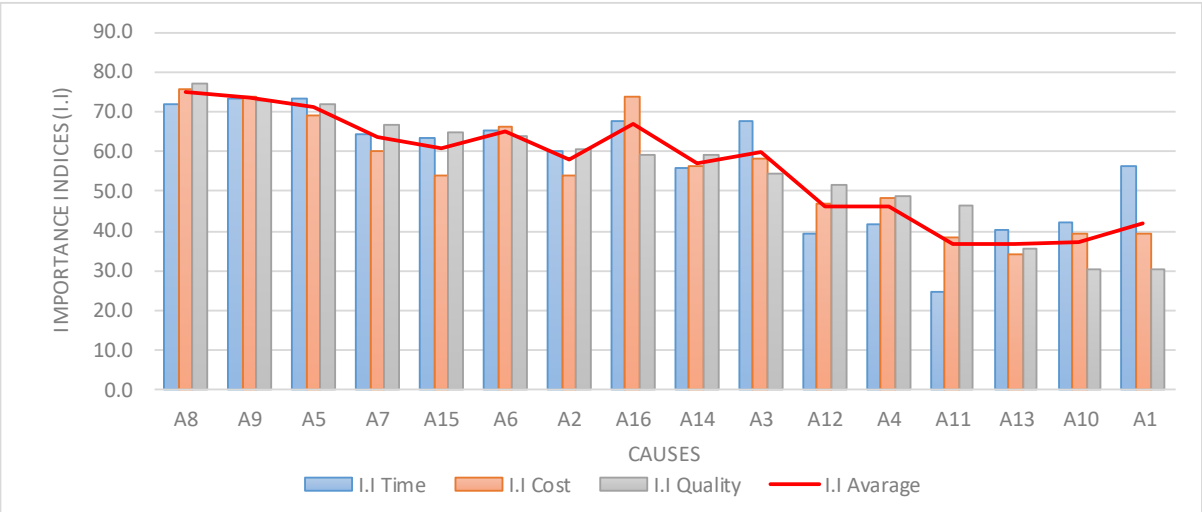


Figure 8.10 Importance indices (I.I) of government-related causes for time, cost and quality of projects

8.3.2.2 Contractor-related Causes

The survey included 14 contractor-related factors. Table 8.7 shows the results of each factor based on frequency, severity and importance indices and ranking. According to the opinions of the respondents, the main factor causing project failure was “improper planning” by contractors, which also ranked first of the most influential factors within this group. The next five factors, according to their respective importance indices were: poor site management and supervision, controlling of subcontractors by main contractor, subcontractors, inadequate contractor experience, and delay in the project timetable, at 60.15, 59.47, 58.27, 57.25 and 55.43 respectively.

In Figure 8.11 it appears that improper planning by contractors and delays in the project timetable both have a highly significant effect on all project constraints. Additionally, weakness of cash flow for contractors during construction and their inadequate experience has a clear effect on the timely delivery of the project. In contrast, according to the interviewees’ views, the quality of implemented projects was significantly affected by the factors of poor management of subcontractors by the main contractor, poor performance of subcontractors and poor quality work.

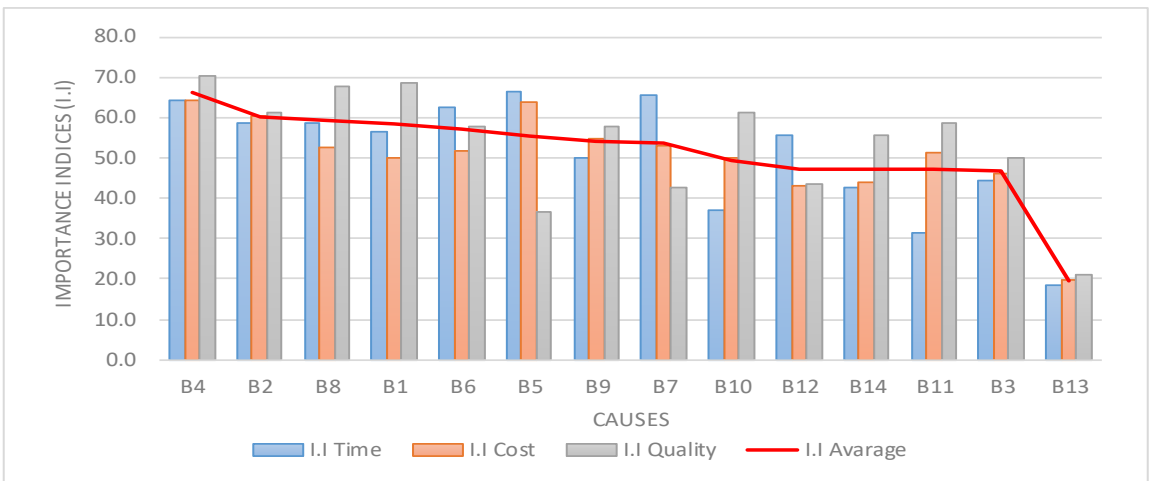


Figure 8.11 Importance indices (I.I) of contractor-related causes for time, cost and quality of projects

Table 8.7 Frequency, severity, importance indices and ranking for contractor-related causes

Code	Factor	F.I.	Time			Cost			Quality			Average			Overall
			S.I	I.I	Rank	S.I	I.I	Rank	S.I	I.I	Rank	S.I	I.I	Rank	
B4	Improper planning	89.6	71.6	64.15	3	71.6	64.15	1	78.4	70.25	1	73.87	66.18	1	7
B2	Poor site management and supervision	84.8	69.2	58.68	5	71.2	60.38	3	72.4	61.4	4	70.93	60.15	2	13
B8	Management of subcontractors by main contractor in the execution of work	84	69.6	58.46	6	62.4	52.42	6	80.4	67.54	3	70.8	59.47	3	15
B1	Subcontractors	82	68.8	56.42	7	60.8	49.86	10	83.6	68.55	2	71.07	58.27	4	17
B6	Inadequate contractor experience	76	82	62.32	4	68	51.68	7	76	57.76	8	75.33	57.25	5	19
B5	Delay in the project timetable	82	80.8	66.26	1	77.6	63.63	2	44.4	36.41	13	67.6	55.43	6	22
B9	Mistakes in construction work	70	71.6	50.12	9	78	54.6	4	82.8	57.96	7	77.47	54.23	7	23
B7	Financing by contractor during construction	81.6	80.4	65.61	2	64.8	52.88	5	52	42.43	12	65.73	53.64	8	24
B10	Poor quality of construction work	70.8	52	36.82	12	70.8	50.13	9	86.4	61.17	5	69.73	49.37	9	32
B12	Inadequate equipment used	74	75.2	55.65	8	58	42.92	13	58.8	43.51	11	64	47.36	10	34
B14	Unavailability of engineers on the project site	66.4	64	42.5	11	66	43.82	12	83.6	55.51	9	71.2	47.28	11	35
B11	The selection of unskilled workers by the contractor to work on site	73.6	42.8	31.5	13	69.6	51.23	8	79.6	58.59	6	64	47.1	12	36
B3	Construction methods	62.4	71.2	44.43	10	74	46.18	11	80.4	50.17	10	75.2	46.92	13	37
B13	Personnel safety issues	52	35.2	18.3	14	38	19.76	14	40.4	21.01	14	37.87	19.69	14	60

8.3.2.3 Contract-related Causes (Consultant)

Table 8.8 shows the results of each contract-related factor based on the frequency, severity and importance indices and ranking, according to the experts interviewed. Among all 10 factors within this group, the preference for the lowest price tendering was considered to have a highly significant effect and was ranked in first place, followed by insufficient data collection and survey before design. Concerns regarding changing orders, unrealistic contract duration and requirements imposed, mistakes and discrepancies in contract document and lack of contract document occupied third, fourth, fifth and sixth place respectively, as shown in Table 8.8. Maladministration of disputes and negotiations, as well as lack of communication and coordination between the parties, were accorded the lowest importance index, at 37.92 and 30.03 respectively.

Overall, most of the factors in this category were believed to have no significant impact on the quality, except for the choice of the lowest-price tendering value and insufficient data collection before design. As Figure 8.12 shows, most of the factors in this group had an uneven effect on the time and cost of the projects.

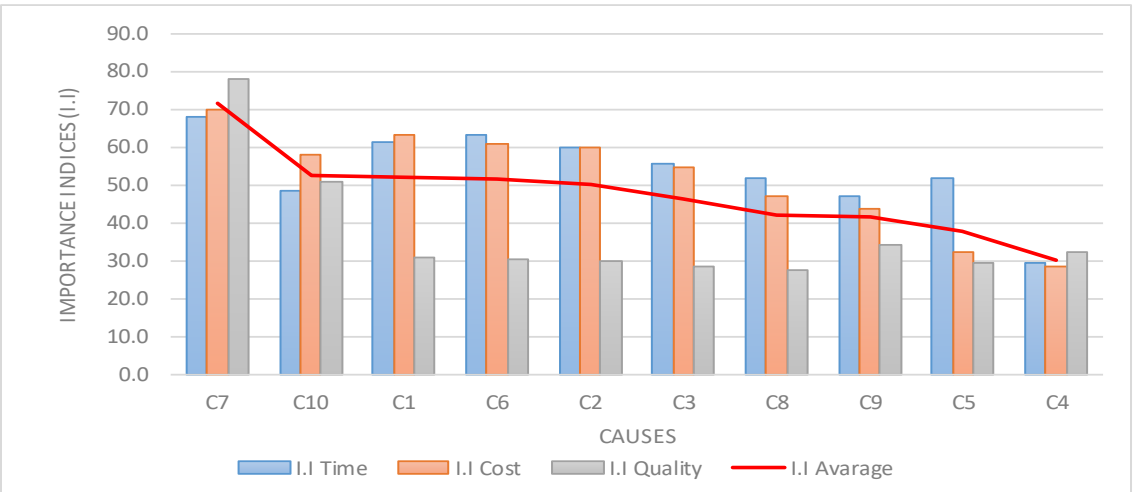


Figure 8.12 Importance indices (I.I) of contract-related causes for time, cost and quality of projects

Table 8.8 Frequency, severity, and importance indices and ranking for contract-related causes

Code	Factors	F.I.	Time			Cost			Quality			Average			Overall rank
			S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	
C7	Tendering system that obligates the choice of the lowest bidding value	96.4	70.4	67.87	1	72.4	69.79	1	80.8	77.89	1	74.53	71.85	1	4
C10	Insufficient data collection and survey before design	76.4	63.6	48.59	8	76	58.06	5	66.8	51.04	2	68.8	52.56	2	26
C1	Change of orders	80.4	76.4	61.43	3	78.8	63.36	2	38.4	30.87	5	64.53	51.88	3	28
C6	Unrealistic contract duration and requirements imposed	82	77.2	63.3	2	74	60.68	3	36.8	30.18	6	62.67	51.39	4	29
C2	Mistakes and discrepancies in contract document	80.8	74.4	60.12	4	74	59.79	4	37.2	30.06	7	61.87	49.99	5	31
C3	Lack of contract document	79.2	70	55.44	5	68.8	54.49	6	36	28.51	9	58.27	46.15	6	40
C8	Delays in obtaining permits from municipality or related bodies	75.2	68.8	51.74	7	62.4	46.92	7	36.8	27.67	10	56	42.11	7	43
C9	Lack of preparation of work site	72.8	64.8	47.17	9	60	43.68	8	46.8	34.07	3	57.2	41.64	8	45
C5	Maladministration of disputes and negotiations	69.2	74.8	51.76	6	46.8	32.39	9	42.8	29.62	8	54.8	37.92	9	46
C4	Lack of communication and coordination between parties	58.8	50	29.4	10	48	28.22	10	55.2	32.46	4	51.07	30.03	10	56

8.3.2.4 Material-related Causes

Material-related causes included 5 factors. Table 8.9 shows the results of the study based on frequency, severity and importance indices. Interviewees expressed their opinion that issues with regard to material mostly came from "delays in the test material", with relatively high frequency, severity and importance indices of 81.20, 80.00 and 64.96, respectively. The next most significant factor was considered to be the quality of material. The respondents believed that "inaccurate material testing" was the least influential factor in this category, causing problems with an importance index of 20.64. The averages of the group indices related to frequency, severity and importance are 59.28, 52.64 and 31.20, respectively.

Table 8.9 Frequency, severity, and importance indices and ranking for material-related causes

Code	Factors	F.I.	Time			Cost			Quality			Average			Overall rank
			S.I.	I.I	R	S.I.	I.I	R	S.I.	I.I	R	S.I.	I.I	R	
D5	Delays in the test material	81.2	80	64.96	1	60	48.72	1	38.8	31.51	3	59.6	48.4	1	33
D4	Inaccurate material testing	51.6	40	20.64	5	70.4	36.33	2	82	42.31	1	64.13	33.09	2	54
D1	Quality of material	56	42.8	23.97	4	50.4	28.22	4	74.4	41.66	2	55.87	31.29	3	55
D2	Shortage in material	55.2	50.4	27.82	2	55.2	30.47	3	45.6	25.17	4	50.4	27.82	4	57
D3	Material transfer problems	52.4	50	26.2	3	50.4	26.41	5	34.4	18.03	5	44.93	23.55	5	59

The results in Figure 8.13 show that "delays in the test material" significantly affected the delivery of the project in time and had a lower impact on cost. In contrast, it was found that "material transfer problems" had the least impact on project constraints.

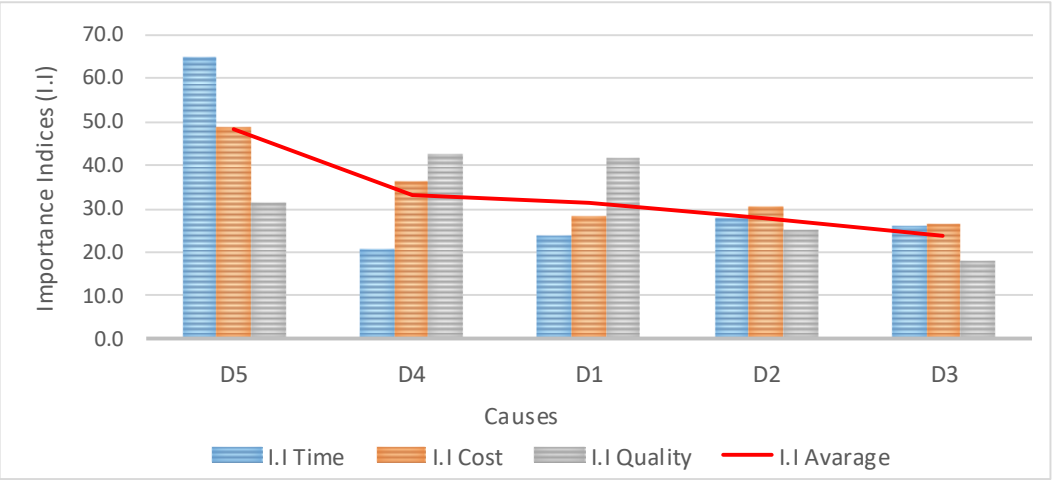


Figure 8.13 Importance Indices (I.I) of material-related causes for time, cost and quality of projects

8.3.2.5 Labour- and equipment-related Causes

The labour and equipment category consisted of 6 factors. Table 8.10 shows that "lack of commitment and discipline by local labourers" with an importance index of 60.76 was highlighted as the most critical factor within this group, causing time and cost overrun in addition to poor quality of Karbala projects. Similarly, a lack of labour productivity, unskilled local operators and lack of modern equipment occupied second, third, fourth place respectively according to their respective importance indices. Conversely, the least influential factor in accordance with the classification of this group was considered to be lack of local labour supply, with an importance index of 37.63.

Table 8.10 Frequency, severity, and importance indices and ranking of labour- and equipment-related causes

Code	Factors	F.I.	Time			Cost			Quality			Average			Overall rank
			S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	
E5	Lack of commitment and discipline by local labourers	86.8	70	60.76	1	64.8	56.25	3	69.6	60.41	2	68.13	59.14	1	16
E4	Unskilled local operators	78.4	48.8	38.26	4	75.6	59.27	2	80.4	63.03	1	68.27	53.52	2	25
E2	Lack of labour productivity	79.6	70.02	55.74	2	80.4	64	1	47.6	37.89	5	66.01	52.54	3	27
E3	Lack of modern equipment	72.4	68	49.23	3	65.2	47.2	5	76	55.02	4	69.73	50.49	4	30
E6	Lack of foreign labour because of security factor	69.6	54.4	37.86	5	51.6	35.91	6	83.6	58.19	3	63.2	43.99	5	42
E1	Lack of local labour supply	68	47.6	32.37	6	72.8	49.5	4	45.6	31.01	6	55.33	37.63	6	47

According to the results in Figure 8.14, it appears that non-use of modern equipment and technologies in construction has had a clear impact on all project constraints (time, cost, quality).

On the other hand, the employment of unskilled local workers seems to have caused a shortage in quality and increased the cost of projects. Moreover, it was found that lack of labour productivity also significantly affected the cost of projects. The lack of recruitment of foreign workers was believed to have negatively affected the quality of projects.

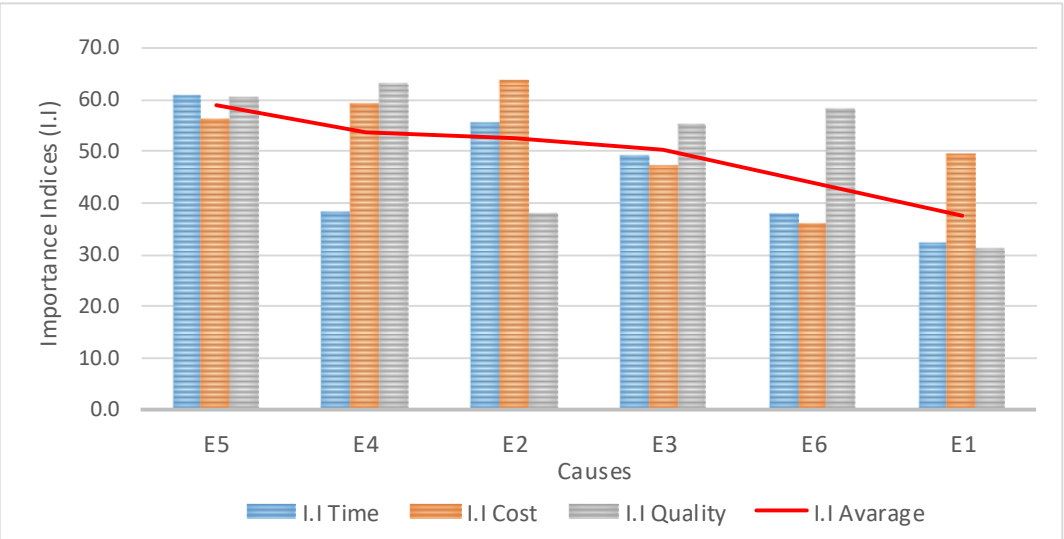


Figure 8.14 Importance Indices (I.I) of labour- and equipment-related causes for time, cost and quality of projects

8.3.2.6 External Related Causes

Ten external factors were included in the interview questions. Table 8.11 elucidates the results of the study based on frequency, severity and importance indices. It was found that "political changes" is the most critical factor, occupying the highest importance indices (77.58). The second most important factor was recognised as "regulatory changes", which also yielded high importance indices (65.40). The next most critical factors are social and cultural factors, public holidays, unforeseen site conditions, weather conditions, and security factors. Their importance indices are 60.49, 55.83, 46.90 and 37.21 respectively.

Table 8.11 Frequency, severity, and importance indices and ranking of external related causes

Code	Factor	F.I.	Time			Cost			Quality			Average			Overall rank
			S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	S.I.	I.I	Rank	
F7	Political changes	92.8	80	74.24	1	84	77.95	1	86.8	80.55	1	83.6	77.58	1	1
F2	Organisational changes	90	75.6	68.04	3	72.4	65.16	2	70	63	2	72.67	65.4	2	8
F5	Social and cultural factors	84.8	73.2	62.07	4	75.6	64.11	3	65.2	55.29	3	71.33	60.49	3	12
F8	Public holidays	87.6	84	73.58	2	68.8	60.27	4	38.4	33.64	6	63.73	55.83	4	21
F4	Unforeseen site conditions	76.8	66.4	51	5	70	53.76	5	46.8	35.94	5	61.07	46.9	5	38
F6	Security	69.6	47.6	33.13	7	69.6	48.44	6	43.2	30.07	8	53.47	37.21	6	49
F10	Effects of subsurface conditions (e.g. soil, high water table, etc.)	60.8	64.8	39.4	6	60.8	36.97	7	52.4	31.86	7	59.33	36.07	7	52
F1	Weather conditions	75.6	40.8	30.84	8	47.2	35.68	8	52.8	39.92	4	46.93	35.48	8	53
F3	Disputes with neighbours	56.8	50.4	28.63	9	46	26.13	9	33.6	19.08	9	43.33	24.61	9	58
F9	Unavailability of utilities on site (water, electricity, etc.)	45.2	38.4	17.36	10	41.2	18.62	10	39.2	17.72	10	39.6	17.9	10	61

Figure 8.15 illustrates that political and organisational changes, as well as social culture, have a profound effect on all three project constraints. Additionally, the large number of public holidays has been known to seriously affect the delivery of projects on time. In contrast, according to the participants' views, unavailability of utilities on site, such as water and electricity, had the weakest impact on the project constraints.

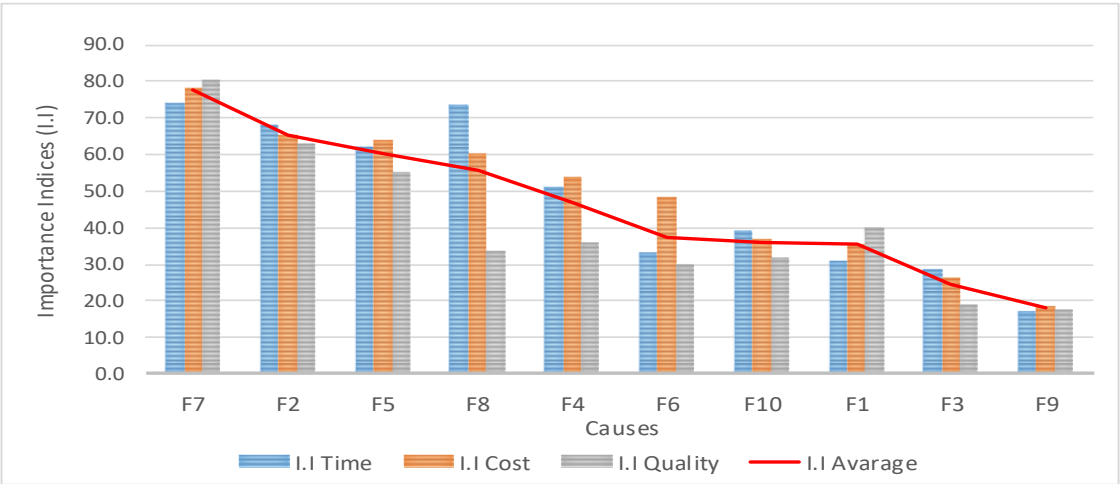


Figure 8.15 Importance Indices (I.I) of external related causes

8.3.3 Overall Results

Table 8.12 shows the Importance Indices of each cause based on time, cost and quality constraints of projects. The rankings of causes for each constraint and their overall rank are also shown.

Table 8.12 Importance Indices and ranking of each cause

Code	Cause	Time		Cost		Quality		Average	
		I.I	Rank	I.I	Rank	I.I	Rank	I.I	Rank
F7	Political changes	74.2	1	78	1	80.6	1	77.6	1
A8	Recruitment of unqualified project management leaders for political reasons	72.1	5	75.8	2	77.3	3	75.1	2
A9	Financial and administrative corruption	73.4	3	73.8	4	73.1	4	73.4	3
C7	Tendering system that obligates the choice of the lowest bidding value	67.9	8	69.8	5	77.9	2	71.9	4
A5	Excessive bureaucracy in project owner operations	73.2	4	68.9	6	71.8	5	71.3	5
A16	Staff fear of Anti-Corruption Commission	67.8	9	73.9	3	59.2	18	67	6
B4	Improper planning	64.2	15	64.2	9	70.2	6	66.2	7
F2	Regulatory changes	68	6	65.2	8	63	13	65.4	8
A6	Inappropriate overall organisational structure linked to the project	65.2	12	66.5	7	63.8	11	65.2	9
A7	Lack of appropriate legislation and government laws	64.6	14	60.4	16	66.6	9	63.9	10

A15	Lack of motivation and encouragement	63.5	16	53.8	27	64.9	10	60.7	11
F5	Social and cultural factors	62.1	19	64.1	10	55.3	25	60.5	12
B2	Poor site management and supervision	58.7	24	60.4	15	61.4	14	60.2	13
A3	Slow decision-making	67.9	7	58.1	20	54.2	27	60.1	14
B8	Management of subcontractors by main contractor in the execution of work	58.5	25	52.4	30	67.5	8	59.5	15
E5	Lack of commitment and discipline by local labourers	60.8	21	56.2	23	60.4	17	59.1	16
B1	Subcontractors	56.4	26	49.9	34	68.6	7	58.3	17
A2	Owner interference	60.1	23	53.9	26	60.7	16	58.2	18
B6	Inadequate contractor experience	62.3	18	51.7	31	57.8	23	57.3	19
A14	Lack of trust among employees and government departments	56	28	56.3	22	59	19	57.1	20
F8	Public holidays	73.6	2	60.3	17	33.6	43	55.8	21
B5	Delay in the project timetable	66.3	10	63.6	12	36.4	39	55.4	22
B9	Mistakes in construction work	50.1	35	54.6	24	58	22	54.2	23
B7	Financing by contractor during construction	65.6	11	52.9	29	42.4	34	53.6	24
E4	Unskilled local operators	38.3	46	59.3	19	63	12	53.5	25
C10	Insufficient data collection and survey before design	48.6	37	58.1	21	51	29	52.6	26
E2	Lack of labour productivity	55.7	29	64	11	37.9	38	52.5	27
C1	Changing orders	61.4	20	63.4	13	30.9	48	51.9	28
C6	Unrealistic contract duration and requirements imposed	63.3	17	60.7	14	30.2	51	51.4	29
E3	Lack of modern equipment	49.2	36	47.2	39	55	26	50.5	30
C2	Mistakes and discrepancies in contract documents	60.1	22	59.8	18	30.1	53	50	31
B10	Poor quality of construction work	36.8	48	50.1	33	61.2	15	49.4	32
D5	Delays in the test material	65	13	48.7	36	31.5	46	48.4	33
B12	Inadequate equipment used	55.6	30	42.9	45	43.5	33	47.4	34
B14	Unavailability of engineers on the project site	42.5	40	43.8	43	55.5	24	47.3	35
B11	Selection of unskilled workers by the contractor to work on site	31.5	51	51.2	32	58.6	20	47.1	36

B3	Construction methods	44.4	39	46.2	42	50.2	30	46.9	37
F4	Unforeseen site conditions	51	34	53.8	28	35.9	40	46.9	38
A4	Lack of staff experience	41.9	42	48.1	38	48.9	31	46.3	39
C3	Lack of contract document	55.4	31	54.5	25	28.5	55	46.1	40
A12	Lack of or inadequate experience of consultants	39.2	45	46.9	40	51.8	28	46	41
E6	Lack of foreign labour because of the security factor	37.9	47	35.9	51	58.2	21	44	42
C8	Delays in obtaining permits from municipality or related bodies	51.7	33	46.9	41	27.7	56	42.1	43
A1	Finance and payments of completed work	56.2	27	39.2	47	30.3	50	41.9	44
C9	Lack of preparation of work site	47.2	38	43.7	44	34.1	42	41.6	45
C5	Maladministration of disputes and negotiations	51.8	32	32.4	54	29.6	54	37.9	46
E1	Lack of local labour supply	32.4	50	49.5	35	31	47	37.6	47
A10	Non-use of information technology	42	41	39.4	46	30.5	49	37.3	48
F6	The security factor	33.1	49	48.4	37	30.1	52	37.2	49
A13	Underperforming employees	40.4	43	34.4	53	35.6	41	36.8	50
A11	Weaknesses of quality assurance/control	24.7	57	38.3	48	46.6	32	36.5	51
F10	Effects of subsurface conditions (e.g. soil, high water table, etc.)	39.4	44	37	49	31.9	45	36.1	52
F1	Weather conditions	30.8	52	35.7	52	39.9	37	35.5	53
D4	Inaccurate material testing	20.6	59	36.3	50	42.3	35	33.1	54
D1	Quality of materials	24	58	28.2	56	41.7	36	31.3	55
C4	Lack of communication and coordination between parties	29.4	53	28.2	57	32.5	44	30	56
D2	Shortage of material	27.8	55	30.5	55	25.2	57	27.8	57
F3	Disputes with neighbours	28.6	54	26.1	59	19.1	59	24.6	58
D3	Material-transfer problems	26.2	56	26.4	58	18	60	23.5	59
B13	Personnel safety issues	18.3	60	19.8	60	21	58	19.7	60
F9	Unavailability of utilities on site (water, electricity, etc.)	17.4	61	18.6	61	17.7	61	17.9	61

8.3.3.1 Analysis of Overall Results by Group

The constraint categories of time, cost and quality were analysed based on the overall results for each constraint and each cause. The importance indices were calculated as the averages of indices for related factors in the group. Government-related causes occupy the first place when each group is ranked by their influence on each constraint. This group is followed by contractor-related causes, then labour and equipment, contracts, external, and material-related causes. The ranking of groups by causes and their importance indices are shown in Table 8.13 and the chart in Figure 8.16.

Table 8.13 Importance Indices and ranking of groups by cause

Code	Group	Time		Cost		Quality		Overall	
		Importance Index (I.I)	Rank of Group	Importance Index (I.I)	Rank of Group	Importance Index (I.I)	Rank of Group	Importance Index (I.I)	Rank of Group
A	Government-related causes (clients)	55.94	1	54.91	1	55.49	1	55.39	1
B	Contractor-related causes	53.24	2	49.83	4	53.49	2	51.68	2
E	Labour- and equipment-related causes	50.02	3	51.85	2	50.89	3	51.11	3
C	Contract-related causes (consultants)	45.97	4	50.99	3	36.83	5	45.24	4
F	External causes	45.33	5	47.03	5	39.1	4	43.46	5
D	Material-related causes	31.2	6	33.96	6	32.63	6	32.6	6

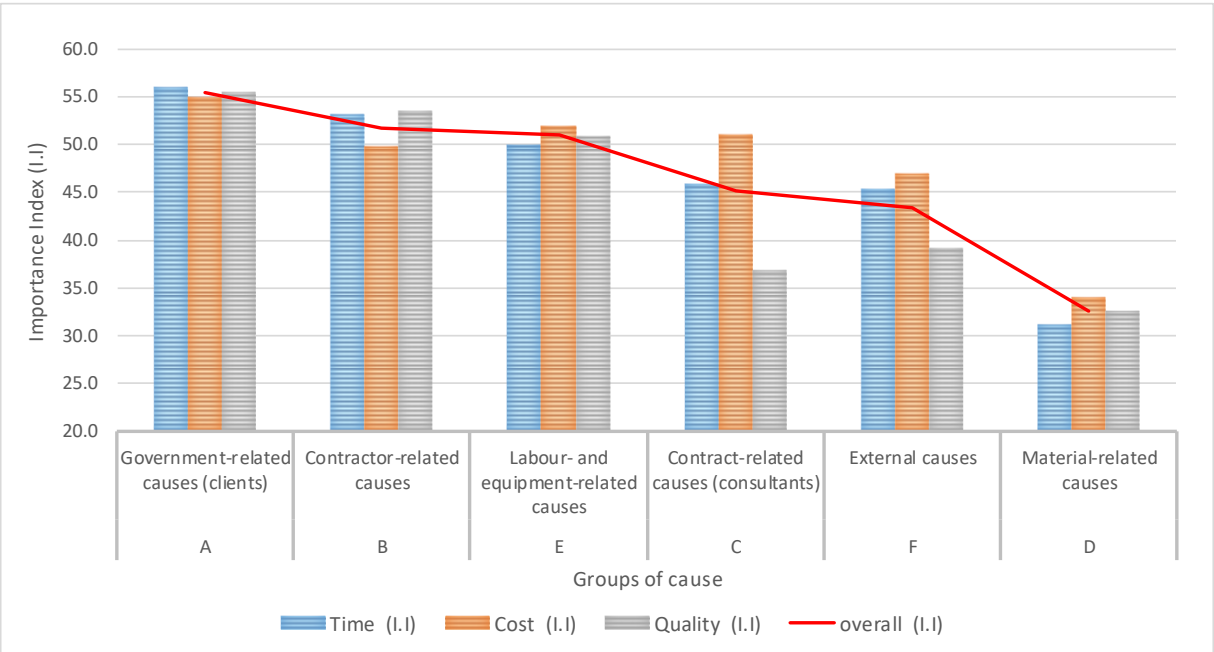


Figure 8.16 Ranking of frequency, severity and importance index of groups by cause

8.3.3.2 Analysis of Overall Results by Cause

Figure 8.17 shows the top 15 rankings of 61 factors which have affected Karbala's project outcomes, analysed independently from their groups. It was found that most of the factors which have an impact on delays, overrunning costs and poor quality of Karbala's projects are, directly or indirectly, due to the government. This conclusion is reflected in the fact that 10 of the top 15 factors were due to the government, as shown in Table 8.14.

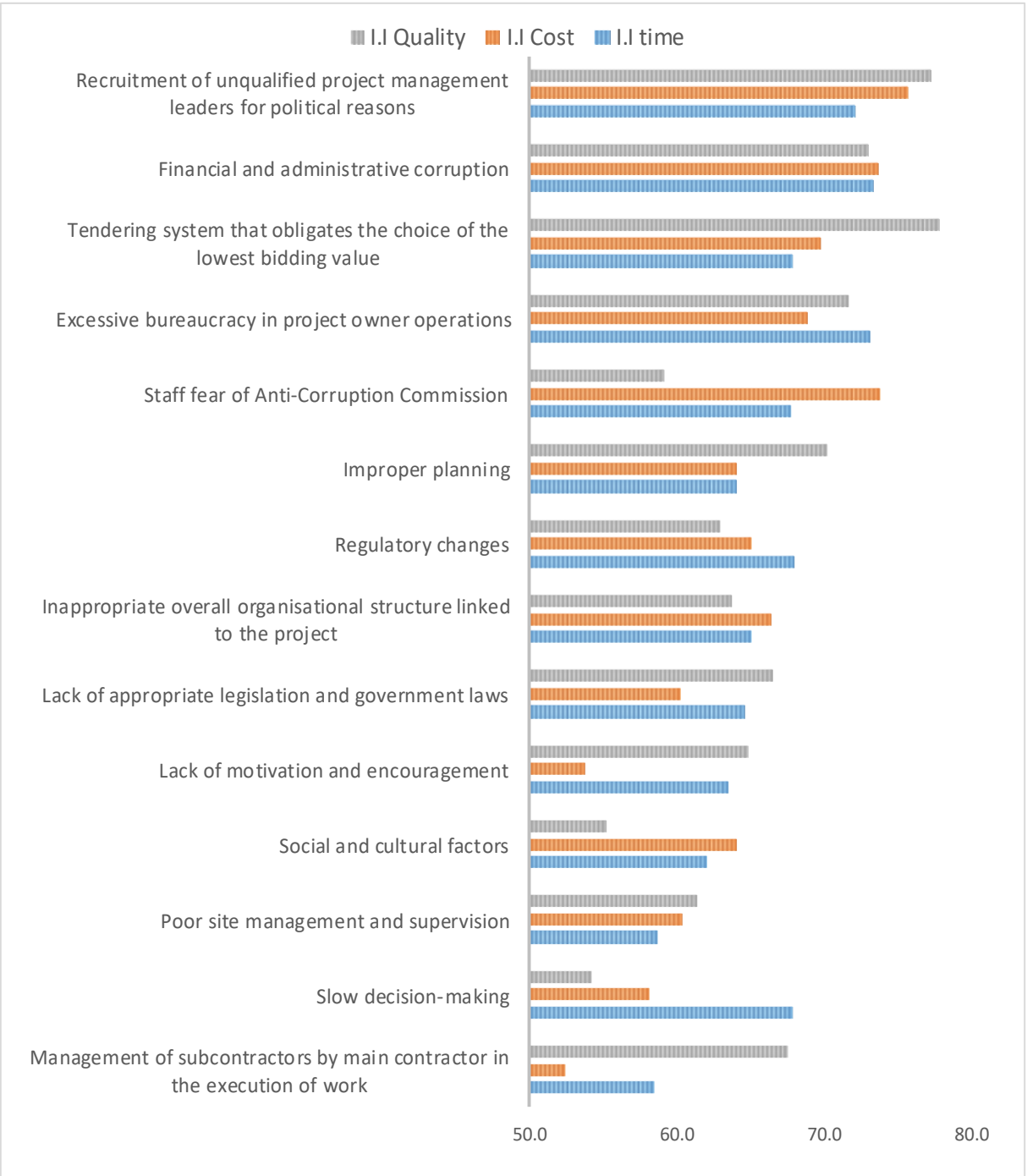


Figure 8.17 Top 15 factors which affect Karbala's project outcomes

Table 8.14 Key causes under the responsibility of the government

No.	Code	Cause	Responsibility			
			Details	LG	FG	LG+FG
1	A8	Unqualified leaders	The appointment of the governor and his deputies by the Provincial Council	X		
2	A9	Financial and administrative corruption	Attributed to poor performance and control by the federal and local government			X
3	C7	Tendering lowest bidding	Due to the weakness of federal legislation and poor performance of local government			X
4	A5	Excessive bureaucracy	Due to the poor administration of the local government and underuse of technology	X		
5	A16	Staff fear of Anti-Corruption Commission	Due to the weakness of federal legislation and poor performance of local government			X
6	F2	Organisational changes	Decisions made by unqualified leaders	X		
7	A6	Inappropriate organisational structure	Decisions made by unqualified leaders	X		
8	A7	Lack of legislation and laws	Due to the weakness of federal legislation		X	
9	A15	Lack of motivation and encouragement	Management by unqualified leaders	X		
10	A3	Slow decision-making	Unqualified leaders, weakness of federal legislation and performance			X

Furthermore, three other causes can be viewed as factors arising from contractors, such as improper planning, poor site management and supervision and management of subcontractors by the main contractor in the execution of work. In addition, two external factors - political changes and social and cultural factors – should be taken into account.

8.4 Summary

This chapter has focused on qualitative data analysis, and has presented the analysis of staff personal interviews and focus-group interviews. The aim of this data analysis was to identify current organisational structures and processes, responsibilities, authority figures, the type and size of completed projects, and the main problems facing KPM. These fields were analysed with a view to identifying the most important factors which contribute to the deterioration of the results of reconstruction projects in the province of Karbala. The main findings of the investigation were summarised in each section.

The next chapter will conclude the results of the study, and discusses the results using a triangulation approach between qualitative and quantitative findings and the existing literature.

Chapter 9 : Results and Findings

9.1 Introduction

This chapter presents the findings from the research from the primary and secondary data which includes qualitative and quantitative data. Following this, the nature of the existing provision of KPM and its current project management practices are summarised.

The primary data for this research included interviews and questionnaires with citizens, employees and contractors in HKP departments, the secondary comprising examination of official project archives, Iraqi legislation and the analysis of official national and international statistics. Thirty project management departments in Karbala, from both local and federal departments, provided case studies regarding current organizational status and outcomes based on their PM practices. As such, this study has aimed to investigate the impact of various factors on five constraints relevant to project management: time, cost, quality, social and environment, and measurement of the performance of the project key indicators. This will allow a better understanding of the research problem and how key constraint related factors in KPM have contributed to the failure of projects. The data gathered will also inform KPM benchmarking.

This chapter uses an integrated approach, triangulation, between the results of the primary and secondary data, the qualitative and quantitative findings and the literature in order to inform the final findings of the research. The advantages of using triangulation include the usefulness of cross-checking to provide confirmation and comprehensiveness. The purpose of this is to increase the credibility and validity of the results and findings (Olsen, 2004; Yeasmin and Rahman, 2012).

In summary, the results of this study partially supported the research questions. Although there were certain limitations, some of the results are consistent with findings from earlier research. Altogether, these findings can be used to inform KPM practice and future practice, and also identify areas for future research.

9.2 Sustainability Aspects and Outcomes Karbala Project Management

Sustainability is one of the most significant challenges facing decision-makers and developers who must engage in development which creates prosperity for all without compromising the life of future generations (Silvius et al., 2012). The recent literature on sustainability in project management provides strong recommendations that integrate sustainability issues and project management processes and practices at every stage in the life cycle of a project (BS 8903:2010; PMI, 2013; Silvius and Schipper, 2014; Agarwal and Kalmar, 2015; Sholarin and Awange, 2015; Silvius, 2016; Martens and Carvalho, 2016).

This section will review KPM in light of "The Sustainable Project Management Star Methodology". (Figures 2.4, Chapter 2 and 9.1 below). This comprises five elements covering project management constraints (cost, time and quality) and sustainability (economic, social, and environmental). Given that there is considerable similarity between the factors cost and economics, these two factors have been combined into one factor for this study: economics (Grevelman and Kluiwstra, 2010).

Figure 9.1: Sustainability project management circle (Grevelman and Kluiwstra, 2010)

9.3 Time Constraints

In recent years, around delays in reconstruction projects in Iraq have become out of control (Awad and al-Hindawi, 2007; Bekr, 2015). The impact of these delays is so significant that they have decelerated the implementation of construction plans. The cause of these delays is not only limited to technical issues, but also includes political, organizational and managerial factors.

Delays in regional development projects in Iraq, specifically projects in Karbala, are believed to cause a multitude of negative effects on the implementation of development plans and citizen satisfaction. It is commonplace that most construction projects in this region face delay. Because of this, one of the main objectives of this study is to identify the main causes of the delays plaguing regional development projects in Karbala.

Project delay means time overrun, either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project (Hamzah et al., 2011; Salunkhe and Patil, 2014). Delays happen in almost every project, and their impact on the execution of the project may be considerable. Keeping in mind the end goal to minimize or avoid delay, it is essential to establish their cause (Kazaz, et al., 2012) as in each case, a delay is typically costly (O'Brien, 1976).

9.3.1 The Number of Projects Suffering from Delay

Looking to the statistical data from archived documents (secondary data), collected from 579 projects with a total overall cost of $383,225,269, only 27.8% of the projects were completed on time, meaning that 72.2% overran (Table 9.1).

Table 9.1 Number of projects delayed and completed on time.

Projects	No. of Projects	Total overall cost ($)	Delay % (by quantity)
Delayed	418	279,656,151	72.20%
On time	161	103,569,118	27.80%
Total	579	383,225,269	100%

Figure 9.2 illustrates the percentage of projects delayed according to the amount (%) of delay. Nearly 22% of the projects were delayed for up to 19.9% of the proposed completion time. A further 22% were delayed up to between 20 to 50% of the proposed completion time. 23.2% suffered delays of 50 to 100% while 32.5% of projects were delayed for over 100% of the contractual period.

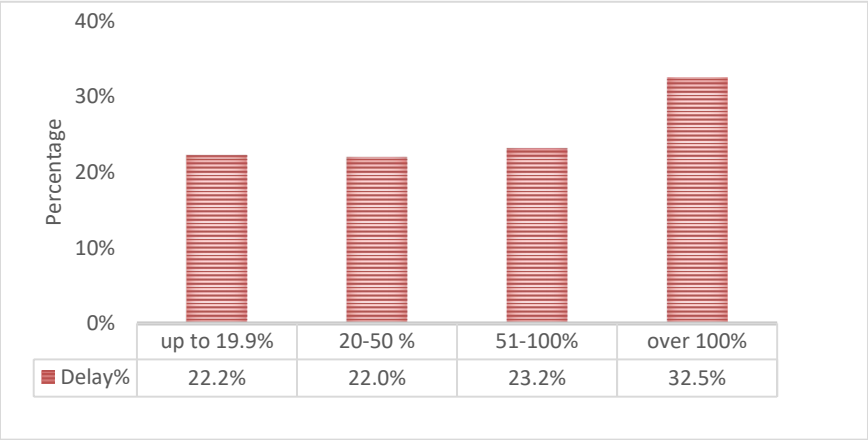


Figure 9.2 The percentage of projects delayed according to the percentage

9.3.2 Factors Causing Delay

The data gathered via qualitative surveys suggests that the main cause of project delay in Karbala, in descending order by importance, are government (Client), contractor, and labour and equipment. Previous studies have reported that the key reasons for delay are Client (government), external and contractor. Both the results from the current study and previous studies show the client to be the main cause of project delay. Previous studies suggest that external reasons and contractors come in second and third place while this study found that contractor reasons came second followed by labour and equipment. In reality, there are no significant differences between the two sets of data (Table 9.2).

Table 9.2 Comparison of the survey results and literature review of the main factors causing delays

Survey Results		Previous Studies	
Cost Overrun's Causes	Rank	Cost Overrun's Causes	Rank
Client (Government)	1	Client	1
Contractor	2	External	2
Labour and equipment	3	Contractor	3

Regarding the sub-factors that cause project delays in Karbala, 61 in total, 20 are responsible for serious delay as shown in Figure 9.3. In order of degree of impact, Government (client) related factors include: financial and administrative corruption (rank 3); excessive bureaucracy regarding project owner operations (rank 4); inappropriate choice of project management (political reasons and unqualified management) (rank 5), and slow decision making (rank 7). With reference to the main external factors, the list reads: political change (rank 1); public holidays (rank 2), and regulatory changes (rank 6), all linked to government.

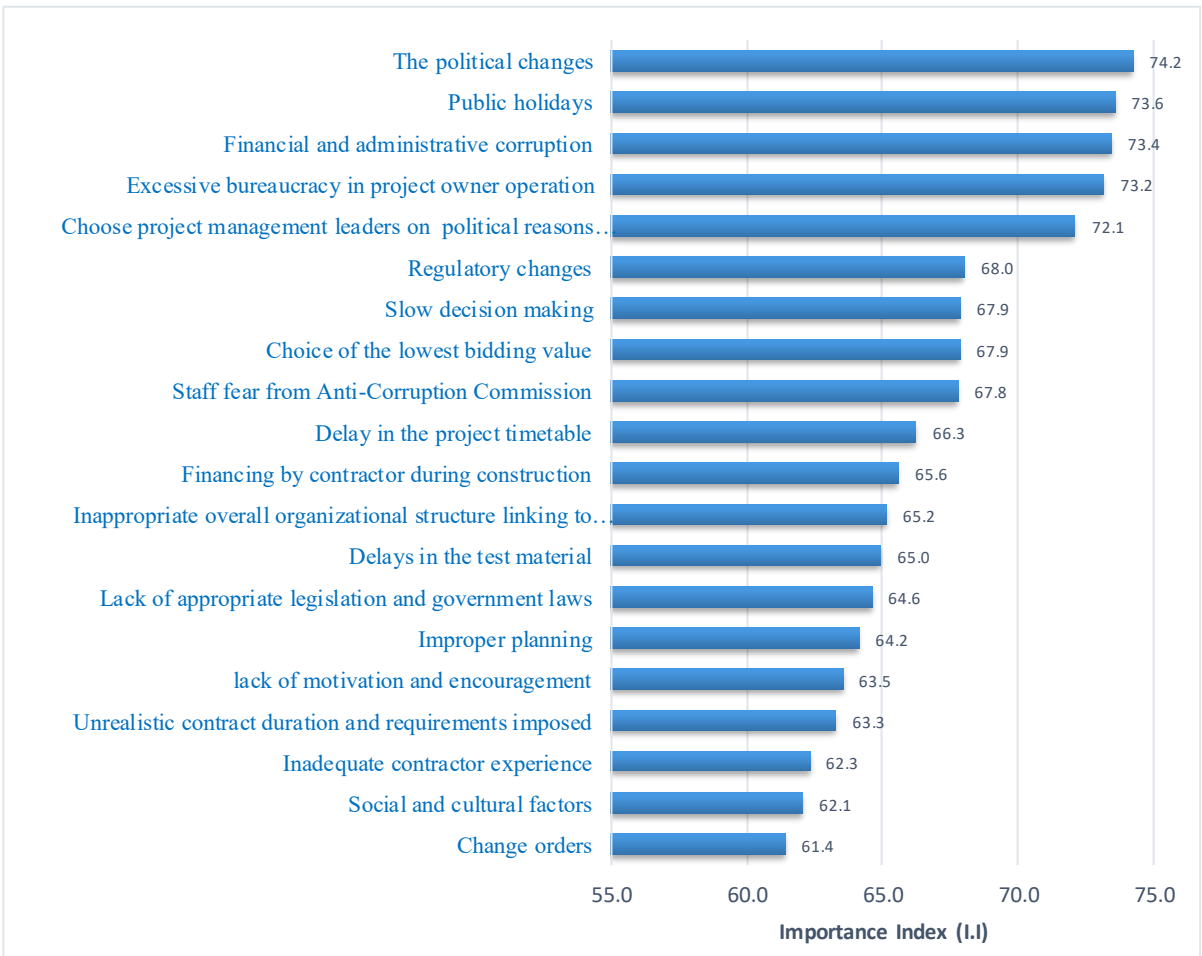


Figure 9.3 Top 20 sub-factors causing project delays in Karbala

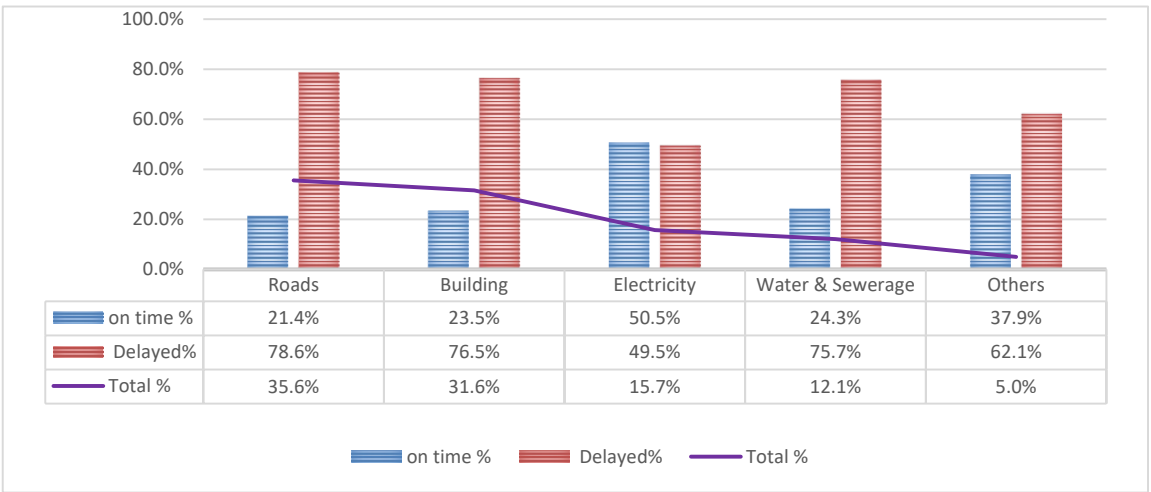
The current study identified political, organisational and corruption factors as the most influential, these results differing from previous studies published in Iraq (Koushki et al., 2005; Awad and Al-Hindawi 2007; Jahanger, 2013; Ghanim, 2015) and the Middle East (Mustafa and Hussain, 2010; Pourrostam and Ismail, 2012; Alnuaimi and Al Mohsin, 2013; Cülfik, et al., 2014). Previous studies found that technical issues have been responsible for poor project management performance this including delays in tests of materials, ineffective planning and scheduling by the contractor, ineffective financial control by the contractor and poor site management/supervision. Security issues were also identified problematic in the past but this factor did not emerge in Karbala as shown in Table 9.3.

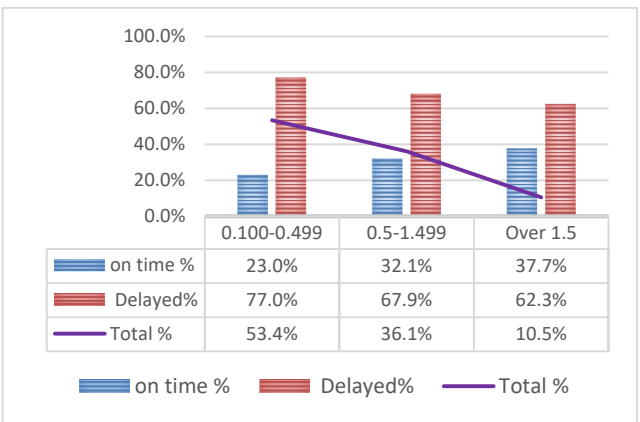
Table 9.3 Comparison of the survey and literature review of sub-factors causing delays

Survey Results		**Previous Studies**	
Quality's Causes	Rank	Quality's Causes	Rank
Political changes	1	Delays in tests of materials	1
Public holidays	2	Ineffective planning and scheduling of project by contractor	2
Financial and administrative corruption	3	Security measures	3
Excessive bureaucracy in project owner operations	4	Inefficient financial by contractor	4
Recruitment of unqualified project management leaders for political reasons	5	Poor site management and supervision by contractor	5
Regulatory changes	6	Government changes to regulations and bureaucracy	6
Slow decision-making	7	Rising costs of materials	7
Tendering system that obligates the choice of the lowest bidding value	8	Poor qualification of the contractor's technical staff	8
Staff fear of Anti-Corruption Commission	9	Official and non-official holidays	9
Delay in the project timetable	10	Low performance of the lowest bidder contractors	10

9.3.3 Findings Related to Time

1. Approximately one out of every four projects is completed on time.
2. Breaking down construction projects, 21.4% of road works, 23.5% of general building and 24/3% of water and sewerage works were completed on time.
3. 50.5% of electricity projects were completed on time, the main reason that most of these projects include supplying equipment and electrical materials and lack of construction works. Other groups of projects; road works, building work, water and sewerage and other project, were completed on time are 21.4%, 23.5%, 24.3% and 37.9% respectively (Figure 9.4).
4. 23% of low-cost projects (M$ 0.1 - 0.499), 32.1% of medium-cost projects (M$ 0.5 - 1.5) and 37.7% of high-cost projects (over M$ 1.5) were delivered on time.
5. Of the projects located within urban administrative boundaries, only 14.6% were completed on time because of the complexities of work in the city centre (Richard and Eschemuller, 2008). In contrast, 37.2% of rural projects were completed within the contract period.
6. Regarding the root causes of delay, no significant differences were found from those identified in previously published studies. However, this study did identify a set of different sub-factors which cause delay.





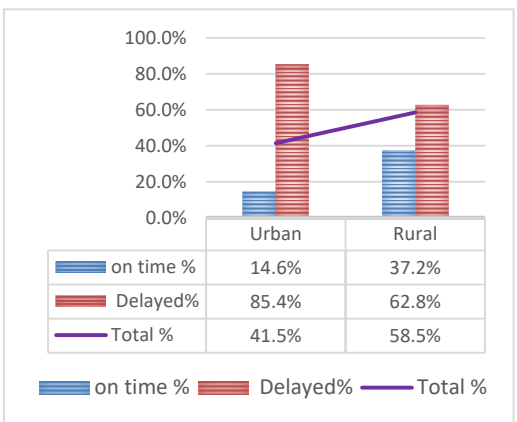


Figure 9.4 Distribution of projects (delayed) depending on the type, cost and geographical location.

9.4 Economic (Cost) Constraints

The issue of cost is essential in the project management process and can be regarded as one of the most important indicators of project success (Aziz, 2013). However, it is more usual that construction projects fail to achieve costing goals i.e. completion within the specific budget. Cost deviation is a frequent phenomenon associated with almost all construction projects (Avotos, 1983; Lee, 2008).

9.4.1 Iraq's Government Budget

Iraq's government budget is nearly entirely dependent on oil revenue with oil exports accounting for 95% of government revenues (IMoF, 2010). Since 2003, Iraq's oil production and exports have risen steadily; exports have increased from an average of 1.4 million barrels per day in 2003 to 4.5 million barrels per day in 2016 (EIA, 2016; Nilsson, 2016). This corresponded with an increase in oil prices from $23.32 billion in 2003, to $140 billion in 2008, subsequently followed by a steady decrease because of a drop-in world oil prices, to $106.17 billion in 2011 and $45 billion in 2016 (OPEC, 2003-2016). Due to these two factors, revenue from the oil sector has increased dramatically, albeit experiencing a drop at present, this clearly reflected in surges in the annual budget. Figure 9.5 shows the annual budgets of the Iraqi Government from 2003-2016 (IMoF, 2003-2015)

According to Iraqi law, the annual federal budget is allocated a certain amount for 'Reconstruction and Development Projects of Regions and Provinces', this to be distributed according to the population of each province.

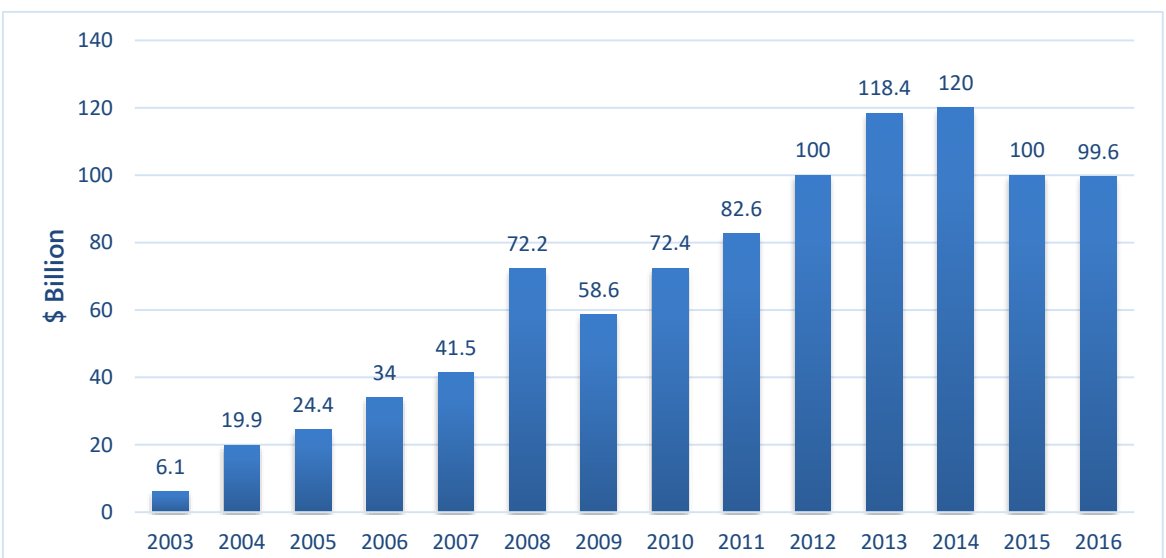


Figure 9.5 Iraqi annual budgets (2003 – 2016) (IMoF, 2003-2015)

"…the governor shall provide a reconstruction plan for the province and its districts and counties, which is to be ratified by the provincial council, depending on the set of plans by the district and county councils to the Federal Ministry of Planning for the purpose of examination and approval, the most affected areas within the province to be taken into consideration. Allocations for the province and its districts and areas shall be distributed according to population ratios after excluding strategic projects that benefit more than one district or suburb. The cost of the new strategic projects shall not exceed 20% of the provincial allocations'' (Iraqi parliament, 2015).

Iraq's budget law includes a mandatory and influential clause in that: "The governor shall exclusively undertake the implementation of the approved reconstruction plan and the provincial council shall be responsible for monitoring the implementation" (Ibid). Iraqi law granted this significant and exclusive authority to the Governor without identifying clearly the professional and academic qualifications necessary for the position. This led to senior management's failure to implement project plans in Iraq.

9.4.2 Budget Processes and Project Planning

Legally, a functioning budget process comprise four essential stages:

1) Formulation, when the executive authority of local government (the governor) drafts the budget proposal;
2) Approval, when the legislative sector of local government (Provincial Council) debates, modifies and approves the budget proposal; this has to then be approved by the Federal Ministry of Planning.

3) Execution, when the executive authority of local government implements the policies outlined in the budget; and,

(4) Oversight, the supreme audit institutions and Provincial Council are controlling and auditing accounts of PM' departments subject to control and making sure of applying financial laws, regulations and instructions.

On examination of the qualitative data results relating to organizational structure and processes analysis, KLG (both the legislative and executive bodies) lack a department or directorate which specializes in the preparation of budgets and planning. However, it has been established that both the current and former governors who are legally responsible and the highest executive authority in the province, did not pay attention to preparation or planning. Their strategy was to assign individuals with limited experience and on a temporary basis, to prepare project plans.

Iraq has been among the 10 worst performing countries on the Open Budget Index (OBI) (IBP, 2015). This is broadly consistent with research that found a negative relationship between hydrocarbon-revenue dependence and budget transparency among autocracies (Ross, 2011). In addition to this, Iraq is one of 16 countries still failing to publish its Executive's Budget Proposal, the primary budget document for the facilitation of public debate and monitoring (IBP, 2015). The Government of Karbala is responsible for nearly 90 percent of the documents that are produced for internal use only and was found to have unacceptably low levels of budget transparency; it appears to be significantly reducing budget transparency by blocking the publication of documents.

9.4.3 Financial Allocations for HKP's Projects

The total budget for HKP's regional development program for the years 2006-2016 was nearly 1.4 billion US dollars. The bar chart below (Figure 9.6) shows that annual budgets increased suddenly from $80 million in 2006 to $130 million in 2008, then fell as suddenly to $79 million in line with the decline in oil market prices in 2009. This was then followed by a gradual rise in financial allocations from $78 million in 2010 reaching $194 million in 2014. Over the last two years (2015 and 2016) allocations were $97 and $138 million respectively. Fluctuations in financial allocation for development projects were due to fluctuations in federal budget allocations, which in turn were influenced by oil prices and the quantity of oil exported. At every opportunity, KLG leaders have requested increased allocations of funds because the amount allocated has been considered insufficient to meet ongoing developments and the provision of essential services to the citizens of Karbala.

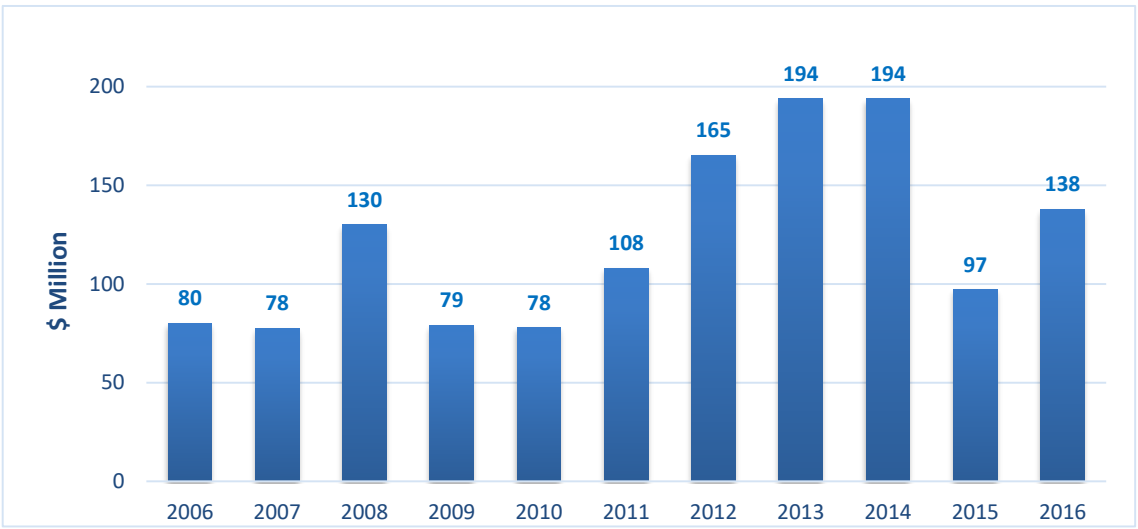


Figure 9.6 The annual budgets for regional development programs in Holy Karbala Province

9.4.4 Financial Status of HKP's Projects

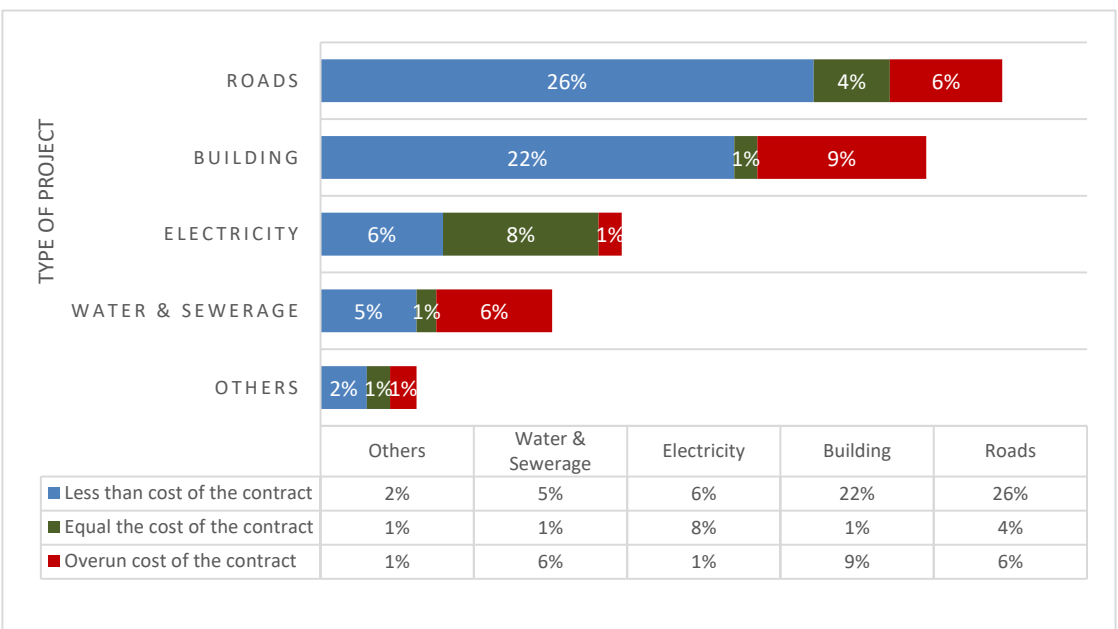
Looking at the secondary data concerning the financial performance of projects in Karbala, the results are clear. Completed projects can be divided into three categories, according to the actual cost in comparison with the contractual cost, as shown in Figure 9.7 and summarised below:

1) 61% of completed projects spent less than the contractual cost.

2) 16% of completed projects spent 100% of the contractual cost.

3) 23% of completed projects overspent the contractual cost.

Figure 9.7 shows the percentage of completed projects by type and comparison between the actual cost and contractual cost. 48% of road and building projects were completed under the contractual cost. The most common reasons for coming in under budget was because of overestimation of materials needed, fines of delay, acceptance lower specifications for lower prices or a lack of clarity and/or accuracy concerning various stages of the work. This can be details as:



	Others	Water & Sewerage	Electricity	Building	Roads
Less than cost of the contract	2%	5%	6%	22%	26%
Equal the cost of the contract	1%	1%	8%	1%	4%
Overun cost of the contract	1%	6%	1%	9%	6%

Figure 9.7 Percentage of completed projects according to actual cost compared with the contractual cost

1) Errors in estimation regarding the quantity of materials or cost of materials: while mistakes in arithmetic have been identified as one of the most common construction estimation errors (Grisham, 2010; Brook, 2012), this high rate of error is not considered a common mistake. The results of the current study point to staff in fear of legal accountability or lack of knowledge and experience in addition to use of inappropriate tools and techniques.
2) Penalties for defects in construction: large financial penalties and liquidated damages occur because of poor implementation. Significant construction errors may occur due to either failure to follow specified procedures, a lack of good practice or carelessness resulting in financial penalties which reverse cost savings due to shortcuts in implementation or because of passing work of a beneath-standard quality. (Josephson and Hammarlund, 1999; Love and Li, 2000). This is something which has been found to happen in projects in Karbala.
3) Late delivery penalties: according to Iraqi legislation, the upper limit for penalties cannot be more than 10% of the total cost of the contract (IMoP, 2008). Because the majority of projects are delayed because of deadline issues (72.2%), a high percentage of financial penalties are levied.

Electricity projects achieved the highest match between actual cost and the contract cost (8%) because of a lack of construction works and the known costs of electrical equipment and materials.

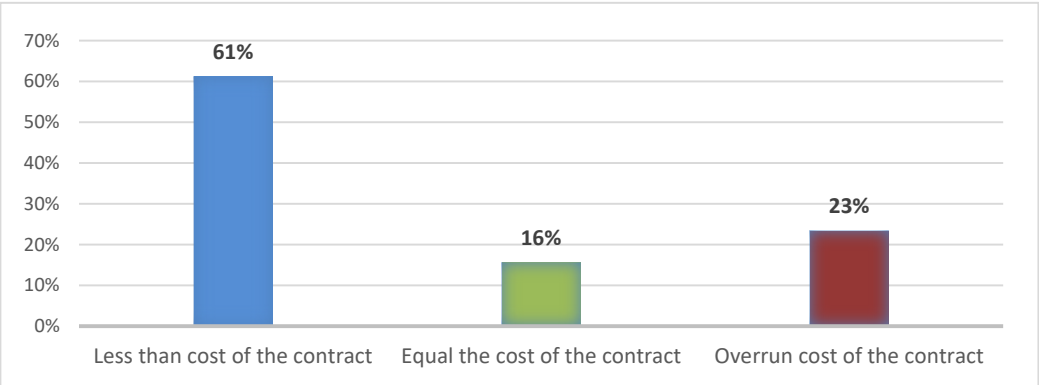


Figure 9.8 Details payments made due to overrun and costing issues.

Figure 9.8 shows that 23% of contracts surpassed their contractual costs, amounting to almost 13.7 million US dollars. 61% of contracts were completed under budget to the tune of approximately 29 million US dollars. According to the Iraqi legislation and procedures, it is difficult to transfer left over funds from completed projects to existing or new plans and developments.

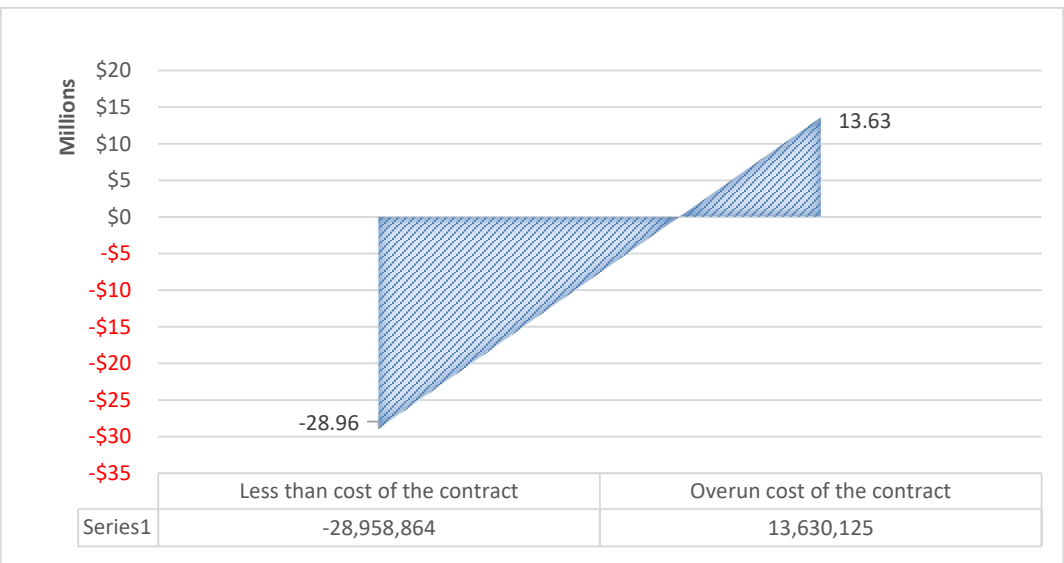
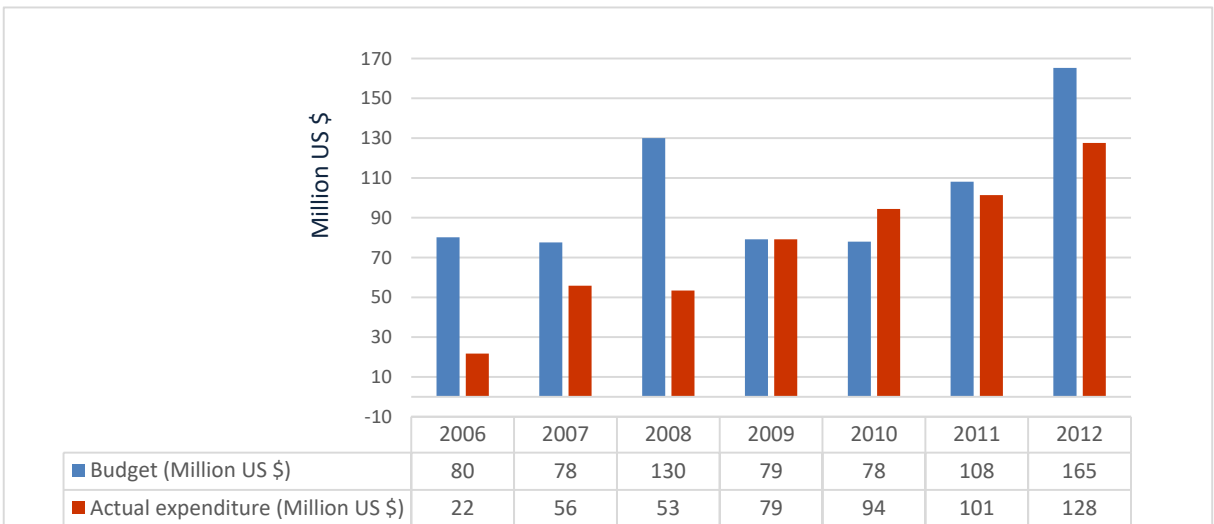


Figure 9.9 The amount of payments due to overrun projects and costing issues

Figures 9.10 and 9.11 show the difference between annual financial allocations, actual spending and the resulting surplus or deficit in the budget. On the whole, there was a financial surplus in spite of the need for services due to poor planning and poor quality construction.



	2006	2007	2008	2009	2010	2011	2012
Budget (Million US $)	80	78	130	79	78	108	165
Actual expenditure (Million US $)	22	56	53	79	94	101	128

Figure 9.10 Annual financial allocations and actual spending for RDP in Karbala for the years 2006-2012

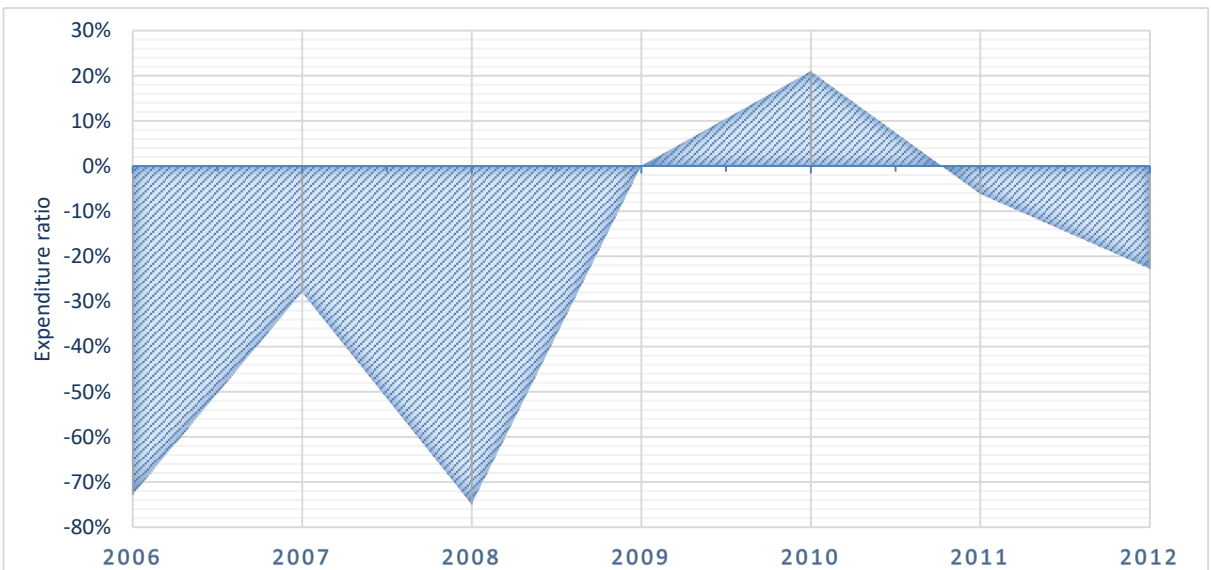


Figure 9.11 Budget deficit and surplus (%) of RDP for Karbala over the years 2006-2012

9.4.5 Financial and Administrative Oversight Agencies in Iraq

There are various authorities entrusted with the task of overseeing financial and administrative tasks in Iraq and, by implication, with KPM:

1. Federal Board of Supreme Audit (FBoSA)

This board has developed over four successive stages, each stage defined through the laws applicable to it. The first stage was between 1927-1968, the second stage 1968-1980, the third stage 1980-1990 the final stage 1990 to the present day. Article 6 (1990) of the FBoSA law stated:

> The essential role of the Board of supreme Audit is to: contribute to support, evaluate and improve financial and administrative performance of the government's institutions, through "central supervision to direct controlling tasks and developing the bases principles, means and ways of implementation and assess the results" (Iraqi Government, 1991).

2. Inspector General Office (IGO):

Within each Iraqi Ministry, the IGO is one of the Federal Oversight Agencies which fight endemic corruption. On February 10, 2004, the Coalition Provisional Authority (CPA), established an Inspector General Office, headed by an Inspector General (IG), based on the American model. The duties of IGs, virtually identical to those of their American counterparts, include auditing ministry records and activities; conducting administrative investigations; addressing allegations of waste, fraud, and abuse; recommending corrective actions to the minister, and cooperating with investigative agencies and the judiciary on cases under review (US-OSIG in Iraq and Bowen, 2009). To accomplish these tasks, the Government of Iraq is supposed to accord IGs "…full and

unrestricted access to all (ministerial) offices." IGs also have the power to subpoena witnesses and documents and are required to report their findings to their minister and to issue an annual report for the Iraqi public.

3. The Commission of Integrity (COI)

This is one of the Federal Oversight Agencies in Iraq, established by the Coalition Provisional Authority (CPA) in 2004. The COI is designed to prevent corruption through legal means, its functions divided four areas: firstly to investigate corruption cases using an investigator under a judge; second, to propose legislation to fight corruption and foster a culture of integrity, honesty, transparency, accountability, submission to questioning and fair dealing with government; third, to require Iraqi officials to disclose their financial status and finally, fourth, to promulgate a code of conduct for public sector employees (COI, 2016).

Since 2003, the task of monitoring finances and related institutions has been affected by decisions made by the Coalition Provisional Authority in Iraq (CPA Iraq), in a manner which censors the use of public funds. This is because the monitoring method applied is similar to that in use in the United States of America. This style of monitoring is somewhat different to the financial and administrative controls applied in the European Union and specifically, in the United Kingdom. They also differ from the methods of control used since the foundation of the modern Iraqi state, this clearly influenced by the British experience in this field (Faraj, 2011).

Both the Commission of Integrity (COI) and Office of Inspector General (OIG) constitute part of the federal authority's institution and are driving anti-corruption efforts in Iraq. However, Iraq is the 161st least corrupt nation out of 175 countries, according to the 2015 Corruption

Perceptions Index presented by Transparency International. The Corruption Rank in Iraq averaged 160.92 from 2003 until 2015, reaching an all-time high of 178 in 2007 and a record low of 113 in 2003, as shown in Figure 9.12.

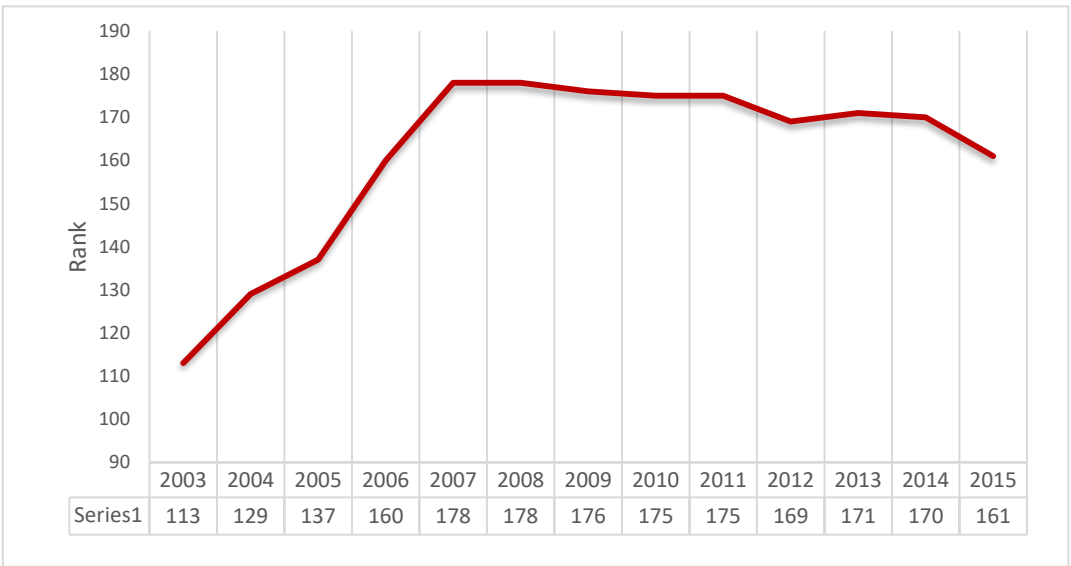


Figure 9.12 Iraq Corruption rankings
Source: www.tradingeconomics.com, Transparency International

The results of the current research have revealed the existence of multiple financial and administrative control bodies whose roles overlap with reference to functions and responsibilities. Corruption spreads horizontally and vertically in most of Iraq's governmental institutions because of political status, organizational weakness and the appointment of individuals who are not qualified to do the job they are employed to do.

9.4.6 Factors Affecting Cost Overrun of Projects in Karbala

The results of the qualitative data analysis reveal that factors related to the government (client) had a substantial impact on the cost of projects. Political change (rank 1) is the main external factor which impacts on this.

The main factors relating to the government (client) are:

1. The choice of unqualified project management leaders based on political reasons (rank 2).
2. Staff fear of the Anti-Corruption Commission (rank 3)
3. Financial and administrative corruption (rank 4)
4. A tendering system that constrains the choice of contractor to the lowest bidder (rank 5)
5. Excessive bureaucracy in project owner operations (rank 6)

Out of 61 factors, there are 20 which have a serious impact on the cost of projects, as shown in Figure 9.13.

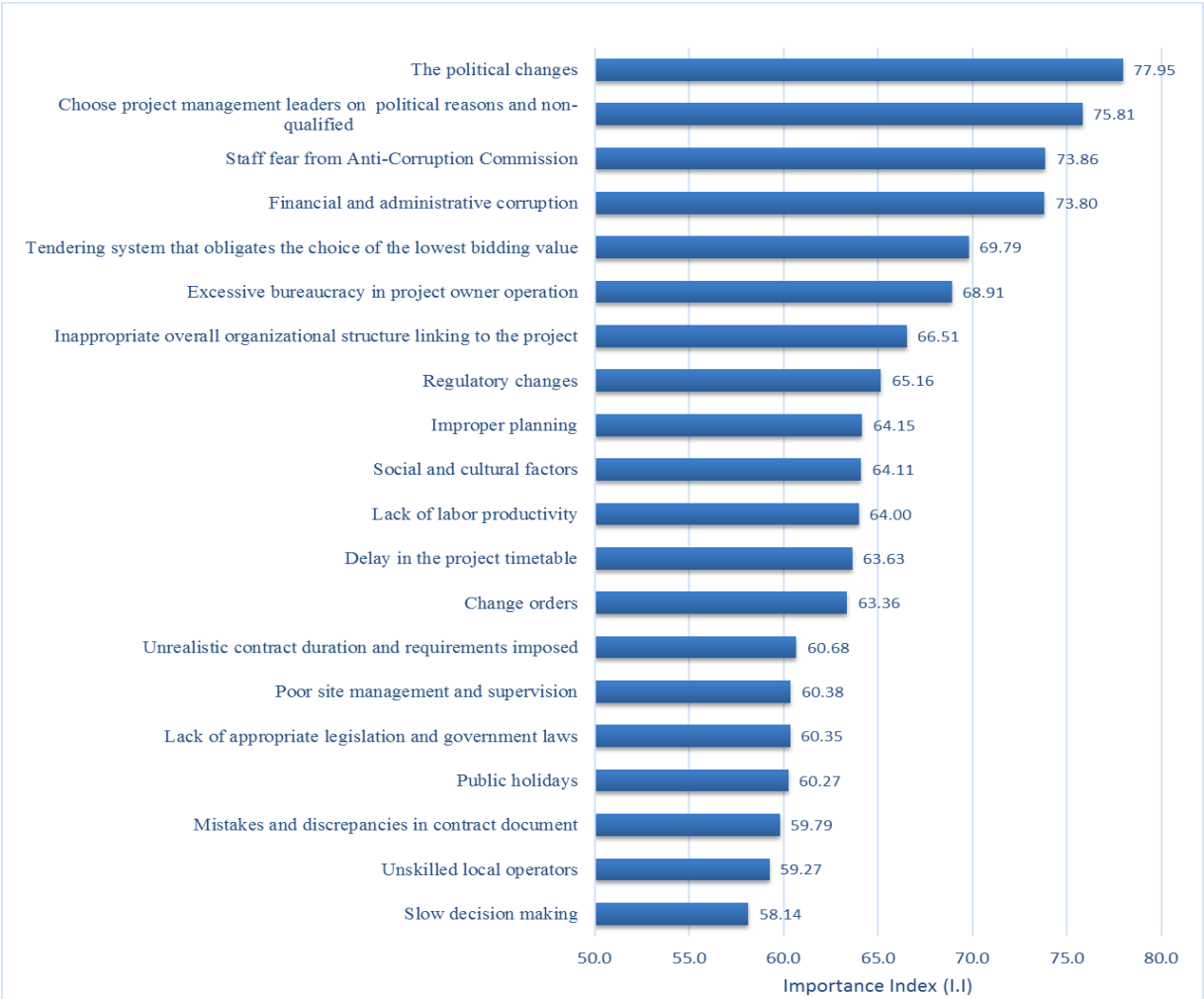


Figure 9.13 The main sub-factors impacting the cost of projects in Karbala

The present findings appear to be consistent with other published studies in developing countries (Nega, 2008; Memon et al., 2011; Durdyev et al., 2012; Aziz, 2013; Bekr, 2015; Rajakumar, 2016), their findings also indicating that client, external factors and contractor issues are the main reason for budget overrun in projects, as shown in Table 9.4.

Table 9.4 Comparison between the current study survey and previous research of main factors which cause cost overrun

Survey Results		Previous Studies	
Causes of Cost Overrun	Rank	Causes of Cost Overrun	Rank
Client (Government)	1	Client	1
Labour and equipment	2	External	2
Contract (Consultants)	3	Contractor	3

Looking at Table 9.5 below, it is encouraging to compare those results with those found by other authors (Ibid). In comparison with the present results, the sub-factors classified as the top four causes of budget overrun for the current study are: political change, recruitment of unqualified project management leaders, staff fear of Anti-Corruption Commissions, and financial and administrative corruption. These differ from many previously published studies from other developing countries. Previous studies have identified causes related directly to the performance of project managers such as: fluctuations and escalations in the cost of labour and material, poor changes and delays in design, improper planning, a lack of experience and schedule delays. Regarding sub-factors, use of the lowest bidder by the client and improper planning match those observed in earlier studies (Durdyev et al., 2012; Aziz, 2013).

Table 9.5 Comparison of the survey and literature review of sub-factors causing cost overrun

Survey Results		Previous Studies	
Cost Overrun's Causes	Rank	Cost Overrun's Causes	Rank
Political changes	1	Fluctuations and escalation cost of labour and/or material	1
Recruitment of unqualified project management leaders for political reasons	2	Poor changes and delays in design	2
Staff fear of Anti-Corruption Commission	3	Improper planning and lack of experience	3
Financial and administrative corruption	4	Lowest bidder method by client	4
Tendering system that obligates the choice of the lowest bidder	5	Schedule delay (time overrun)	5
Excessive bureaucracy in project owner operations	6	Land acquisition and increase in land cost	6
Inappropriate overall organisational structure linked to the project	7	Insufficient geotechnical investigations	7
Regulatory changes	8	Unrealistic contract duration and requirements imposed	8
Improper planning	9	Inaccurate project cost estimation	9
Social and cultural factors	10	Additional works	10

9.4.7 Findings Related to Cost Overrun

1) Iraq's economy depends almost entirely on oil export revenue accounting for about 95% of total budget revenue.
2) Allocations of development projects in Karbala were affected by fluctuations in the federal budget allocations as a result of a drop-in oil export revenue.
3) The total budget for Karbala's development program for the years 2006-2016 was nearly 1.4 billion US dollars.

4) Budget processes; (a) the Governor submits a budget proposal (b) this has to be approved by the Provincial Council and the Federal Ministry of Planning (c) the governor implements the plan and policies outlined in the budget (d) the supreme audit institutions and Provincial Council assess funds spent on financial and administrative performance
5) Iraqi law delegates all financial powers entirely to the Governor.
6) KLG is significantly reducing budget transparency by blocking the publication of documents that the government produces.
7) Currently, statistics show that 61% of completed projects spent less than the contractual cost, 23% of completed projects incurred overspend while 16% were delivered on budget.
8) For the majority of the financial years in the period 2006-2012, there was a financial surplus in spite of the need for services largely due to poor planning, implementation and construction.
9) From the results of the quantitative data analysis, 93.3% of those who completed the survey in Karbala strongly disagreed with the plans for projects as these did not meet their needs. 81.3% believe that there is financial and administrative corruption in the project process. 82.6% felt that KPM is not helping to reduce the cost of projects by investing in alternative approaches. A number of residents complained about the rise in construction costs as a result of an unjustified increase in the quantity of materials consumed and power, including fuel and electricity.
10) The results of the qualitative data analysis demonstrate that factors related to the government (client) had a substantial impact on costs. This included political change, fear of the Anti-Corruption Commission, financial and administrative corruption, restrictions to use of the lowest bidder and excessive bureaucracy.

9.5 Quality Constraints

Quality is considered one of the most important components in the construction industry. As in other industries, it has been considered one of competitive elements amongst construction firms during the last few decades (Al-Ani and Al-Adhmawi, 2011). It is also an essential factor with reference to sustainability and owner satisfaction (Ahmed and Yusuff, 2016). Quality management can be considered one of the important management techniques that industrial corporations rely on to improve their levels of performance. Good management guides firms to adopt techniques in order to develop the quality their work in addition to addressing issues around time, cost and other constraints (Gharakhani et al., 2013). Quality management is all about identifying and following quality requirements, auditing the results of quality control measures and using quality measurements to control quality, recommending project changes if necessary (PMI, 2013).

Regarding Iraqi public sector projects, there is a limit on the level of orientation and response to the implementation of quality criteria because of the lack of comprehensive knowledge and understanding of what quality is. That said, the essential problem is the absence of good quality supervision, in parallel with poor quality management, throughout the construction industry (Hani, 2005; Al-Najjar and Jawad, 2011; Ahmed and Yusuff, 2016).

9.5.1 The Quality and Duties of Supervising Engineers

The main duties and responsibilities of the engineer or supervising engineer are to monitor the implementation of tasks and to make sure all materials and products, works performed and skills used in the execution of the work, or at the manufacturing level, are according to contract documents, conditions and the technical specifications required for each. The engineer,

supervising engineer and contractor are responsible for this, in accordance with the terms and technical specifications required (MoCH, 2015).

Officially, there are three mandatory and essential examinations to test the quality of materials and processes involved in the project:

1) Examination of materials, equipment and supplies for each segment of the project.

2) Examination of the completed works during and after implementation.

3) Examination the completed works of the project before issue of a formal receipt.

9.5.2 Quality Issues from the Stakeholders Perspective

This section will present a summary of the views of residents, employees and contractors about the quality of projects in the Holy Province of Karbala.

- **Karbala's citizens.**

When asked about the quality of projects, 83.5% of respondents said that the implementation of projects in Karbala was poor. In addition to this, many residents complained that local government did not carry out seek periodic feedback from residents as to the quality of work, believing that project work is subject to financial and administrative corruption. It is the belief of the local people that KLG did not care about the opinions of people regarding the development or implementation of projects.

Figure 9.14 shows an example of asphalt pavement failure. The site was not been cleaned before applying the prime coat layer which was then not applied uniformly leading to bleeding off.

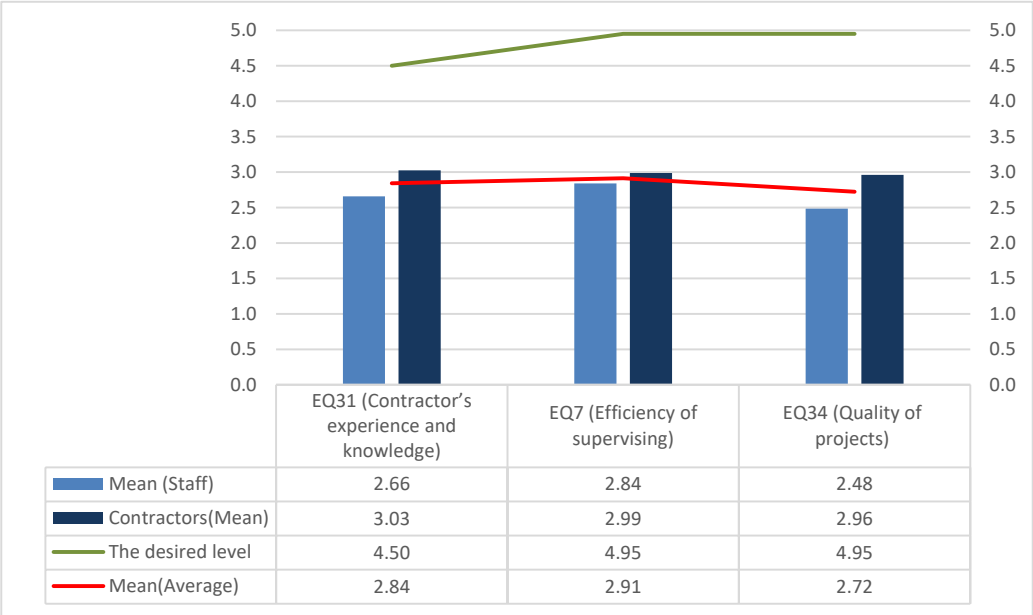
Figure 9.14 A sample of asphalt pavement failure

Figure 9.15 shows an example of concrete works where there is segregation of the aggregate; the coarse aggregate has separated from the concrete in its plastic state. In addition, the grout (cement + paste) has also separated from the mix because it was too wet.

Figure 9.15 An example of concrete works failure

- **B. KPM's Staff and Contractors**

Figure 9.16 illustrates the percentage of difference between the average of means across all groups of participants and the target level of response for the three questions related to this section; experience and knowledge of the contractors, the efficacy of supervision provided by engineers and the quality of implemented projects. The average means of the answers were 2.84, 2.91 and 2.72 respectively, which is equivalent to about 56% applicable to all the questions when presented as a percentage response. The target level of response higher than average of mean answers, but regarding the question of quality of projects, there was a substantial drop in actual responses equal to a mean of -2.72. It is interesting to note that regarding these questions, there was no significant difference between the answers given by both employees and contractors.



	EQ31 (Contractor's experience and knowledge)	EQ7 (Efficiency of supervising)	EQ34 (Quality of projects)
Mean (Staff)	2.66	2.84	2.48
Contractors(Mean)	3.03	2.99	2.96
The desired level	4.50	4.95	4.95
Mean(Average)	2.84	2.91	2.72

Figure 9.16 Comparison between average of mean and the desired level for quality issues

9.5.3 Factors Affecting the Quality of Projects in Karbala

The results of the qualitative data analysis have revealed that the most important factors (20 out of 61 factors) affecting the quality of projects in Karbala, as seen in Figure 9.17, are:

1) External factors: political change (rank 1) and regulatory change (rank 13).

2) Factors related to contracts: the tendering system that restricts choice to the lowest bid (rank 2).

Figure 9.17 The 20 most important 20 factors affecting the quality of projects in Karbala

3) Factors related to government: there are 11 factors which impact on the quality of projects. The most important are choice of project management leaders for political reasons and those who are not qualified (rank 3); financial and administrative corruption (rank 4), and excessive bureaucracy (rank 5) as shown in Table 9.3.

4) Factors related to contactors: there are 3factors which impact substantially on the quality of projects as follows: improper planning by contactors (rank 6); subcontractors (rank 7) and the level of control of subcontractors by the main contractor in the execution of works (rank 8) as shown in Table 9.4.

5) Factors related to labour: unskilled local operators (rank 12).

As can be seen from Table 9.6, both the study results and results from previous studies reveal that the client is the main cause of failure of projects. Previous studies suggest that external and contractor issues came in second and third place while in the current study, contractor came second with labour and equipment third. Consequently, there are no real significant differences between the two sets of data.

Table 9.6 Main factors causing failure for projects in Karbala

Survey Results		Previous Studies	
Quality's Causes	Rank	Quality's Causes	Rank
Client (Government)	1	Client	1
Contractor	2	External	2
Labour and equipment	3	Contractor	3

The results of this study are in agreement with those of previous research (Tan and Lu, 1995; Chan and Tam, 2000; Jha and Iyer, 2006; Callistus et al., 2014; Oyedele et al., 2015; Ebrahim Abu El-Maaty and El-Hamrawy, 2016; Jraisat et al., 2016). The top four sub-factors which caused failure identified in the current research are: political change, a tendering system that restricts choice of contractor to the lowest bidder, recruitment of unqualified project management leaders, financial corruption and excessive bureaucracy in projects. This list differs

from most previous studies published in Asian and African countries (Ibid). Previous studies have demonstrated that the causes related directly to the performance of project management have been the capability of project managers, the effectiveness of the design team, top management support and quality management systems. With reference to sub-factors, selection of the wrong contractor or subcontractors matches those observed in earlier studies (Callistus et al., 2014; Ebrahim Abu El-Maaty and El-Hamrawy, 2016) as shown in Table 9.7.

Table 9.7 Comparison of the survey and literature review of the cause of failure in quality

Survey Results		Previous Studies	
Quality's Causes	Rank	Quality's Causes	Rank
Political changes	1	Capability of project managers	1
Tendering system that obligates the choice of the lowest bidding value	2	Effectiveness of design team	2
Recruitment of unqualified project management leaders for political reasons	3	Top management support	3
Financial and administrative corruption	4	Quality management systems	4
Excessive bureaucracy in project owner operations	5	Lack of training on quality for staff	5
Improper planning	6	Conformance to codes and standards	6
Subcontractors	7	Poor inspection and testing	7
Management of subcontractors by main contractor in the execution of work	8	Lack of management leadership	8
Lack of appropriate legislation and government laws	9	Lack of previous experience of contractor	9
Lack of motivation and encouragement	10	Selection of wrong contractor	10

9.5.4 Findings Related to Quality

1) There is lack of understanding of the meaning of quality with reference to Iraqi public sector projects. However, the essential problem is that of poor-quality supervision and poor-quality management.
2) 83.5% of people in Karbala said that the implementation of projects was poor stating that the KLG had not carried out any periodic assessment of projects in the last few years.
3) With reference to KPM staff and contractors, their assessment for quality of projects was an average of 2.48 (out of 5.0) which is equivalent to approximately 50%. The efficiency of supervision by engineers was rated on average as 2.91 (out of 5) which is equivalent to 59%.
4) The factors exerting the most influence on quality are: political change (rank 1) and the tendering system that restricts the choice to the lowest bidder (rank 2). Both these are the responsibility of the government. There are a further 11 factors affecting quality, also related to government which include: choosing non-qualified project management leaders (rank 3), financial and administrative corruption (rank 4), excessive bureaucracy (rank 5), lack of legislation (rank 9), lack of motivation and encouragement (rank 10) and inappropriate overall organizational structure linked to the project (rank 11). Finally, there are 6 factors related to contactors which include: (rank 6), subcontractors (rank 7) and controlling subcontractors by main contractor in the execution of works (rank 8).

9.6 Environmental Criteria

Looking at the "bigger picture" concerning project management, there is the need to look at all aspects of a project, including the environment, and how change can affect other project management areas (Maltzman and Shirley, 2012; Heizer, et al., 2016). The use of Integration

Management is a potential candidate when considering environmental aspects in the decision-making process. A range of project management processes can be coordinated within this area whereby change is evaluated to determine its effect on all project management processes, including trade-offs, the resulting decision integrated into all aspects of the project (PMI, 2013).

9.6.1 Environmental Regulation in Iraq

Over the last decade, Iraq has adhered to several international treaties on environmental remediation. The Environmental Law 27 in 2009 expanded the role of environmental regulation in Iraq to include Environmental Impact Assessments (EIA) and penalties for non-compliance (Iraqi Parliament, 2009). This new law also contains various criteria required in an EIA. According to Article 10, an EIA must include:

1) Determination of the positive and negative impacts of the project on the immediate and surrounding environment.
2) The proposed means to prevent and address causes of pollution in order to achieve compliance with environmental regulations and instructions.
3) Contingencies for pollution emergencies and potential precautions.
4) Possible alternative technology that is less harmful to the environment and the efficient use of resources;
5) Provisions to reduce waste such as the inclusion of recycled or reused materials when possible, and
6) An assessment of the environmental feasibility of the project and an estimate of the cost of pollution relative to production.

Although Iraq is party to several international environmental agreements and conventions, environmental regulation in Iraq has traditionally lagged behind international standards and historically there has been no compliance with such international laws (Donovan, 2010).

9.2.4.1 Environment Issues from the Stakeholders Perspective

A. Karbala's Citizens

The results of the quantitative data analysis (questionnaire) revealed:

1) 76.3% of respondent's believe KPM does not contribute towards preserving the environment. Several complained of air pollution due to dust during building and that fossils are left in the open without a fence or warning signs.
2) Most of Karbala's residents (78.5%) believe that KPM does not contribute to the reduction of energy consumption and does not seek to increase the use of clean energy.
3) Three out of every four expressed a belief that KPM does not contribute to improving the health of citizens.
4) 82.6% stated that KPM does not help reduce the cost of projects or help to find alternatives.

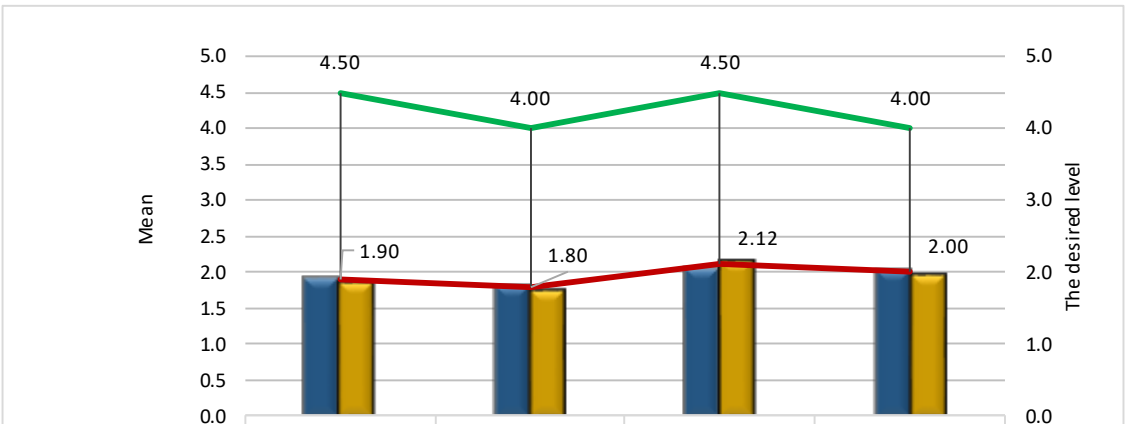
B. KPM Staff and Contractors

Figure 9.18 below illustrates the problems related to environment issues linked to project work. There were four sections in the survey beginning with preservation of the environment, reduction in energy consumption and the use of clean energy, improvements in the health of citizens and reductions in the cost of projects and the search for alternatives.

With regard to preserving the environment, projects contributed to an increase in environmental pollution. Neither KPM nor individual contractors acted in accordance with regulations and legislation, both national and international, in this field.

Looking at reductions in energy consumption and the use of clean energy, KPM did not contribute, motivate nor promote the use of renewable energies in the province and thus encourage the gradual transmission toward a more sentient and sustainable use of energy sources. It is of interest to point out that in Iraq, solar energy density is the highest amongst the world's countries, in addition to a significant wind energy potential in several areas of the country (Kazem and Chaichan, 2012).

Improving the health of Karbala's citizens is a pre-requisite for sustainable development and a fundamental component of the mission of reconstruction. This is regarded as a fundamental duty of decision-makers elected by the people. Figure 9.18 below illustrates the decline in the health of the population and in the standards of health services over the last decade such as poor



	Q14: Preserving the environment.	Q15: Reducing energy consumption and the use of clean energy	Q16: Improvement the health of citizens	Q17: Reducing the cost and finding alternatives.
Staff	1.94	1.82	2.06	2.03
Contractors	1.87	1.77	2.18	1.97
Average	1.90	1.80	2.12	2.00
The desired level	4.50	4.00	4.50	4.00
Gap level	-2.60	-2.20	-2.38	-2.00

Figure 9.18 Environment issues by viewpoints of KPM's staff and contractors

sanitation and water supplies. This is in addition to poor management of hospitals, health facilities and health centres (World Health Organization, 2015).

Figure 9.19 below shows KPM's reported contribution to environment criteria i.e preserving the environment, reducing energy consumption and the use of clean energy, improving the health of citizens, reducing the cost of projects and finding alternatives.

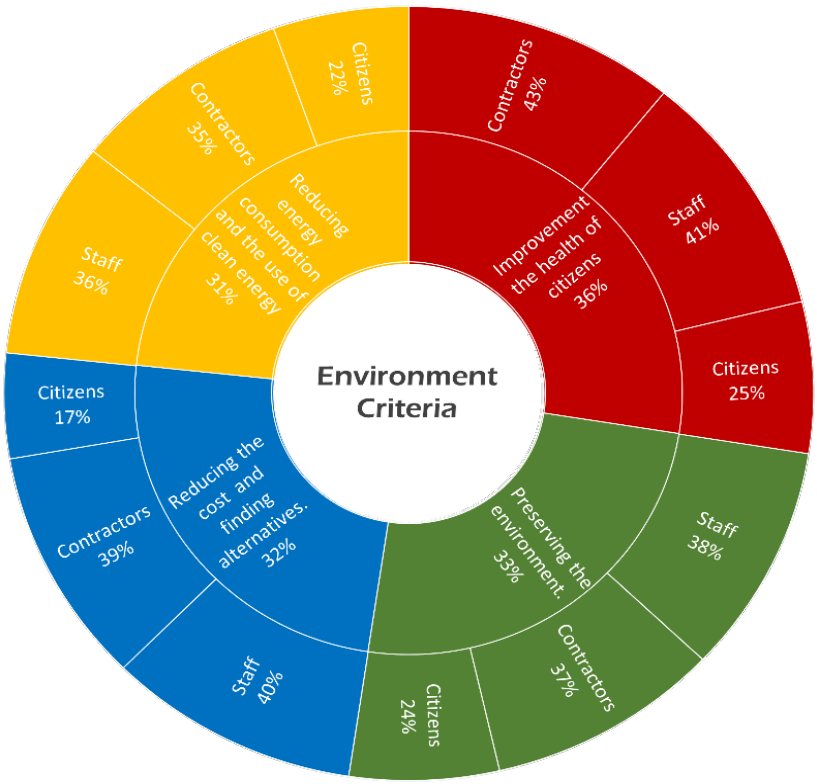


Figure 9.19 Environment issues as reported by KPM

9.7 Social Criteria

Over the last few years, harmonizing social interests has become one of the most important sustainability principles in project management. This is specifically applicable to the social aspects of sustainability, such as equal opportunities, human rights, training, education, health, safety and

engagement in development, factors which can be put to practice by the management of the project team (Tharp, 2013; Silvius and van den Brink, 2014).

According to ISO-BS 26000 (2010), PMI-PMBOK (2013) and IPMA-ICB4 (2016), proactive stakeholder engagement is one of the essential principles of sustainability. Several authors conclude that there is a need for stakeholders to integrate their interests in more project management activities, in other words to link sustainable development, the role of stakeholders and project management activities (Perrini and Tencati, 2006; Pade et al., 2008; Gareis et al., 2009; Silvius et al., 2012; Achman, 2013; Eskerod and Huemann, 2013; Walker, 2015; Martens and Carvalho, 2016).

9.7.1 Social Responsibility

The adoption of social indicators was the first attempt to apply traditional methods of financial reporting by measuring the social impact of company operations (Lin et al., 2014). Matthews (1997) reported that employment and product impacts were the two most targeted fields for social reporters. Ranganathan (1998) identified four indicators for social performance: (1) employment (2) community relations (3) ethical sourcing, and (4) the social impact of products. Kolk (2004) observed that health and safety (accident/injury frequency) seems to receive more attention than other social performance indicators.

The GRI Guidelines for 2015 (G4), list four key elements for social performance: (1) labour practice and decent work, (2) human rights, (3) society, and (4) product responsibility, each element having further sub-factors (GRI, 2015).

The International Organization for Standardization ISO-BS 26000 (2010) (reviewed and confirmed in 2014), defines social responsibility as seven core subjects:

1. Organizational governance
2. Human rights
3. Labour practices
4. The environment
5. Fair operating practices
6. Consumer issues, and
7. Community involvement and development.

Each of the above also has sub-factors (ISO-BS, 2010).

ISO 26000 (2010) provides information and decision-making methods for organisations to identify techniques that would improve their potential impact on the people and places where they work, and thereby become more valuable and valued members of society.

9.7.2 The Corporate Social Responsibility of KPM

This section explores the meaning and practice of Corporate Social Responsibility (CSR) in KPM while establishing a quantitative framework for CSR for KPM. At the policy level, Iraq lacks a policy on CSR or specific measures to support private sector engagement in sustainable development; the private sector does not engage in parallel, or in partnership, with the public sector. This means that there is a lack of appropriate opportunity for corporations and individuals to contribute to social and environmental development, at the same time reducing risk related to business performance (IPMsAC, 2013).

When looking at the social performance of KPM, there are eight aspects of note;

1) Bribery and corruption (GRI, 2015)

2) Disciplinary practices and human rights (ISO-BS, 2010; GRI, 2015)

4) Consumer issues (ISO-BS, 2010; GRI, 2015)

5) Anti-competition behaviour and non-equal opportunities (ISO-BS, 2010; GRI, 2015)

6) Health and safety (GRI, 2015)

7) Community involvement and development (ISO-BS, 2010)

8) Organizational governance (ISO-BS, 2010)

Overall, according to the results of the quantitative data (questionnaires) analysis of this study, Figure 9.20 below shows KPM's involvement in a range of sustainable social criteria including corruption, disciplinary practices and human rights, consumer issues, anti-competition behaviour, organizational governance, community involvement and development.

Figure 9.20 KPM's participation in aspects of social responsibility

It was found that decision-makers in Karbala do not acknowledge or practise social responsibility in their projects. The findings revealed unacceptably low levels of responsibility, according to international standards, for each of the categories shown above. It should be noted that this is the first report on the application of social responsibility in the field of local development projects in the provinces of Iraq.

9.8 Benchmarking Sustainability-Constraints of KPM

Sections 9.3 to 9.7 of this chapter have measured the current level indicators of constraints/sustainability relative to KPM; time, cost, quality, environment and social. Regarding time constraints, the results show 28% of projects delivered on time, while 72% were delayed. Cost (economic) constraints, shows that 27% of projects were completed within the contractual cost, while 73% either went over budget or were completed under budget. 42% of projects were good quality, but 58% of them were of poor quality. 33% of projects incorporated environmental requirements, while 67% failed to meet environment criteria. Finally, with regard to sustainability issues, 35% achieved the set criteria; in contrast, 65% did not meet these.

Overall, all constraints-sustainability of KPM indicators were very low. Therefore, KPM's performance was poor. Due to many reasons including: lack of organizational status and excessive bureaucracy, wrong people in leadership positions, limited capabilities of project teams and contractors, inadequacy legislation with the project management environment and shortfalls in reconstruction plans.

. Figure 9.21 below shows benchmarking sustainability-constraints of KPM at the current levels which measured from the results of this search and gaps which are the amount of the shortfall in the performance.

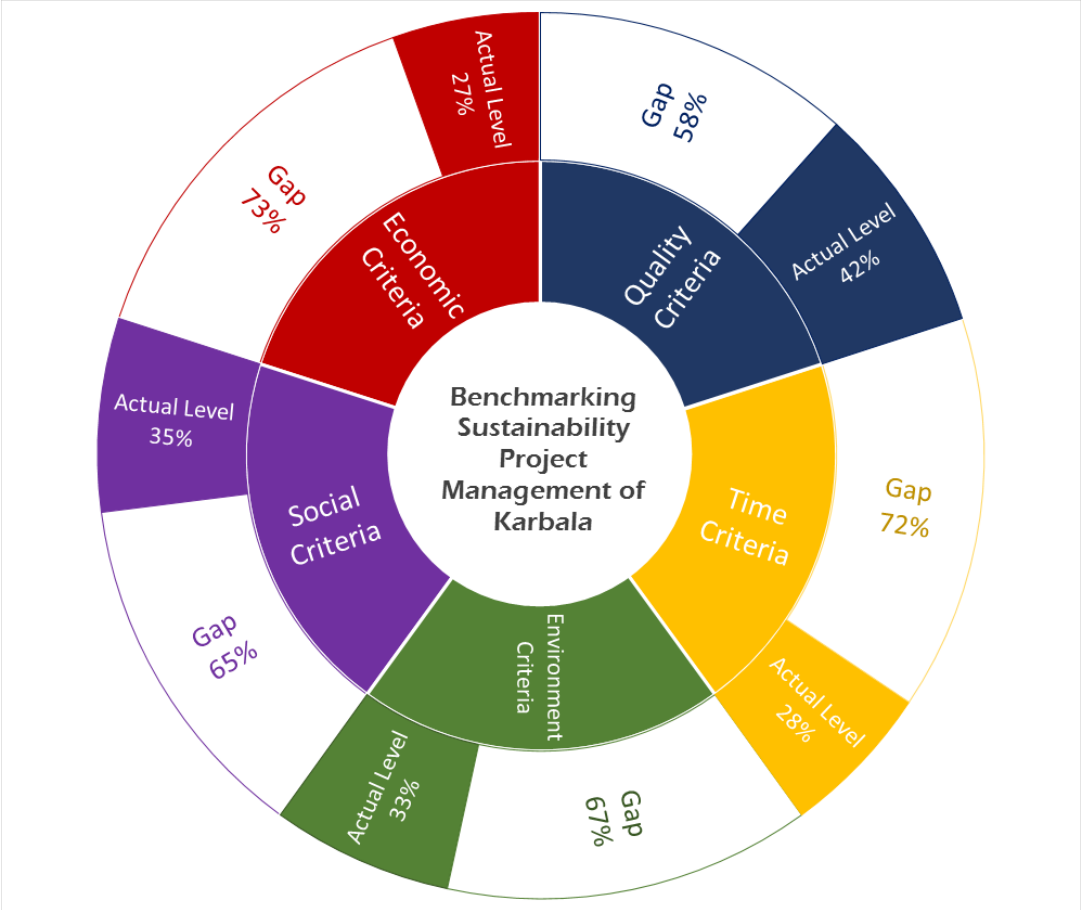


Figure 9.21 Benchmarking sustainability-constraints of KPM

9.10 Measuring performance and benchmarking in Karbala

Benchmarking has become the most important tools to use in order to improve performance (Boxwell, 1994; Lankford, 2000; Barber, 2004; Kim and Huynh, T.A., 2008; Ahuja et al., 2010; PMI, 2013; Grant, 2016). The development of efficient project management in Karbala city is an important objective for this research. Therefore, this study is seeking to find a way to improve performance, to access best practice and create citizen satisfaction. This section presents the results of a review on benchmarking and its application in the study area, Karbala Projects and Program Management (PPM). Previous studies conducted on benchmarking PPM performance have been

summarised. The results for both project and program management, have been summarized separately in tables and figures. The purpose of this section is to offer a starting point in order to plan an improvement framework for those seeking industry-related data for comparison.

9.10.1 PMI Standards Benchmark Tool

PMI is the world's largest project management member association, representing more than half a million practitioners in more than 185 countries. As a global leader and knowledge resource, PMI advances the profession through its global standards and credentials, collaborative chapters, virtual communities and academic research.

The PMI Standards Benchmark is an innovative online tool that gives quick and instant access to PMI standards and other cognitive resources. It is designed for companies that already use project management. It also provides the information needed to increase productivity, ensures alignment in all areas regarding knowledge and processes, and validates and improves team practices for all sizes of organizations.

PMI Standards Benchmark offers an efficient and effective way to access project management knowledge to facilitate further improvement. It is a self-assessment tool that allows an organization to evaluate the design and processes in use by their developer. The tool, based on questionnaires, uses 42 questions about project management and 47 questions about program management, thus allowing users to see where improvements are required.

The first-time user answers a questionnaire using the tool to create a baseline for future evaluations. Baseline reports include an overall score which comprises scores for each of the Knowledge Areas. (GREEN = Always, YELLOW = Sometimes / Occasionally, RED = Never).

Every time a search is performed, the system shows where there is improvement with respect to the management of projects and programs.

For the current research, the PMI Standards Benchmark Tool was utilised, purchased directly from pmi.org/Marketplace. The primary purpose of using this tool is to identify a baseline and then document improvement in Karbala's project and program processes. This benchmarking entails gathering information from currant practices of the study area to beneficially apply it to future practices in same organisation or other organizations with similar properties and same conditions such as the rest of project management in other Iraqi provinces. The main advantage of PMI Standards Benchmark Tool is that assists PM developers, directors or managers quickly and easily demonstrate improvement (PMI, 2016). PMI Standards Benchmark offers project and program surveys as follows;

- The Project Benchmark assessment is a high-level assessment of an organization's project management processes. It is based on the processes detailed in the PMBOK® Guide fifth Edition. This assessment is appropriate if an organization has not implemented program management (Ibid).
- The Program Benchmark assessment is a high-level assessment of an organization's program management processes. It is based on the processes detailed in the Standard for Program Management, Third Edition. This is assessment is appropriate if an organization has implemented program management (Ibid).

The researcher used the results of both the quantitative and qualitative data obtained from this study as the basis for the PMI Standards Benchmark tool.

9.10.2 Karbala Project Benchmarking Report

According to the PMI's benchmarking project report below, the overall rate of KPM benchmarking was 33%, with no significant difference between specific areas of knowledge. It can be seen from Figure 9.22 that project integration management (53%) was rated more highly than others areas of knowledge but although this was higher in comparison to other areas, it remained at 'YELLOW = Sometimes/Occasionally' according to the PMI classification. Project risk, project time and project human resource management were rated the lowest within the same category of the classification at 25%, 26% and 25%, respectively. The remaining areas of knowledge also achieved moderate scores within the same category of classification.

These results support the findings of this research, particularly in procurement, human resource, time, cost and quality management. However, a high score for project integration management rate (53%) was an unexpected result. This may be interpreted as human error with data input or that the experiences of engineers on previous projects impacted this result.

Figure 9.22 Karbala project PMI benchmarking report

9.10.3 Karbala Program Benchmarking Report

The PMI's benchmarking program report (Figure 9.23) has evidenced that there is considerable failure in performance with reference to program management as seen by an overall score of 27% falling in the YELLOW = sometimes level. There was no significant difference between any area of knowledge implying that failure is apparent across the board.

Figure 9.23 below shows that very few fields were rated higher than others, for example, program scope and program stakeholder management were rated at 32% and 35%, respectively. While others areas of knowledge had lower percentages, all knowledge area rates remained at level YELLOW = Sometimes/Occasionally, according to the PMI classification.

The present findings are consistent with the results of this research. Weak organizational structure and PMO has resulted in a low percentage of program governance. Delays in projects (72.2%) had a direct impact on time management (26%). Deviations in budgets (84%) have had a direct impact on levels of finance management (26%). Likewise, routine excessive bureaucracy and weaknesses in the administrative system have resulted in a weak procedures management indicator (25%).

Figure 9.23 Karbala program PMI benchmarking report

The comparisons between project and program management benchmarking by the PMI tool shows that project performance was the better at 33% (Figure 9.24). This a marginal difference (program management 27%, project management 33%) is consistent with the results of the study.

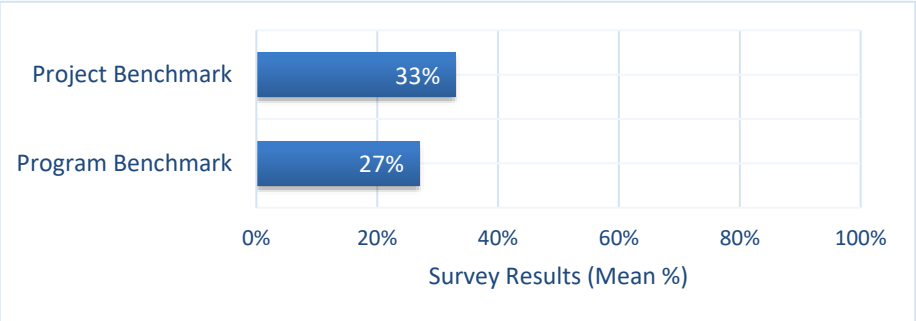


Figure 9.24 Overall project and program benchmark

The Figure 9.25 shows that integration management score for project was much better than the programs. Likewise, indicators of procedures, communication, scope, and cost management in project management were higher than their counterparts in program management. While find that the risk and time management indicators were almost equal for both project and program benchmarking levels.

Overall, the scores of knowledge area benchmarking for Karbala' management (project and program) according to PMI' reports above were very low. But find some important differences between evaluating of projects and programs in most knowledge areas benchmarking scores. Which indicates that the performance of the project team was better than the performance of their bosses in the upper management, because of the academic background and years of experience in field of building and reconstruction of project teams is the best than their boss. this is indicators agree with the survey results of this study.

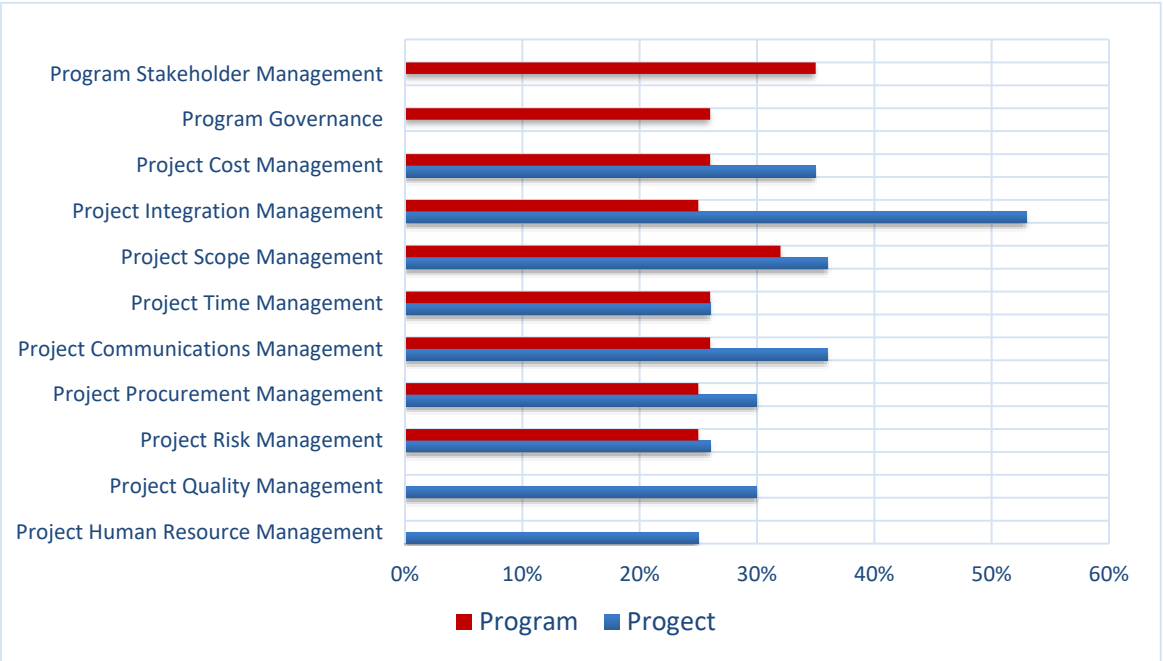


Figure 9.25 Project and program benchmark levels

Figure 9.25 above shows that the integration management score for projects was much better than the program score. Likewise, indicators regarding procedures, communication, scope and cost management in project management were higher than their counterparts in program management. Risk and time management indicators were almost equal for both project and program benchmarking levels.

Overall, the scores for knowledge area benchmarking for Karbala's management (project and program), according to the PMI reports, were very low. However, there are some important differences between projects and programs in some of the knowledge benchmarking scores indicating that the performance of the project team was better than the performance of their bosses in upper management. This may be due to their academic background and years of experience in the field of building and reconstruction; they are better qualified than their managers, a finding which substantiates the survey results from this study.

9.11 Summary

In this chapter, the findings from seven areas (time, cost, quality, social, environment, project and program benchmarking) were discussed in light of the literature reviewed in Chapters two, three and four. This was conducted in order to assess the processes and practices of public sector projects within the limitations of local government authority in HKP. This chapter has highlighted the importance of five areas within project development as vital if any project management team is to achieve its objectives. The study found that regional development projects in Karbala did not reach PMI standards. Schedules, budgets and quality control were all rated as failures. Each of these is affected differently by a range of factors. This study revealed low attainment levels of environmental criteria such as preserving the environment, reducing energy consumption and the use of clean energy, improvements to the health of citizens, reductions in costings and finding alternative construction materials and energy sources. Furthermore, CSR findings revealed unacceptable levels of practice according to international standards for each of bribery and corruption, disciplinary practices and human rights, consumer issues, anti-competition behaviour and non-equal opportunities, health and safety, community involvement and development, and organizational governance. Both this study and PMI benchmarking concluded that both project and program performance were very weak. For these reasons, the project management team cannot be expected to handle problems created by poor management by focusing only on technical improvements, schedule- or budget-related issues; nor can any project team assume that time, cost and quality are affected equally by them.

According to these findings, it can be concluded that the problems plaguing projects in Karbala are not partial problems (Micro-Problems), but instead are structural problems (Macro-

Problem) related to the organization of Karbala project management and its practices. This is related to four axes:

1) Limited capabilities of leadership, project teams and contractors as well as the absence of a project manager role.
2) Organizational weakness and excessive bureaucracy.
3) Shortfalls in reconstruction plans.
4) Lack of legislation which could promote better development and capacity building.

The next chapter discusses key issues that affect projects in Karbala and their causal relationships. It will also present a conceptual framework for the development of best practice.

Chapter 10 : Discussion and Development of a Conceptual Framework for Project Management in Karbala

10.1 Introduction

This chapter is devoted to a discussion of the key issues and causal relationships concerning engineering project management in Karbala Province. The issues of concern are those around problems related to the implementation of projects. This chapter critically analyses these in relation to the findings of other research introduced in previous chapters. Guidelines are then proposed for the development of a conceptual framework for successful project management by merging the results from this research with those from the literature. This conceptual framework adopts several strategies leading from the results of the current research which address problems including a lack of legislation, the limited capabilities of leaders, project teams and contractors, and organizational weaknesses.

These key issues and causal relationships are discussed in the following ten sections.

10.2 Political Change

Political changes and project management are two processes which, while very different, are also inextricably linked (Andersen, 2008, p 247; Pinto, 1996). It is important to understand that project management as a profession, consists of more than simply being technically minded and able to cope with managerial issues (Pinto, 2000). A project manager also needs to acknowledge politics as a fact of organizational and project life (Randolph and Posner, 1988).

That said, political changes are rarely addressed in project management research in that there is no empirical data available about the impact of such changes on project management practice. However, there is the need to understand that their presence is ubiquitous and their impact significant especially in countries where democracy is emerging for example, the Middle East and North Africa. According to the results of this study, it is political change which is the main problem faced by project managers and how to develop projects within an evolving political context. There is the need to find effective project management techniques which may help to avoid conflict arising from politics.

Admittedly, political change is ubiquitous in any democratic country, particularly in those that strives to fulfil society's needs (Dike, 2008). Such a government is one that aspires to win under committed leadership and aims to accomplish propitious changes in quality of life and to provide better services. In Iraq, specifically in Karbala, the local elected government is new to democratic practice. This state of affairs is having a significant impact on the delivery of projects to meet the needs of citizens. Looking at this in more detail, this research found that political changes such as the election of the governor and his deputies every four years, has impacted on time, cost and the quality of projects.

The elected politicians in Karbala do not have an in-depth knowledge of Karbala's services and economic status; neither do they have appropriate business management skills, especially in project management. These individuals have limited knowledge about what is current in the business world and how scientific and technological developments can be applied in Karbala, thus improving the status of the province (Salem, 2012).

The impact of political change on projects in Karbala was because of the following reasons:

(1) Iraqi legislation grants the governor full administrative, financial and technical powers regarding development project management, as befits the highest executive authority in the province (Iraqi Parliament, 2008-2016).

2) Elected members of the Karbala Provincial Council, have appointed the governor and his deputies (Iraqi Parliament, 2008) who, it transpires, do not have the appropriate economic or business knowledge and experience needed for project management. Even with an awareness that they did not possess such expertise, they did not hire experts or consultants in the field as shown by the research results.

3) Sound leadership is a critical and essential component for any project management team (Karas et al., 2009). A leader is someone who has the ability to influence and motivate (House, 1996) and to translate vision into reality (Bennis, 2013), directing the activities of a group of individuals to achieve a shared goal (Yukl, 2002; Northouse, 2015). In addition, he motivates others to reach their maximum potential and to accomplish any task, objective or project (Cohen and March, 1974) thus enhancing the efficiency and success of the organization (House, 1996). It is therefore important to engage an individual who has the necessary skills to form, lead and facilitate a project team. A great leader can create a successful team of individuals who may seem initially to lack ability while a poor leader can cause the collapse and failure of an already great team (Kidd, 2009, p76).

10.2.1 KPM and Decentralization in Iraq

Under the former regime, the rule of Saddam Hussain, the provincial Law No. 159, 1969 made centralized administration the dominant management system. Furthermore, this law made the governor the representative of executive authority in the province. Said governor was therefore responsible for the implementation of central authority policy and of monitoring the performance of the Local Administration according to articles 17 and 28 of this Act.

A change in regime has led to changes in the mechanisms of central administration of the provinces and the distribution of power between central authority, regions and provinces. The new political reality in Iraq has seen the introduction of values and practices like administration decentralization for provinces.

The spring of 2016 saw the 10-year anniversary of the launch of regional development plans (a reconstruction program) in Iraq. However, this whole process has been slow because of development plans which were unprofessional and of poor quality due to a lack of input from individuals who had the necessary qualifications, training and field experience. This was exacerbated by the emergence of a pattern of political conflicts between the ruling parties which then caused a power conflict between federal and local state institutions. This resulted in a deterioration of public services and frustration for its citizens. This situation has angered many citizens, especially those in Karbala, and raised major questions requiring reflection and assessment due in part to the fact that the government choose to turn a blind eye to the situation.

Karbala Province have lodged complaints, as have other provinces, about a lack of allocation of and access to the powers necessary for reconstruction works and provision of services. What makes matters worse is that the general federal budget allocated for the years 2006 – 2016 amounted to approximately $1.5 billion for development projects in Karbala.

Over the last decade, most Federal Government (FG) directorates have had a level of involvement with Karbala's Local Government in the planning, implementation and supervision of engineering projects, specifically for infrastructure and service. FG directorates are beneficiary bodies for project development providing public and basic services directly to citizens such as municipal services, roads, water, sewage, health, education and electricity. They have engineering and technical staff with appropriate expertise and specialization in the field. Although Local Government departments have been growing since 2003, they do not have the appropriate number of qualified engineering and technical staff to meet the needs, the size and the scope of development plans in the province.

The nature of the organizational and administrative framework of state institutions has caused, and still causes, a significant number of problems and obstacles. This in turn has influenced the outcome of projects as detailed in Chapter Seven.

10.3 Un-qualified Leaders

Lord Salter (1955) described the management problem in Iraq nearly sixty years ago, when he said;

> "The chief limiting factor to the success of development in Iraq may prove to be neither the amount of money for investment, nor even the limits of skilled labour and materials available, but the efficiency of the administrative machine" (Salter, 1955, p. 96).

Sadly, this statement has been found to be true. Unqualified leaders, the wrong people, were placed in post creating organisations of low stature. Because of a lack of knowledge and experience in business administration and organizational science, they did not hire experts in the field. The most important negative effects of these choices are as follows;

1) The choice of organizational structure and distribution of tasks has resulted in low regard for these authorities. Relationships between departments and individuals are also poor. This structure is close relatively to flat structure. The main disadvantages concern some of the challenges faced by the project team in the process of project implementation. The project team must negotiate and consult with departmental managers on various issues and because of poor communication, this has led to delays in decision-making. It has also triggered tensions between the functional manager and project team. Under any circumstances, sharing resources, functions and authority among different projects and departments will result in conflict and competition for scarce resources, conflicts of interest, delegation of responsibility and authority. In the case of the management of projects in Karbala, this task has not been carried out according to the principles of unified management. Project team members have many different line managers issuing many different instructions, this very confusing in the absence of a project manager. When management are divided, members feel lost and confused. Projects suffered from a lack of focus. Each unit has its own core tasks of general business, but most of the time, in order to fulfil their other duties, focus on the project will be poor.

ISO 9001 recommend that all project teams must have a job description which is compliant to the organization responsible for procedures. It then follows that all job descriptions must correspond with working procedures. This means that every working procedure in the organization must have a responsible person behind it. As each working procedure of an organization is executed, the end result must be reported to someone at the end of the day. This flow of information must reflect the hierarchy within the organisation: floor staff to management and so on. The structure defines who is managed

(hierarchically) by whom and who is supposed to report to whom. Defining the structure is one of the first steps in documenting a quality system (ISO, 2015). It is clear that within Karbala, the organisational structure did not achieve the simplest requirements according to ISO standards.

2) In an organisation that is performing below par, as apparent in Karbala, leadership has not created or maintained trustworthy relationships with staff. They have not valued employees' loyalty (De Waal, 2007), shown people respect, created or maintained individual relationships with employees, encouraged belief and trust in others or treated people fairly (Sayle, 2015). Karbala's organization and its employees do not share a common culture by which they could share common aims and follow appropriate procedures to achieve them. A collective culture should have positive impact on motivation in an organization (Uddin et al., 2013) as the existence of a common culture should motivate employees to identify with the organization, feel that they belong to it and feel responsible for it (Brown, 1998). Many authors argue that low performance within an organization leads to the birth of a weak culture (Lussier and Achua, 2015, p 53; Barbera, 2014, p 362; Kotter, 2008). The results of the current study have shown that there are two negative elements related to organizational culture: (a) the degree of consistency of beliefs, values, assumptions and practice across organizational members are very weak, and (b) the pervasiveness (number) of beliefs, values, assumptions and practices contravene the goals of the organization.
3) Employees commented on poor management when surveyed. There are several practices which point to the causes of poor management and which have contributed to the

breakdown in relationships between management and staff, the first being not listening and not making staff feel valued. Karbala's management can be described as non-professional, lacking in management training and expertise and as such, do not make people feel valued and do not take the time to actively listen to them. Many employees are frustrated because they feel that management are not really paying attention to what they are saying. This situation is not consistent with the requirements of the IPMA-ICB4, (2016); PMI-PMBOK, (2013) and ISO-BS 26000, (2010). The second practice impacting relationships is that by not enforcing standards and principles of unified management, many people are left without a clear understanding of their role and responsibilities. Too often management have sent the message that the standards are not important or relevant. This is not in agreement with the recommendations of ISO 9001(2015), the PMI PMBOK Guide (2013) and BS 6079-1 (2010).

4) As seen in Figure 10.1, The Dunning-Kruger (1999) effect (awarded the 2000 satirical Ig Nobel Prize in Psychology) is a cognitive bias by which unskilled individuals suffer from illusory superiority, mistakenly assessing their abilities as much higher than they really are. Psychologically, this effect is born from a metacognitive inability of the individual to recognize their limits. The opposite effect happens when a highly skilled person thinks he/she is not good enough. In consequence, this can explain why decision makers in Karbala do not admit to their mistakes easily, in spite of the accumulation of weaknesses in their management and failed output.

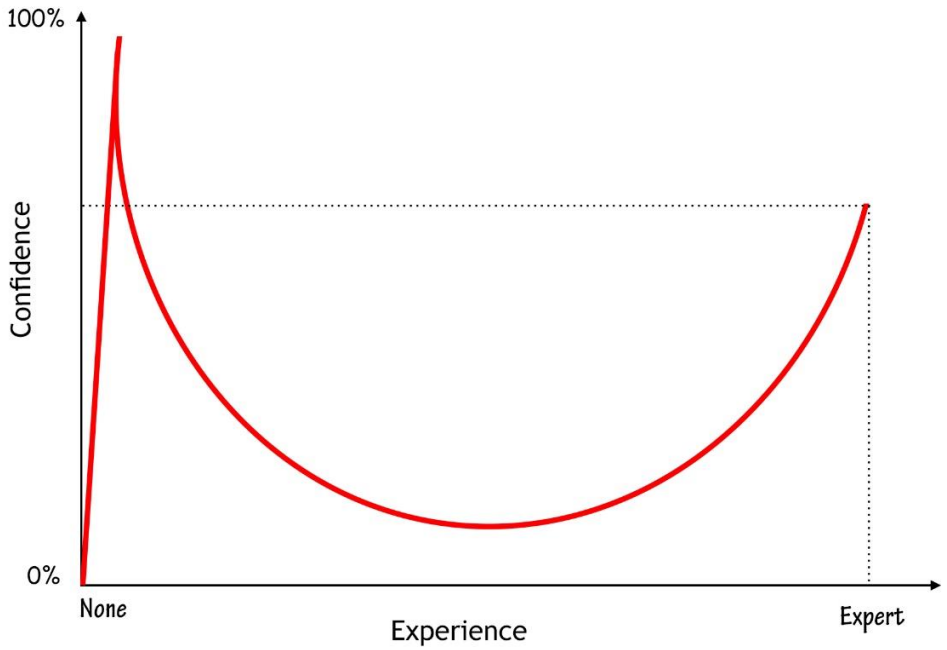


Figure 10.1 Dunning-Kruger effect (Kruger and Dunning,1999)

10.3.1 Karbala Project Management Leaders

Iraqi legislation bestowed exclusive authority onto the governor for administrative, financial and technical affairs regarding the management of regional development projects in the province. The governor is the highest executive authority in local government (Iraqi Parliament, 2008).

The governor, his deputies and the Head of the Reconstruction Committee of the Province Council, are the top administrative and political authorities responsible for the preparation and approval of project plans, subsequent implementation and monitoring (Ibid). They often represent the ruling party in the province. They are appointed via election, or consensus, by provincial council members in 4-year election cycles (Ibid). Table 10.1 shows the number of governors, their deputies and the Head of the Reconstruction Committee for each election cycle.

Table 10.1 Number of project management leaders in Karbala (2005 to 2017)

Years of election cycles	Governor	Deputy Governor	Head of Reconstruction Committee	Total
2005-2009	1	1	1	3
2009-2013	1	2	1	4
2013-2017	1	2	1	4
Total	3	5	3	11

Karbala PM leaders have come from a range of academic backgrounds. 46% studied law, 18% education and 9% for each of agriculture, medicine, veterinary medicine and the arts as shown in Figure 10.2.

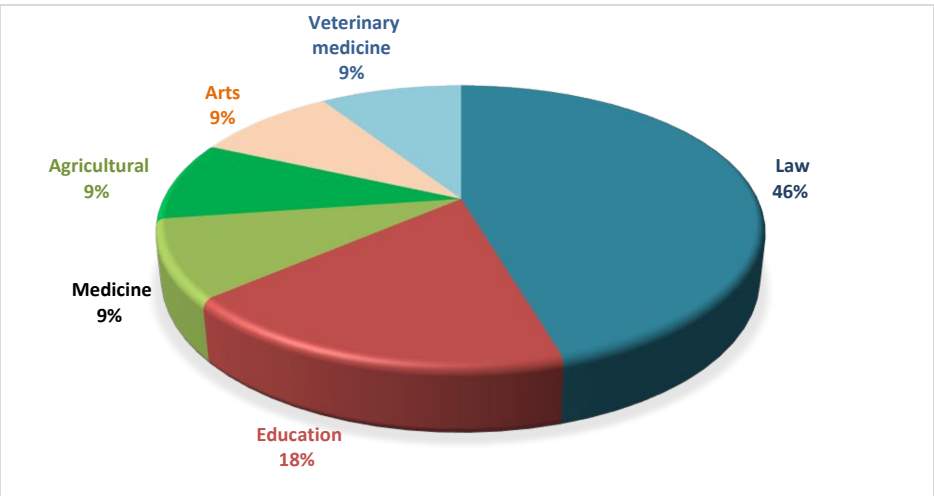


Figure 10.2 Academic background of Karbala PM leaders

Figure 10.3 shows that the leaders of first electoral cycle (2005-2009) had practised in their specialty for less than 5 years. No leader had previous knowledge or experience in the practice of project management.

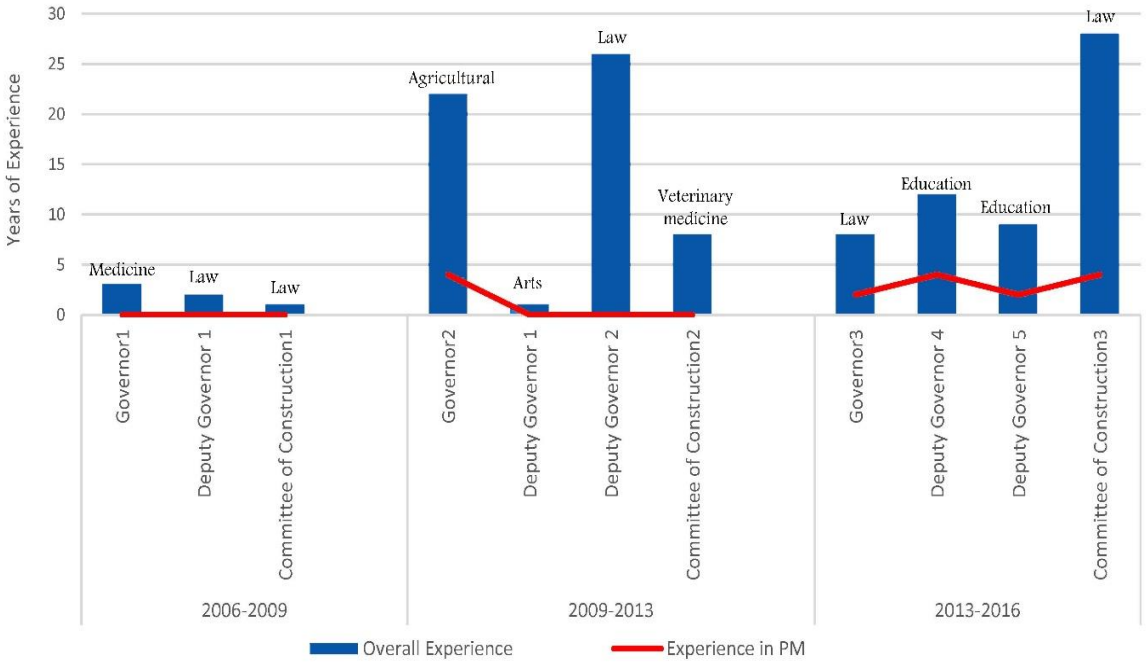


Figure 10.3 Overall and project management experience of Karbala PM leaders

Elected leaders from the second electoral cycle (2009-2013), had worked in their own fields from one to twenty-six years as seen in Figure 10.4. Only the governor had any experience in project management, amounting to approximately 4 years. Finally, regarding those from the third electoral cycle (20013-2017), they also spent a variety of time working in their own fields, from eight to twenty-eight years. This group had an average of 3 years' experience in project management.

According to Iraqi provincial law No. 21 (2008) and its amendments, issued by the Iraqi parliament, nominees for the position of governor and his deputies should have obtained a university degree the same as for the Chairman of the Committee for Reconstruction. This law does not specify how many years' experience they need, their level of competence in the field nor any other professional qualifications required.

According to the laws governing the Iraqi federal budget for the years 2007-2016, in relation to reconstruction projects in the provinces, all financial, administrative and technical authority was proportioned to one person, the governor. This was in addition to his other responsibilities concerning the management of province such as security, health, public services, education, agriculture, municipal, culture and citizens' affairs. This same law stipulates that the governor has two deputies, five assistants and five consultants, however, the responsibility for project management is solely on this one person. It must also be noted that while these laws allowed the governor to give some of his powers to his deputies and assistants (Iraqi parliament, 2008), this was not done effectively.

This legislation created the scenario where unqualified leaders were appointed causing weaknesses in the regulatory and administrative status of project management in Karbala.

10.3.2 The Lack of Managers of Millions Dollar Projects

A more serious problem for development projects is the shortage of skilled workers in HKP. There are large numbers of unskilled, unemployed and underemployed individuals in Iraq but civil engineers and other types of skilled specialties are in short supply. Iraq must either train skilled engineers or hire expatriates. There is also a shortage of managers, specifically those who can efficiently managing million dollar projects.

To efficiently manage million-dollar projects requires not only a first-class education and, most likely, an engineering degree followed by an MBA, but also 12-20 years of field experience on complex projects with regularly increasing responsibilities (Gunter, 2013). Since 1991, Iraq has been more or less separated or cut off from the world. The quality of higher education, particularly in management and engineering fields, has deteriorated substantially for those who have recently

graduated. An extra difficulty, added to the lack of good managers, concerns non-equal opportunities because of political interference. Even those Iraqis who have gained a good education have little chance of winning appropriate positions of responsibility. KLG's bureaucracy and political biases reward and promote managers more for their political agility than for their ability to achieve technological or managerial successes. As a result, in the absence of competent management, there will be further deterioration of the organization, missed opportunities, wasted budgets and corruption.

10.4 Administrative and Financial Corruption

Undoubtedly, Iraq ranks within the ten most corrupt countries in the world. The results of this study have shown that the second factor that influences the success, or more commonly failure of Karbala's projects is rampant corruption. The role of leader can be a positive one for public services but may also be negative leading to underdevelopment, conflict and corruption (Lerbinger, 2012). A very important factor, fundamental to every practice in government, is the decision-making process. If the process of decision-making by a leader and project team goes against all the criteria and standards of scientific dictates of conscience, the inevitable result is corruption (Anazodo et al., 2015).

Weaknesses in Iraqi legislation can be considered a factor with reference to the presence of corruption. Bodies responsible for monitoring situations in Iraq, for example the Integrity Commission, focus only on the application of the law. They demand that government employees apply laws regardless of the outcome, whether negative or obstructive, to the possibility of achieving goals. In such cases, any and every employee is required to apply laws which in effect steal public money, without legal liability. Because of this, the majority of corruption cases in Iraq

cannot be held accountable by law. There is also the issue of incompatibility between the Iraqi system of legislation with the modern sciences of management and economy. There have been no reviews of regulations which implies that the same practice will continue with the same negative outcome. Finally, there is a high level of bureaucratic corruption because of the high number of procedures and associated excessive complexity. Such corruption can lead to illegal administrative practice and behaviour which cannot be easily controlled. Those responsible for bureaucratic corruption in Karbala are the administrators who have been appointed to implement government policies. The nature of this corruption means that a public official will allow a private agent a privilege that they are not legally entitled to (Schaffer, 1986; Dahlström et al, 2011).

Certain authorities have been entrusted to oversee financial and administrative functions throughout Iraq as follows:

4. Federal Board of Supreme Audit (FBoSA)
5. Inspector General Office (IGO)
6. The Commission of Integrity (COI)

Since 2003, the supervision of financial tasks and related institutions has been affected by decisions issued by the Coalition Provisional Authority in Iraq (CPA Iraq). Its vision, influenced by monitoring styles used in the USA, has resulted in a move to censor the distribution of public funds in Iraq.

The Integrity Commission (IC) and Office of Inspector General (OIG), created in 2004 by CPA Iraq as independent Government Commissions, are part of the federal authority's institution and are responsible for driving anti-corruption efforts in Iraq. IC is responsible for the

implementation and application of laws, public service standards and anti-corruption according to Article (102) of the Constitution of the Republic of Iraq for 2005 and IC Act No. (30), 2011. The IC is responsible for the investigation of all corruption cases in the 15 provinces and the institutions of FG.

Iraq is the 161st least corrupt nation out of 175 countries, according to the 2015 Corruption Perceptions Index reported by Transparency International. The Corruption Rank in Iraq averaged 160.92 from 2003 until 2015, reaching an all-time high of 178 in 2007 and a record low of 113 in 2003 as shown in Figure 9.12.

The results of the research show that there is overlap in the functions and responsibilities of financial and administrative control bodies. Corruption spreads horizontally and vertically in most of Iraq's governmental institutions, because of political status, organizational weaknesses and the selection of unqualified individuals.

10.5 Choice Lowest Price Tendering

The FG issued instructions, via the Ministry of Planning, stating that employers were not obliged to accept the lowest bids. This was stated in the instructions and implementation of government contracts for the year 2008, Article 5/2/K. However, the Karbala Government is committed to the tendering system that obligates choice of the lowest bidder because it believes that this is the best way to save money for the public sector. Nevertheless, the lowest tender is not always the cheapest (Uher and Davenport, 2009) because the majority of enterprises cannot compete on price alone. International standards have been set to help more companies to compete and give better value for money, this defined as ‘the optimum combination of whole life costs and quality to meet the user requirement’ (Lewis, 2015, p15). Using an integrated tendering system

can offer excellent value for money and a simpler approach to implement, manage and improve multiple competition standards simultaneously. It can offer greater competition, new ideas, responsiveness, flexibility, quality of service and specialisation (Seddon, 2009). All of this implies better value for money for the public sector (ISO 9001,2015).

Other reasons that influence the choice of lowest bidder include: (a) Legislative weaknesses which do not cover all the necessary technical, administrative and legal requirements; (b) Lack of knowledge and experience of the members of the committees evaluating bids; (c) political interference, and (d) fear of the judicial authorities, in particular the Integrity Commission. The choice of the lowest bidder has greatly affected the implementation mechanism, design and quality of materials used in the work. Delays also occur due to contractual financial deficit because of errors in estimating the actual contract cost.

10.6 Excessive Bureaucracy

Governments in Iraq have been guilty of constantly engaging in excessive bureaucracy for decades. Even though there has been an awareness of this over the last ten years, the local government in Karbala has not taken the initiative to make the changes required to overcome this obstacle.

The major reasons for excessive bureaucracy include: (a) federal and local legislation which has not improved performance in government institutions; (b) employing staff who are not qualified to lead the change towards e-government processes, and (c) a lack of development in the use of technology, particularly Information Technology (IT), in project management processes. This situation exists despite the fact that there are thousands of local individuals who have appropriate undergraduate and postgraduate qualifications.

According to the current study, excessive bureaucracy in Karbala adversely affects the processes involved in project management, a situation confirmed by the literature (Weber, 1978; Martínez-Lorente and Martínez-Costa, 2004; Landstrom, 2005; Frâncu, 2014). The presence of different forms of corruption in Karbala's bureaucratic institutions is having a major impact on local business people and potential foreign contractors, discouraging business men from working in the province. A reduction in bureaucracy, a cut in red tape and the simplification of bureaucratic formalities, may reduce levels of corruption.

10.7 Staff fears about the Anti-Corruption Commission

There are various performance issues which cause concern for public servants including hesitation, and delayed or no decision-making, because of the fear of legal accountability. This can happen if a complaint is made to the Integrity Commission; even the most frivolous complaints from the client can have catastrophic consequences for the employee who has to be brought to justice. Even if the judge then issues a verdict of innocence, the impact of the process is substantial on the employee's reputation and moral status. The main reasons for the growth of this situation are:

a) Legislative weakness and the incorrect application of laws.

b) An increase in financial and administrative corruption in public sector institutions coupled with weak anti-corruption measures by government.

c) A lack of unified standards of management and technical practices by the government.

d) Political interference; the protection of political classes against of legal accountability, as well as the transfer of responsibility for administrative and financial crimes onto junior employees.

10.8 Improper Planning by Contractors

Since 2006, the contractor sector has played a fundamental role in the implementation of development plans in Karbala. 90% of development projects in Karbala have been carried out by contractors of various classifications, this making contractors the main executive instrument for these projects. National contractors are not only key partners with KLG in the implementation of development plans, but are also responsible for the execution of projects and considered irreplaceable.

Regrettably, the private sector – contractors - who should be in a position to help restore Iraq's production capacity and competitiveness, suffers from a set of problems due to deficits in the system. Impediments to development include: an inappropriate legislative and regulatory system, incompetent financial instruments, absence of an efficient dialogue between the public and private sector, weaknesses in consultation platforms and governance systems, non-transparent public procurement systems, a lack of knowledge and organisation in the contractor sector, an absence of policies and strategies, suboptimal capacity and a lack of skilled labour (IPMsAC, 2013). This has resulted in slower economic growth and poor service provision to citizens.

This research has shown that contractors knowledge and experience is limited and not commensurate with the magnitude of their responsibilities with regard to the implementation of development projects. The deputy governor of Karbala has noted this weakness stating that 'contractor weaknesses and their inability to implement projects is one of the reasons that lead to delay in the completion of projects in the province.'

Currently, the spread of corruption regarding contract implementation and completion can be considered a major disaster for Iraq; substantial bribes are offered and accepted by individual who prefer money over values. This results in poor quality construction, poor planning and site management, a situation which is exacerbated by poor supervision by government engineers.

The results of this research have demonstrated that poor planning by the contractor is a major issue impeding successful implementation. Projects have become uneconomical as a consequence of time and cost overrun, as well as poor quality. This issue of poor planning by the contractor has been one of the main reasons for time or cost overrun in projects in many developing countries including India, Qatar, Iran, Egypt, Oman, Saudi Arabia, Pakistan, Jordan and the United Arab Emirates (Faridi and El-Sayegh, 2006; Sweis, 2008; Haseeb et al., 2011; Albogamy, et al., 2012; Alnuaimi and Al Mohsin, 2013; Marzouk and El-Rasas, 2014; Mulla et al., 2015; Miri and Khaksefidi, 2015; Emam et al., 2015)

10.9 Regulatory Changes

Regulatory changes in Karbala often occur at the beginning of each new election cycle. Followed by the appointment of a new governor with his deputies, those changes included basic positions of responsibility within HKP, positions of authority, and procedural changes. These changes often see shifts in priorities dependant on the vision of the new senior management (the governor and his deputies) and the new local political status quo.

The question which arises is whether or not these changes have an impact on project outcomes. From the data analysed in this study, over the period 2006-2017 which covers three election cycles, it has emerged that Karbala's leaders, had minimal knowledge and experience regarding project management and implementation. Despite this, these same leaders instituted

several regulatory changes at managerial level. In consequence, the reality was that of little or no positive change during their period of governance. The changes did not help to solve problems, improve practice or performance; on the contrary, these changes became part of the problem (Kandt, 2002; Gill, R., 2002; Beerel, 2009; Liozu, 2015; Storey, 2016).

10.10 Inappropriate Overall Organizational Structures Linked to Projects

In the province of Holy Karbala, the governor is the exclusive authority regarding the development of the organizational structure (Iraqi Parliament, 2008). It has been established that the governor(s) have not hired experts or consultants in the field, despite their lack of expertise and the availability of financial resources and legal powers (Ibid). This inappropriate organizational structure is a logical consequence of a lack of knowledge and experience of the decision makers.

This misplaced absolute level of responsibility leaves projects open to risk (BS, 2010; APM, 2012; PMI, 2013; ISO, 2015). As stated in the literature, the power and influence held by a project manager is dictated by the company's organizational structure. In turn, the extent and characteristics of the project managers' authority and role will impact on development schedules, budget management, quality of control, resource availability, awareness and control of risk and eventually on project staff (Ibid).

10.11 Lack of Government Legislation and Laws

Iraqi laws and legislations have been developed over time to address specific problems. Unfortunately, they do not address the challenges associated with regional development plans at a holistic level. Project management, from design to delivery, is intended to integrate diverse

functions and align efforts and stakeholders toward a common end thus achieving the objectives of the project. This project management logic runs counter to the political forces and orientations that have resulted in a highly fragmented, underdeveloped management and legal environment. One such force is the tendency in federal government to address management failures by strengthening individual management functions. These efforts often involve the creation or enhancement of senior executive positions, including the position of Governor, moves which do not help attain project objectives.

Following a review of the laws and regulations governing performance in public sector projects, there are seen to be a number of legislations and regulations issued by the Federal Parliament or Federal Government, which intervene at core management level and have a direct impact on the success or failure of projects:

1. The structure of administrative units, authorities and roles (Iraqi Parliament, 2008).
2. Regulations for the implementation of government contracts (IMoP, 2008).
3. Laws and instructions regarding salaries, wages and rewards (Iraqi Parliament, 2008b; 2010).
4. Regulations for the procurement of materials and equipment from local markets or foreign countries (Iraqi Parliament, 2010-2016).
5. Instructions governing contracts with experts and consultants, both local and foreign (Iraqi Parliament, 2010-2016).
6. Adoption of standards, methodologies, tools and techniques (Iraqi Parliament, 2009).
7. Systems of promotion, motivation and penalties (Iraqi Government, 1991).
8. Systems of development, training and rehabilitation (Iraqi Parliament, 2010-2016).
9. Contractor's classification regulations (IMoP, 2009).

10.12 The Framework of the Research Problem

The purpose of this section is to answer the research question about the nature of project management and related human behaviour issues and practices, specifically in the context of Karbala's projects.

The most critical challenge in this study was to identify the causal relationships between the nature of KPM and practitioners, including leaders, staff and contractors, their background and behaviour and subsequent impact on practice (Crawford et al., 2014). The model for the research problem reflects the integration of findings of the quantitative and qualitative data analysis and the literature for both human factors and the nature of project management.

As explained in Chapters 7 and 8, from the perspective of the respondents, 35 components were identified as having a clear impact on PM practice. These include human attitudes, skills and behaviour as well as organizational and management techniques in addition to external factors. From the project management perspective, there are two factors involved: process and the influence of human attitudes, mentality, skills and behaviour (Crawford et al., 2014; PMI, 2014). As can be seen in Figure 10.5, these results have high face validity. The most highly rated sets of factors are the types of activities that might be expected of any project or leadership role, regardless of specification or size of project. They involve common features and outputs as identified by the respondents. It can be suggested that there is a causal relationship between the background of individuals and the behaviour of said leaders, employees and contractors. In addition, other factors that influence PM performance include the organizational structure, administrative situations, contracts, legislation, materials, sustainability issues and external factors.

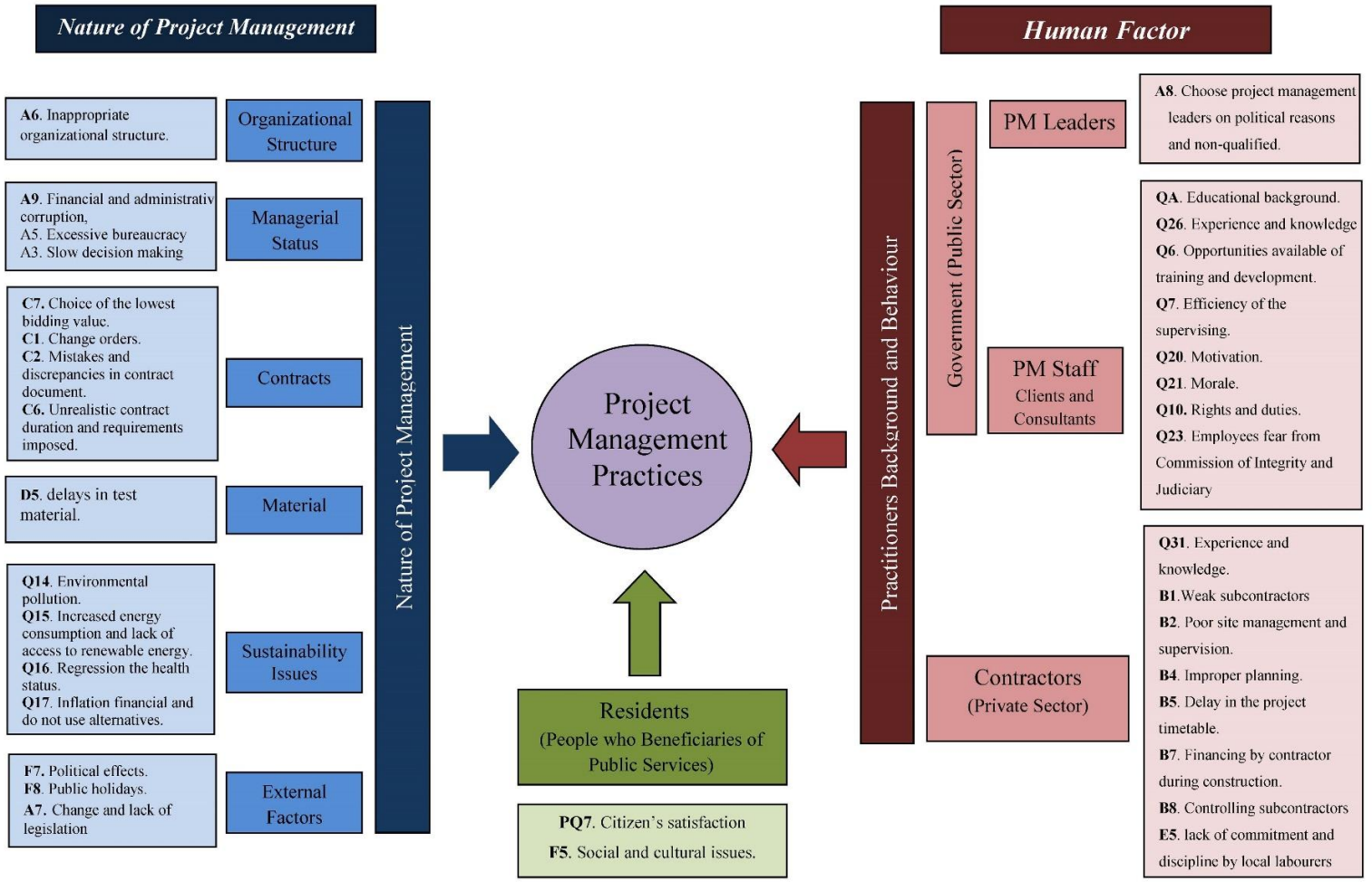


Figure 10.4 Research problem model: PM practices according to the nature of PM and the practitioner's background and behaviour

10.13 Conceptual Framework for the Development of Best Practice

The final objective of this thesis was to develop a conceptual framework for the development of best practice for project management in the provinces of Iraq. Such a framework is one of the components of this thesis that represent the answer to the question of the research: How can best practice PM structure and processes be developed for Holy Karbala City?

The conceptual framework detailed within this chapter allows researchers, practitioners or developers to synthesise key themes, leading them to a better understanding of best practice. This framework has been developed by fully utilising existing theory and knowledge based on the results from this research, to act as the foundation for a structural model which incorporates strategies and the inter-relationships between them.

There is significant interest in the capacity to deliver projects by local governments in Iraq. Globally, as is well known, project management has been recognised as a strategic delivery process that can assist organizations (including public sector organizations) to achieve their strategic objectives (Crawford, 2004; Besner and Hobbs, 2006; Blichfeldt and Eskerod, 2008; Mir and Pinnington, 2014; Archibald and Archibald, 2016). Many organisations have implemented formal PM infrastructures, methodologies, tools and techniques realising several tangible or quantifiable benefits, and have been able to capitalise on their investment (Marnewick and Labuschagne, 2010). In recent years, the development of corporate governance (Turner, 2006; Thiry and Deguire, 2007), has improved strategic ability. The need to get value from all provision of services or investments has become imperative (Marnewick and Labuschagne, 2010). This has resulted in corporations developing modern and more flexible organisational forms and skills, the ability to manage projects becoming more important strategically (Marnewick and Labuschagne, 2008).

Regarding project management in the public sector, decision makers should have access to evidence-based portfolios, programs and strategies to improve PM practices and reduce project problems. They should also have the necessary tools to guide their selection or adaptation of appropriate standards, methodologies and techniques in the PM context. In reality, much work needs to be done to achieve this target as many pressing problems exist regarding development and reconstruction plans as available international guidelines were not provided by the government. Therefore, there is a growing need for evidence-based PM practices that produce maximum effectiveness, efficiency, flexibility and which are commensurate with various levels of management.

The theoretical framework method began with the classification of the factors that caused projects to fail. An extensive literature review was carried out to determine the factors, as well as the components, that influence an organisation's PM strategic success. These results were used to determine how successful governmental institutions in Iraq have been in implementing and establishing PM as a sustainable commodity. The purpose of the literature review in Chapters two, three and four, was to acquire an understanding of the topic of this study as well as any key issues. The results of the literature review were analysed to provide the foundation for the new framework.

Based on the above, a conceptual framework was developed, Figure 10.6 illustrating the main steps followed and the presumed relationships between them. It was constructed using theory, logic and current practice (Olivier, 2009; Cusumano, 2010; McLaughlin, 2013; Kerzner, 2014; Scott, 2016). The purpose of this conceptual framework is to provide a proposal to decision-makers in the Iraqi government in order to address managerial and organizational weaknesses including issues around project leaders, project managers, project team and contractors.

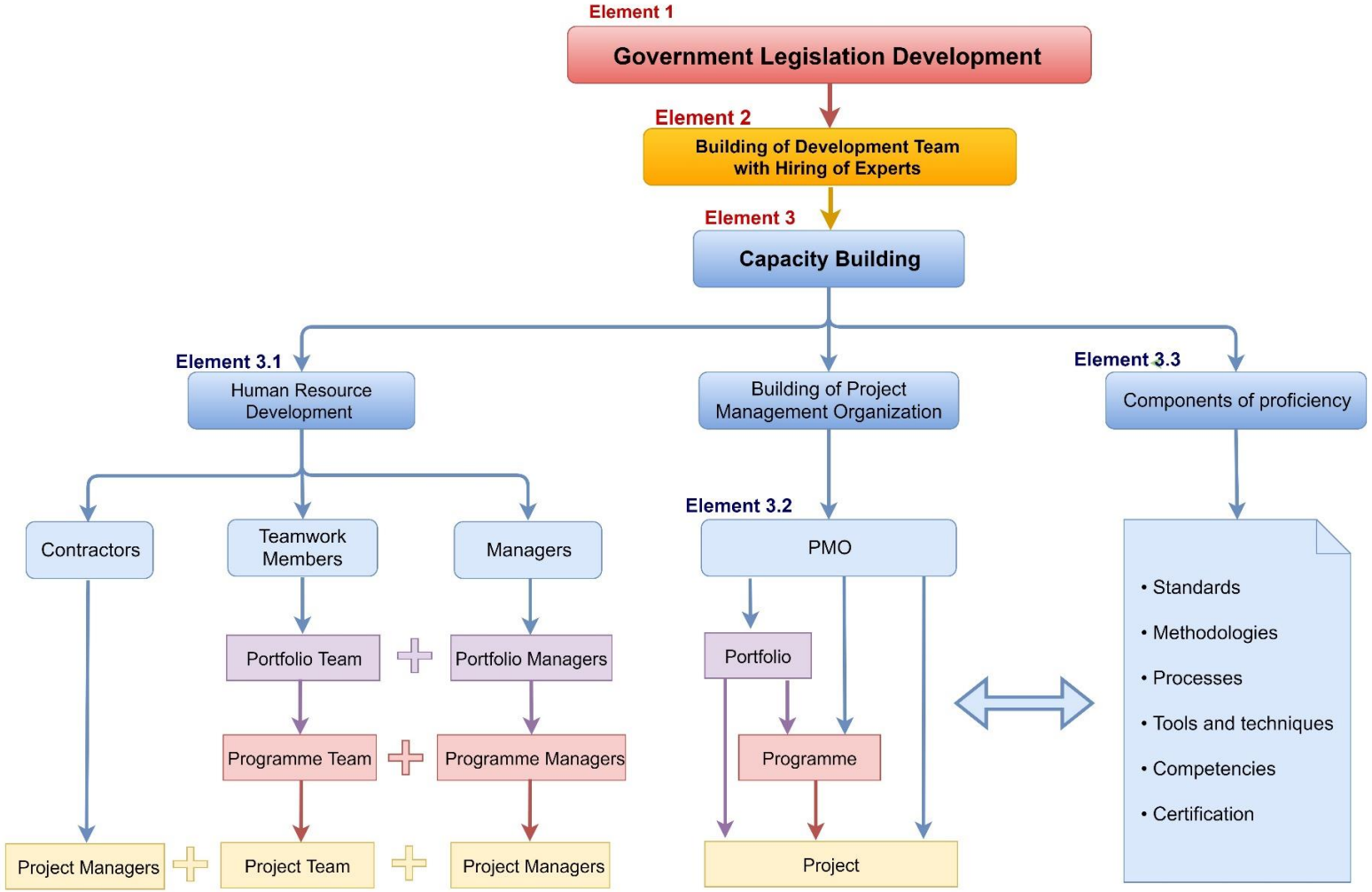


Figure 10.5 Conceptual framework for the development best practices for project management in Iraq's provinces

10.13.1 Strategies for Change

In general, public sector practitioners are resistant to change (Cunningham and Kempling, 2009) partly because often, proposed change involves a conflict of interest (Kassel, 2010). In consequence, many public-sector institutions seek to dramatically improve performance but not to change (Wignaraja, 2006). The introduction of change in practice will often be resisted due the difficulty of accurate reporting of their results and questionable outcomes (Ibid). For example, in the politically turbulent situation that has been Iraq, decision-makers or planners failed to frame the problems they faced correctly resulting in reconstruction work failures that inevitably increased project costs or created loss of public money.

For many, improvements in practices and capacity are distinct (Wignaraja, 2006), depending on the planning assumptions for the development (Kassel, 2010). The evidence in this research suggests that external and internal factors interact making it harder to understand what aspects of the status quo can be improved so that change can take place. Identifying the boundaries of practice in the development framework is as important as identifying risks and potential mitigation (Wignaraja, 2006).

Development frameworks and processes that aim to change practice in public sector institutions are difficult to operationalise, because of the inherent difficulty of exposing the informal systems that guide politicians' behaviour. Using a mix of insider knowledge and experience of scientific principles, would help to facilitate the identification of strategies for change. Based on the above, and in combination with the rating factors that led to the failure of projects in Iraq, four main development elements with three sub-elements for best practices have been identified and can be seen in Figure 10.7:

- Element 1: Government Legislation Development (GLD)
- Element 2: Creating of Development Team and Hiring of Experts (BoDT)
- Element 3: Capacity Building (CB)
  - ➢Element 3.1: Human Resource Development (HRD)
  - ➢Element 3.2: Project Management Office (PMO)
  - ➢Element 3.3: Components of Proficiency (CoP)
- Element 4: Application of Competencies in Implementation (AoCI)

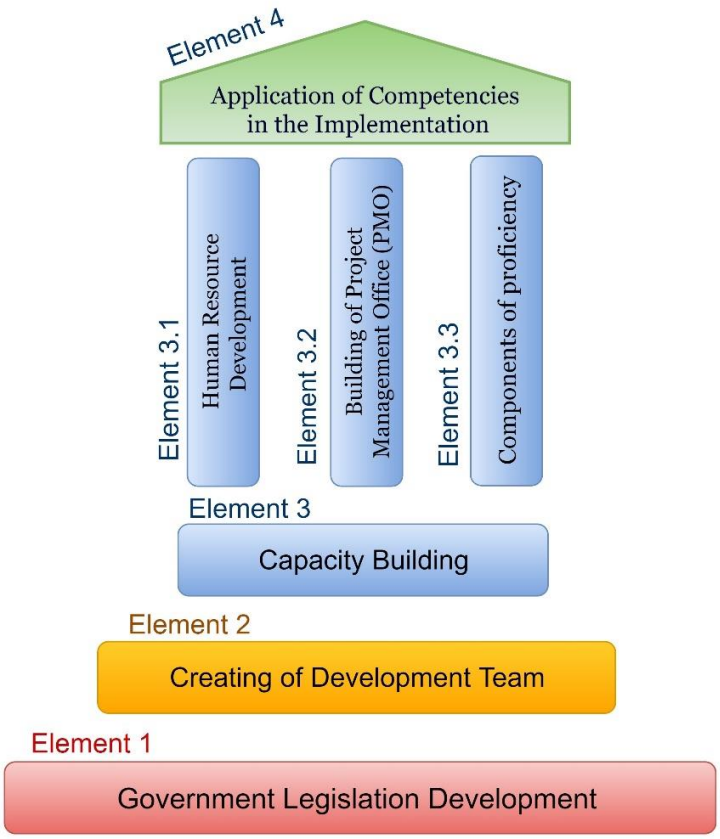


Figure 10.6 Development elements

10.13.2.1 Government Legislation Development

The results from this research show that Iraqi legislation is not appropriate nor beneficial for project management, specifically, the Provincial Act (Iraqi Parliament, 2008), regulations implementing government contracts (IMoP, 2014), general conditions of contracting-sections I and II (IMoP, 1987) and the Federal Budget Act (Iraqi Parliament, 2006-2016). These have all had a significant negative impact on the outcomes of projects. Moreover, different individuals in practices or in government have different powers and exert various influence. Therefore, there is a risk that best practice development models may be perceived as a 'political fix' project or a response to 'external drivers' without a genuine commitment to change and thus risk failure in implementation. Development initiatives in public sector institutions in Iraq need to have the support of the ruling political parties. Because of this, there needs to be a focus on power relations and dynamics. Involving the ruling political parties from the beginning, through their contribution to the development of the legislative system, could constitute the first step towards change and provide legal cover for all practitioners working towards improvement.

10.13.2.2 Creating of Development Team

Following legal reform, an effective team needs to be put in place to manage development operations. Project management reform is informed by those with expertise at the domestic or global level. The expectation is that domestic management will be informed by management staff imported from Western European countries or the United States of America through the processes of organizational learning. The development of public project management in Iraq raises the expectation of an increased role for experts in management reform processes (Ladi, 2005).

Over the last three decades, the majority of Western European countries have been engaged in "New Public Management Reforms" with the goal of changing the culture and performance of the public sector. This has been called a managerial revolution in public bureaucracies (Pierre, 1995). The development of project management during the last decade has involved the adoption of new standards, methods, techniques and instruments which presuppose an increased role for experts (Kerzner, 2004; Ilieş et al., 2010; Power, 2015).

The development team need to be experienced in taking overall responsibility for a development project regardless of whether it is a rehabilitation, transformation, retained facade or knock-down, rebuild scheme. They need to work alongside members of the project management team at all levels, moving the development project forward from initial inception through to design, planning, execution, observation, delivery and end of project operations. The professional development team should be able to draw on their extensive expertise in direct development management and beyond, across its advisory disciplines, to meet development requirements.

Since Iraq does not lack financial resources but needs training and qualification of its human resources, it could make use of European experience in capacity and institution building. Infrastructure projects however, should remain an Iraqi responsibility to achieve sustainable management. These components, foreign experts together with the Iraqi professional's willingness to actively participate in co-managed development projects, should help Iraqi managers gain full responsibility for the administration of sustainable development projects.

10.13.2.3 Capacity Building

Efficient project management, strategic policies and high performance indicators are key for the effective delivery of public services (Lafuente and Manning, 2016). This requires attention

to a lengthy list of tasks and challenges including reforming and modernising regional development plans, developing structures for project management organizations, enhancing intra- and inter-institutional work processes, and strengthening human resources at both public and private sector levels, in order to improve the delivery of public services (Hilderbrand et al., 1997; Cruz et al., 2016).

The unfortunate reality behind the lack and inefficiency of capacity building initiatives in local governments in Iraq, particularly in Karbala was because of a lack of a comprehensive strategic framework towards capacity development. There are several ways to define capacity development. Nwankwo et al. (2012) defined it as the capability of a person, an institution or organization to perform a given task effectively, efficiently and on a continuing basis and with reduced dependence on external resources', this regarded as the most comprehensive definition available. Therefore, strategies to build capacity in this framework (Figure 10.8) are concerned with:

1) Human resource development which includes managers, the project team and contractors.
2) Institutional development, which is concerned with building a PMO over three levels: portfolio, program and project.
3) The overall project management policy environment, within which local government and various public service institutions operate and interact. This is intended to unify principles, knowledge areas, processes, detailed tools and techniques used to manage specific fields within projects for example, roads, bridges, health, water, sewage, construction of schools and hospitals. Alternatively, they may associate the term capacity building with the project management systems and processes that are used to guide the desired goals of projects.

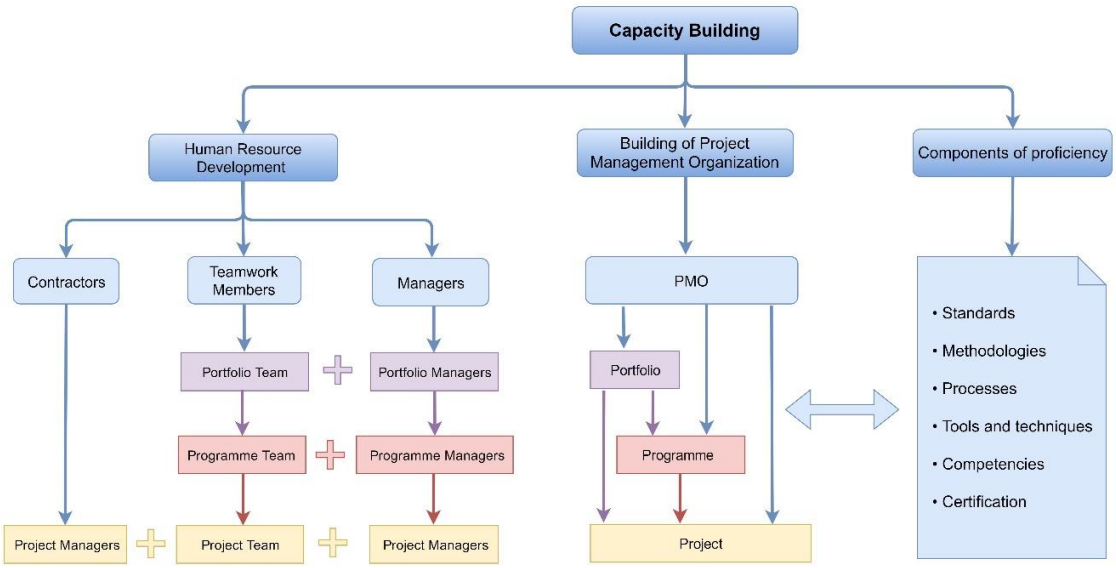


Figure 10.7 Capacity building elements

10.13.2.3.1 Project Management Office

Due to the emerging importance of best practice, several PM centres and associations have developed standards and methodologies that emphasize the importance of the PMO that provides centralised control and support functions for the portfolios, programs and projects under its domain. (Marsh, 2000; PMI, 2008; Unger et al., 2012; Alkhuraissi, 2015; Bromley, 2016; Aubry et al., 2010; Too and Weaverb. 2014). PMO responsibilities can range from multi-project management (Kerzner, 2003; Aubry et al., 2010), an emphasis on organization and providing effective communication through faster and more consistent access, the consolidation and dissemination of high quality information, less meetings, and more efficient and effective activities (Crawford, 2010; Unger et al., 2012; Tsaturyan and Müller, 2015; Bromley, 2016), as well as balancing competing needs (Aubry et al., 2010; Pemsel and Wiewiora, 2013).

The current research revealed the absence of a PMO in the Holy Province of Karbala. There were many offices that practiced specific activities relevant to each project but without a project manager or his representative to oversee operations, projects failed because of a failure to achieve the objectives of regional development plans. For these reasons, strategies have been adopted as recommended by BS 6079-1, (2010); BS ISO 21500, (2012); APM PM-BoK, (2012); PMI PM-BoK, (2013) and ISO 21504, (2015).

10.13.2.3.2 Human Resource Development (HRD)

Project management organizations in Iraq are the engines that drive the nation's development and reconstruction plans. Consequently, they must train their workforce effectively and efficiently to enhance performance. According to the literature, it has been recognised that training is the most effective tool for improving the performance and efficiency of all practitioners including leaders, managers, contractors, workforce, government agencies and professional institutions connected to the construction industry (Gomez-Mejia, 2004; Gilles Caupin et al., 2012; Alkinani, 2013; Kevin, 2014; Milewicz and Goodin, 2016). More recently, several standardisation institutions (BS ISO 30405:2016 and BS 76000:2015), professional associations (APM PM-BoK: 2012 and PMI PM-BoK: 2013) and authors (Schuler, 1992; Gomez-Mejia et al., 2004; Armstrong and Taylor, 2014; Bennett and Ho, 2014) highlighted the importance of HRD for project management. The human factor in PM has become essential regarding the competence of the organization (Mullins, 2007; Nahavandi et al., 2013; Kevin, 2014). Investment in individuals has increased best practice in PM (Kerzner, 2001) through the development of system-wide strategic plans, production of new training curricular and the support of individuals within work teams though on-the-job learning (Carden and Egan, 2008).

This strategy, within this framework of development, seeks to train all practitioners to build the requisite knowledge and skills in every aspect needed to meet the needs of all PMO levels; portfolios, programs and projects. Another important area for workforce training is PM process improvement applicable to specific levels within the organisation. It makes sense that trainees need to develop and strengthen their own professional skills which in turn help them to do their job more successfully. This includes problem-solving, managing people, negotiation, strengthening of credibility and building relationships.

10.13.2.3.3 Adoption of a Proficient Components

Proficiency is defined as "skilfulness in the command of fundamentals deriving from practice and familiarity" (Marnewick and Labuschagne, 2010, p.252). This section describes the different components that constitute the proficiencies required for portfolios, programs and project managers, as outlined in Figure 10.9.

Components which must reach a certain standard of proficiency include standards, methodologies, processes, tools and techniques, competencies and certifications of project management. Usually, project managers concern themselves with their resume when seeking employment, needing continuous professional education/development to update their knowledge about project management standards, methodologies, tools and techniques when seeking or renewing professional certification. This situation means that project managers need to create their own individual, continuing professional development plan.

However, building PM capabilities and utilizing the potential of PM does not happen suddenly and it cannot be solely the responsibility of the project manager or team members. Thus, "Organizations must actively work to shape mature project management practices and integrate it

across all levels of the organization" (Musa, 2014, p.221). Appropriate t PM standards and methodologies are crucial for the improvement of performance and practice development (Bredillet, 2003; PMI, 2008; Crawford, 2013). These standards are developed to ensure that portfolio, program and project managers are competent in the PM field.

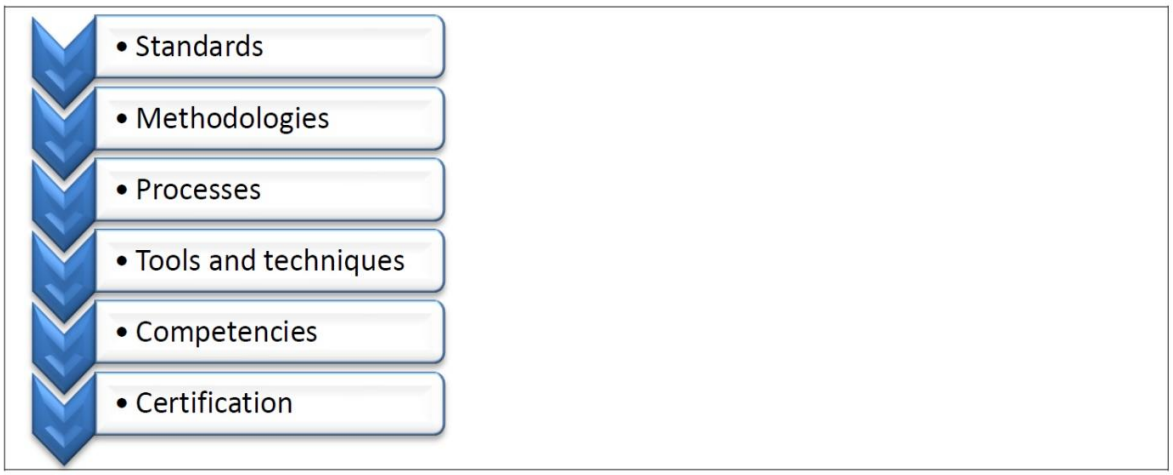


Figure 10.8 Components of proficiency (Marnewick and Labuschagne, 2010)

10.13.3 Operations of the Development and its Application

After addressing human resource development, portfolios, program and project management office building according to set standards as detailed above, the development project will be ready to run. The knowledge and skills gained from professional training can be applied and a new structure, comprising specialized techniques and tools in accordance with known standards and a methodology adopted under legislation, will be possible. Project management best practice can be implemented under the guidance provided by a team of experts, who can offer support to the project manager and his team to ensure success as shown in Figure 10.10.

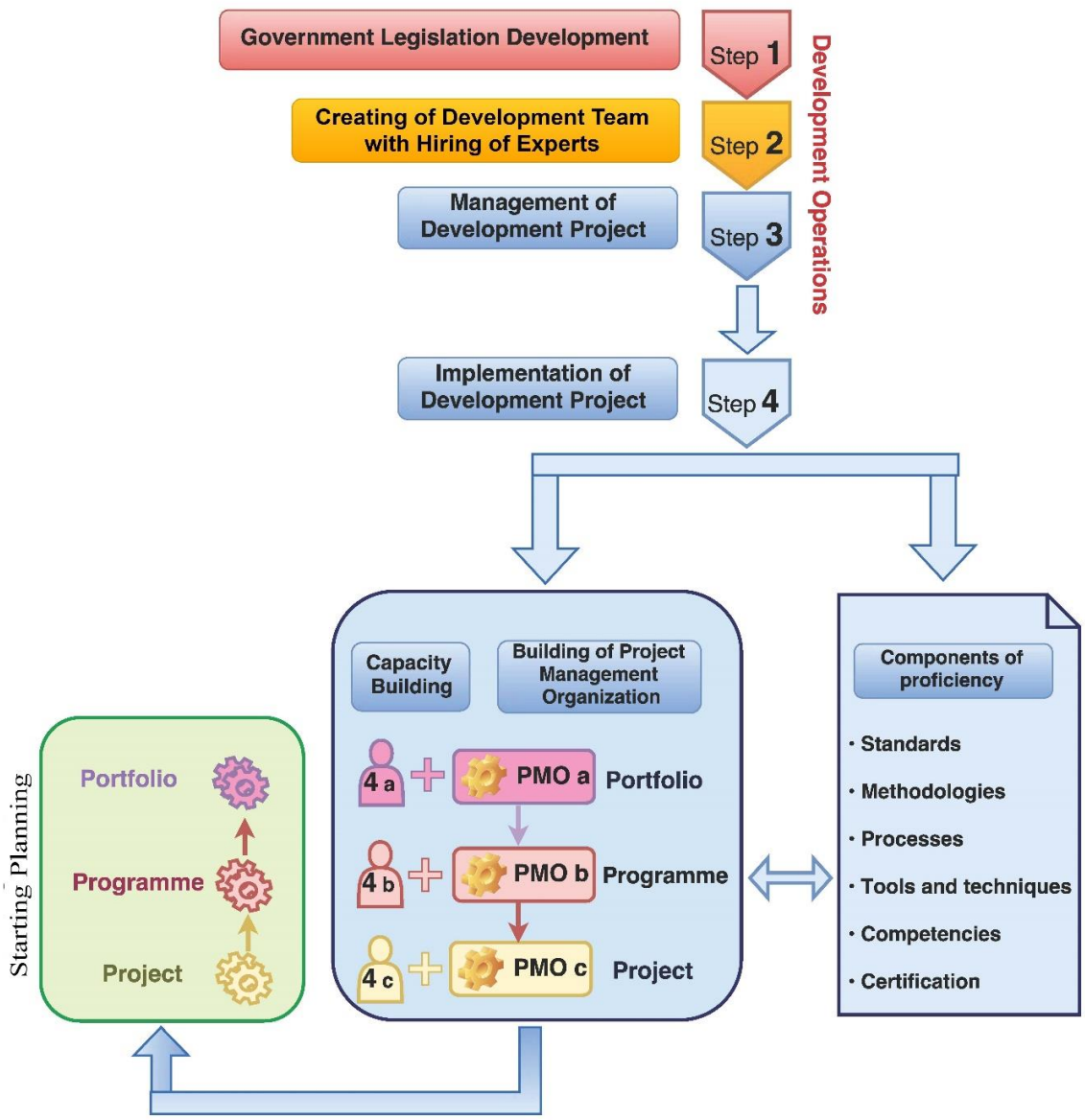


Figure 10.9 Operation stages of the development

10.13.2 The Development Process

The process of development consists of five basic steps, as shown in Figure 10.11:

1. Government legislation development
2. Creating of development team and hiring of experts
3. Management of development project
4. Implementation

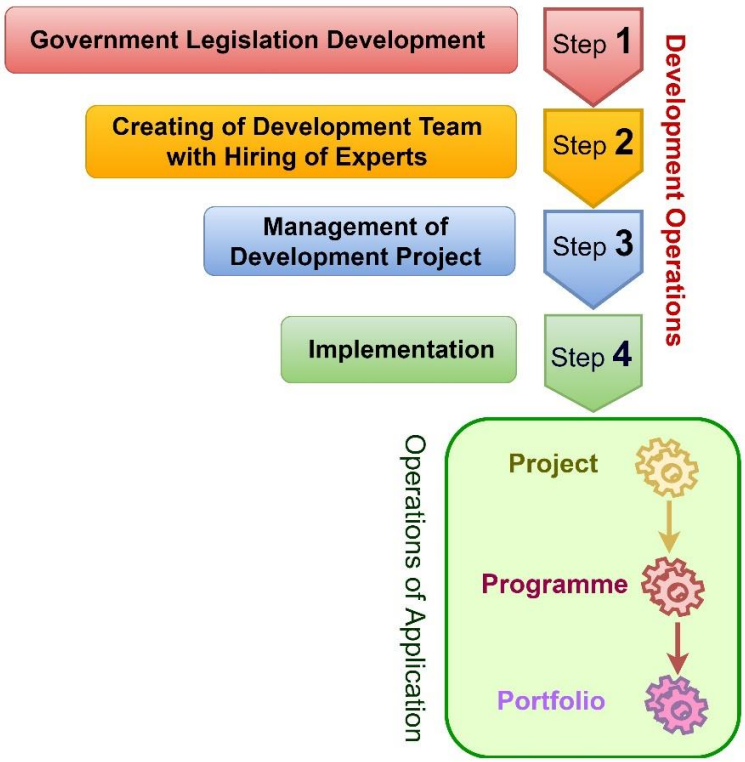


Figure 10.10 Development processes

Regarding public-sector projects, the essential management end-goal is to deliver projects according to set specifications (APM, 2012; PMI, 2013; Silvius, 2016) and to the satisfaction of citizens (Klakegg et al., 2009; Stummer and Zuchi, 2010; Jałocha et al., 2014; Senouci et al., 2016).

This requires several factors including a strong team driven by skilled manager (Pinto and Kharbanda, 1996; Drury-Grogan, 2014; Anantatmula, 2016) working with a qualified contractor (Kim and Huynh, 2008; Holt, 2010; Callistus et al., 2014). These individuals require an effective and appropriate set of regulations (Wooldridge and Floyd, 1990; Kandt, 2002; Berenbach, 2006; Villinova, 2014; Reason, 2016) and uniform project management policies (BS-ISO, 2012; APM, 2012; PMI, 2013). These individuals can then need to be engaged in the process of capacity building at a more advanced level (Gill, 2002; Al-Tameemi and Alshawi, 2014; Power, 2015). Consequently, addressing the capacity building needs of a project requires effective and efficient administration (Hilderbrand et al., 1997; Gruidl and Hustedde, 2003; Kent and Davis, 2010; Cruz et al., 2016). Appropriate capacity can only be built by a development team of experts and their assistants (Grindle and Hilderbrand, 1995; Allen, 2006; Plummer and Taylor, 2013) even if this means hiring foreign experts for this purpose (Cohen, 1992; Grindle and Hilderbrand, 1995; Atherton and Smallbone, 2013; Milewicz and Goodin, 2016) To activate this and other steps, each administrative decision must have a legal basis (IMoP, 2008; MoCH, 2015; Iraqi Parliament, 2006-2016) meaning that laws need to be passed to allow the decision-makers in Federal and local government to proceed with project developments.

The first step is to develop a legislative system that relates to the practice of project management including financial, administrative, contractual and technical issues in order to create a suitable starting point for change with the least number of legislative obstacles. Figure 10.8 illustrated these stages.

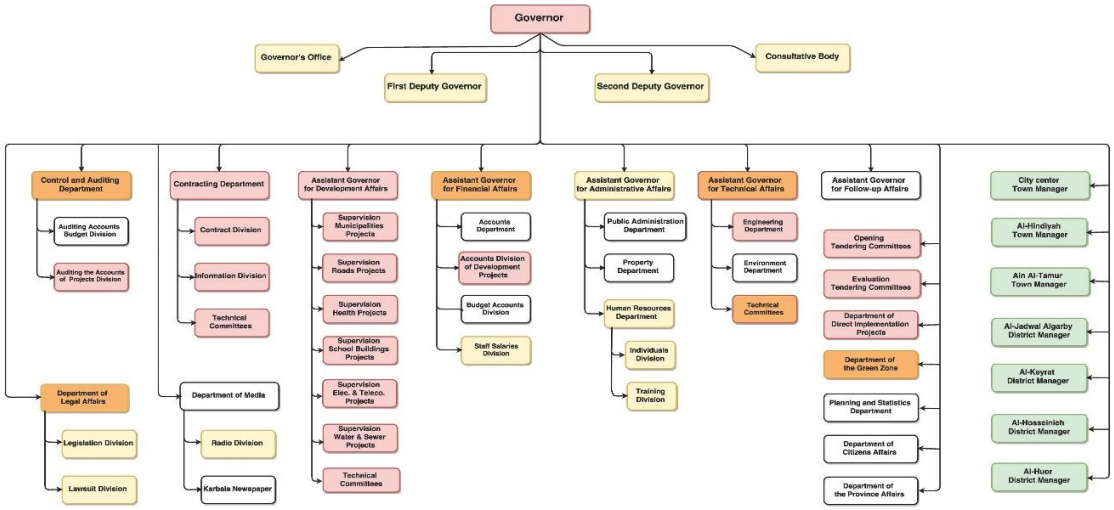
10.13.4 Comparison Between the Old Organizational Structure and Proposed Structure of KPM

From the findings of this research, the failures in the old organizational structure in KPM are now a visible reality. The traditional management framework for reconstruction projects is increasingly proving itself incapable of meeting the requirements of national development plans, the aspirations of citizens and to deal successfully with new projects. Conventional theories and practice no longer provide the necessary guidance and support for decision-making in a world of complex project management. Would that Iraqi project management organizations could adapt quickly to deteriorating current management conditions, they could emerge as stronger entities when conditions improve.

Figures 10.12 and 10.13 show the old organizational structure and new proposed structure of KPM. The most important characteristic of the proposed organizational structure is the existence of a project management office operating at different levels: portfolio, program and project. This provides centralised control and support, removes the duplication of functions and responsibilities and enables project managers to do their job (this absent in the old structure) from inception to delivery and completion of the project. This proposal provides a streamlined organizational structure and hierarchy, something which did not exist in the previously.

Other proposals include the creation of a department of planning and development, its duties to prepare local development plans and to undertake project planning, this including design criteria, construction standards, statistics and information, development plans and research and development. The creation of an IT department and annexation of the departments of finance and human resources, contracts, legal and direct implementation of projects the responsibility of the new PMO are also suggested.

Old Structure



Proposed Structure

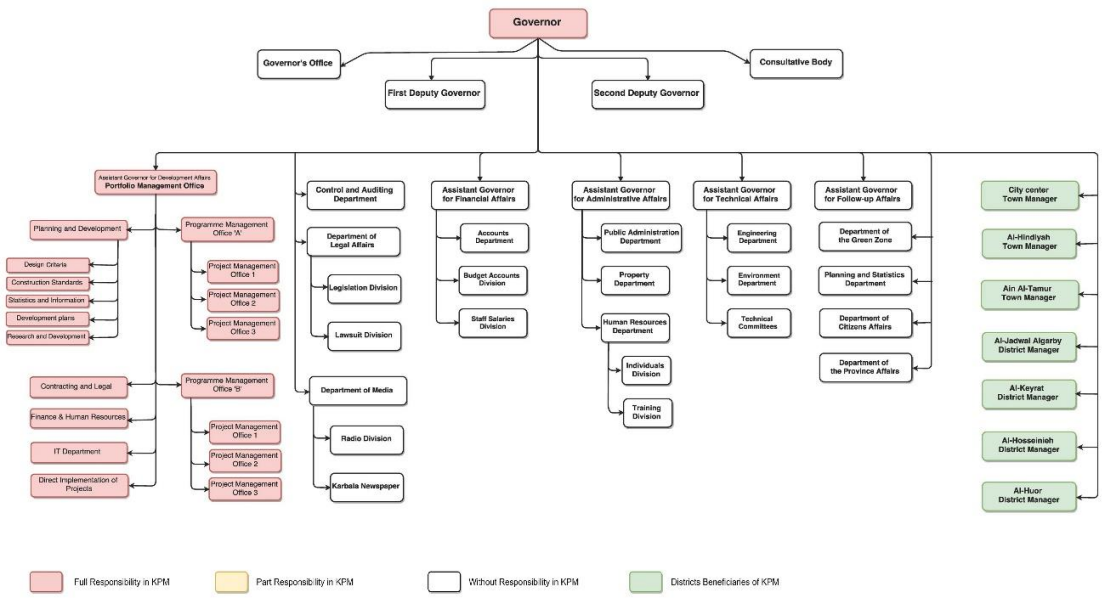


Figure 10.11 Old Structure and Proposed Structure of KPM

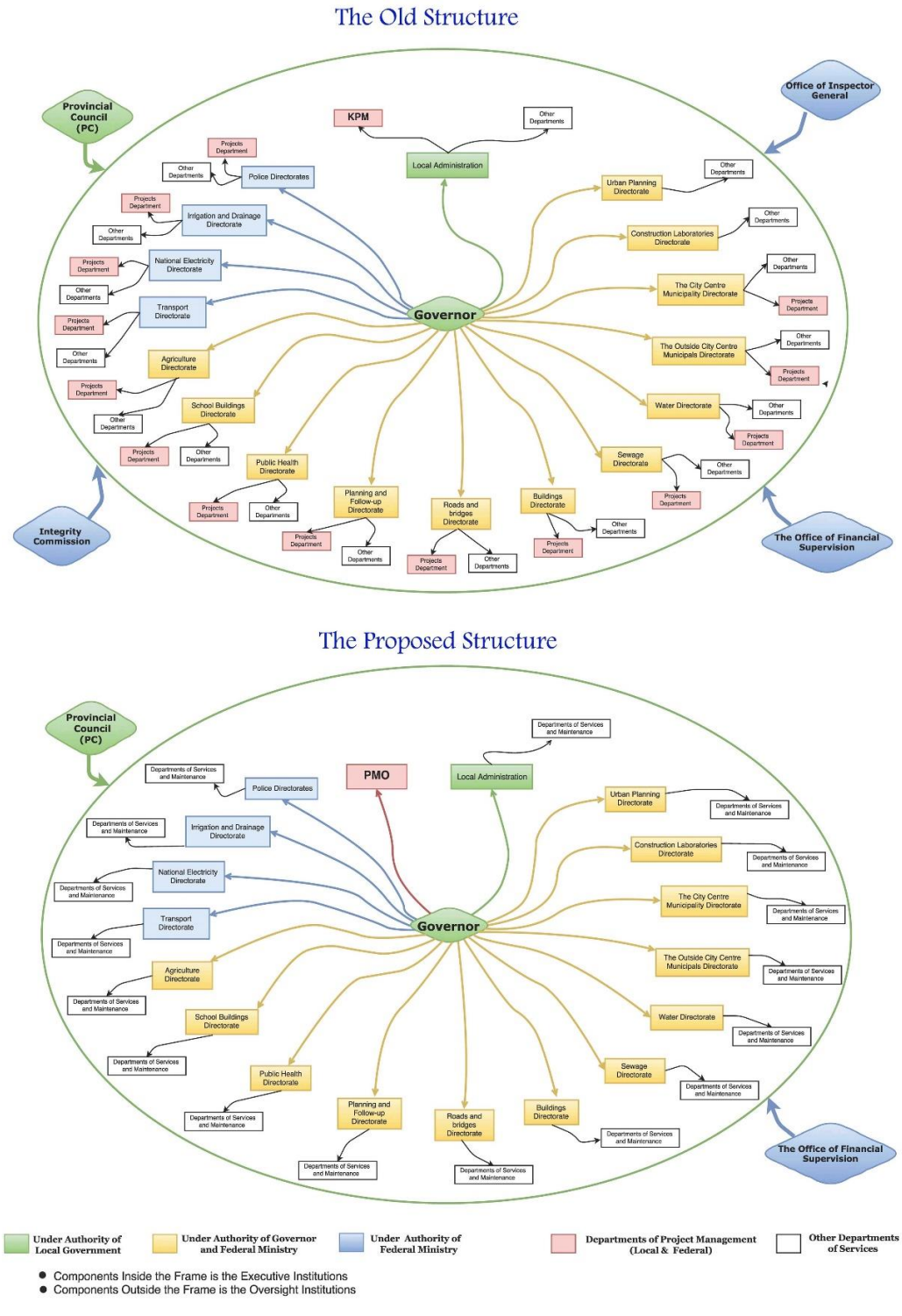


Figure 10.12 Old network and proposed network of local and federal directorates

10.13.5 Comparison Between Old Processes and Proposed Processes of KPM

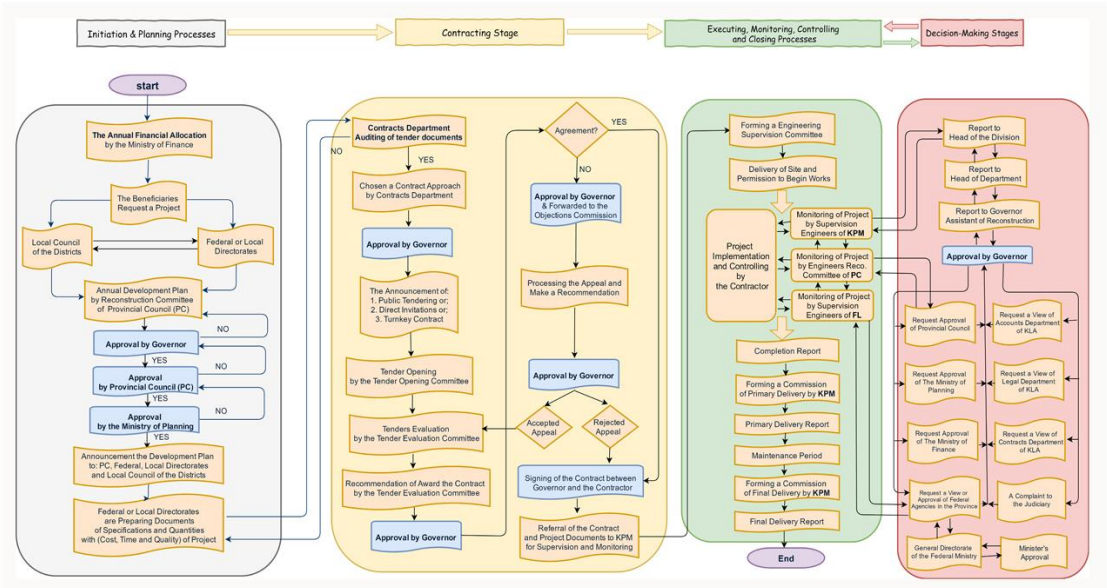
Regarding project processes, Figure 10.14 illustrates the perceived differences between current and proposed processes. The initiation and planning stage has become more focused; currently this is distributed among several directorates and is missing a project manager. In the proposed model, the processes of initiation and planning will be one of the functions of the planning department who will communicate with beneficiary bodies, taking their views and requirements into consideration, under the supervision of the project manager and his / her team appointed by a project charter.

In the contracting stage, all proposed contract operations will fall to the contracts department and the manager of either the portfolio, program or project, dependant on powers granted. Currently, contracts operations are administered between the contracts department, several committees (opening, evaluation and objections) and the governor, to the exclusion of the project manager. Regarding the processes of executing, monitoring, controlling and closing of projects, all processes will be performed by the project manager and his /her team in liaison with the contractor. At present, processes are distributed among several committees, the supervisory committee, additional periods committee, construction errors committee, first delivery committee and final delivery committee separate, with no input invited from the project manager.

The quantity of decision-making needed for the project will be greatly reduced due to two main reasons: firstly, the planning department will collect all the information and requirements which are needed by the project, then create a project plan taking into consideration the potential risks before proceeding with execution. Secondly, a number of important decision-making processes will be undertaken by the portfolio or program management office, who are in direct

contact with the project. Any decisions that require approval from Federal Ministries will be carried out by the governor and those Ministries.

Old Processes



Proposed Processes

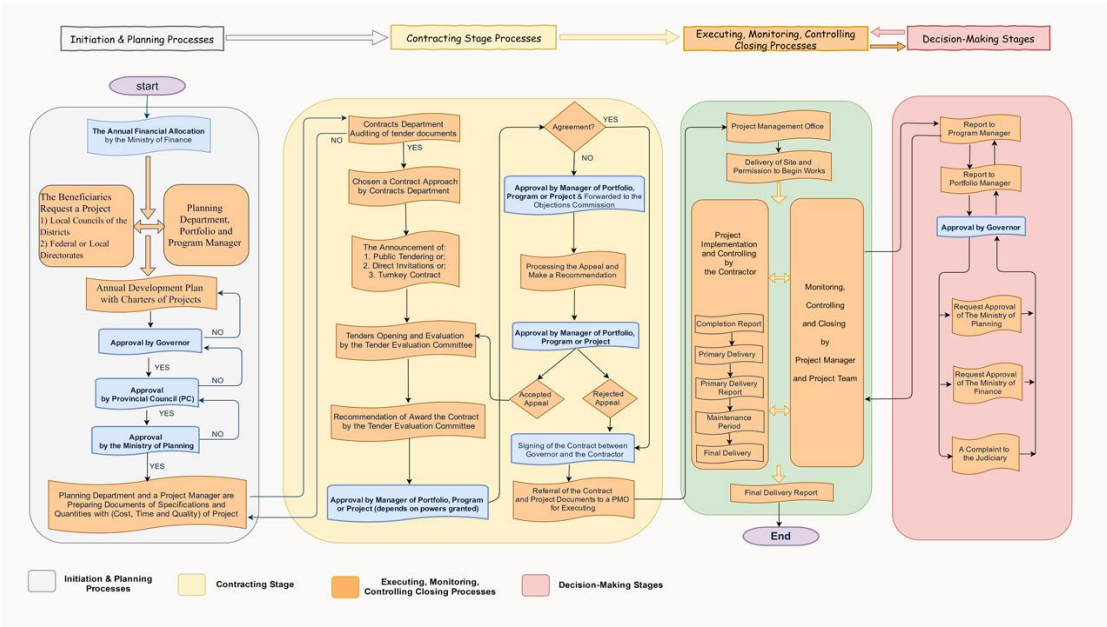


Figure 10.13 Old Processes and Proposed Processes of KPM

10.14 Summary

This chapter began by discussing the major issues in, and causal relationships between, engineering project management practices in Holy Karbala Province. Problems around the implementation of projects have been identified and critically analysed in relation to the findings of other research presented in the literature review chapters. It has been shown that political changes, non-qualified project leaders, administrative and financial corruption, regulatory changes and a lack of government legislations and laws had the biggest impact on the lack of project success. Various factors that influence current practices have been addressed within the framework of the research problem.

This chapter has also proposed a conceptual framework of best practice for KPM. This framework includes four main strategies: new government legislation, the building of development teams by hiring experts, capacity building and the application of competencies in implementation. Three sub-strategies were also addressed: human resource development, project management office and components of proficiency. This conceptual framework has attempted to provide a sustainable solution to the problems and failure in management of development projects in Iraqi provinces, including Karbala. The next chapter will review the summary of conclusions and recommendations for further work.

Chapter 11 : Summary, Conclusions and Recommendations

11.1 Introduction

This final chapter concludes the thesis by summarising the background and justification of the study, the literature review, the research design, the data that has been collected and analysed, and the main findings resulting from this research, and discusses these results in the context of the overall research aims and objectives. General conclusions based on the findings of the research presented in this thesis are described. Finally, the contributions of this research to both theory and managerial practices are discussed, taking into account the limitations of this study, followed by recommendations for future work.

11.2 Summary of the Research Process

The background to the research stems from the regime change in Iraq in 2003, which led to a change in the mechanisms of the central administration of the provinces and the distribution of powers between the central authority and the aforementioned regional governments. These changes caused the emergence of conflicts between the federal and local state institutions. Since then, a regional development plan (reconstruction programme) has been launched in the Iraqi provinces, including Holy Karbala Province. The general federal budget has allocated funds totalling approximately $1.5 billion for development projects in Holy Karbala Province for the years 2006 - 2016. However, this important step was dilatory due to insufficient and unprofessional development plans, a shortage of skilled individuals, as well as a combination of routine and difficult procedures. These setbacks resulted in the failure of the reconstruction projects and ended

with the development plan goals not being achieved. Consequently, public services deteriorated, to the indignation of local citizens. This situation has raised major questions and has necessitated in-depth reflection and assessment, yet has continuously faced governmental neglect, when it requires critical review by government leaders, researchers and interested parties.

There are two main drives which justify this research project: firstly, the researcher has identified the need to develop a conceptual framework which helps to improve management practices in the regional development projects in Iraq. Secondly, this study intends to take steps to fill the void created by the limited availability of research results that explain the impact of internal and external factors on practices of project management in these projects. The research questions for this study were:

f) What are the current organisational structures and processes for regional development project management in Holy Karbala Province?

g) What are the key issues in regional development project management in Karbala in its current form, and what are the causal relationships?

h) What is the impact of these key issues on Karbala's regional development project management?

i) What constitutes best practice (structures and processes) for project management, and where are its applications in Iraq?

j) How can best practice in project management be developed for Holy Karbala Province?

In terms of its objectives, this research aims to develop best practice project management structures and processes to support the regeneration of regional development projects in Holy

Karbala Province, Iraq. This aim was achieved through meeting several specific objectives, including:

a) Critical examination of the current organisational structures and processes for regional development project management in Holy Karbala Province.
b) Critical analysis of the key issues in regional development project management in Karbala Province, and the causal relationships.
c) Evaluation of the impact of these key issues on project management processes and structures.
d) Critical analysis of best practice (structures and processes) for project management, and its application in Iraq.
e) Development of a conceptual framework for good practice of project management structure and processes for Holy Karbala Province.

The research process began with an extensive review of literature on the theories, frameworks and schools of thought relating to project management, with a view to helping provide a theoretical foundation for the research questions. Chapter two reviewed the project management literature, incorporating definitions of a project and project management and addressing project management constraints and various sources of knowledge for project management (such as professional institutions or associations, standards, methodologies, processes, and knowledge areas of project management).

The third chapter encompassed a literature review of project management best practices that consisted of three main topics: project management best practices, project governance and the human factor in project management and related issues. Finally, chapter four provided a literature review of the main factors affecting project success, focusing on defining project success and

establishing the major causes of delays, cost overruns and quality failures in projects. Based on the results of the literature review, the appropriate theoretical framework of this research became apparent and helped the researcher to approach the research problem in greater simplicity and with a clearer vision of the problem at hand (Olivier, 2009). This chapter also "explains graphically the main things to be studied and the presumed relationship among them" (Miles and Huberman, 1994, p. 18).

The research methodology was discussed in chapter five with reference to three philosophical levels: ontology, epistemology and methodology. This research adopted the pragmatic philosophical worldview because it enables the researcher to deal with things sensibly and realistically in a way that is primarily based on practical considerations. It also provides the appropriate theoretical basis for the research in practices of organisational improvement, as offered by Creswell (2009). The pragmatic approach allowed the researcher to adopt both inductive and deductive reasoning; it therefore helps the researcher to fully analyse the research problem. This study adopted a mixed-methods (qualitative and quantitative) approach for better understanding of the research problem and its complex phenomena than either approach alone would have offered. The time horizon of this research was longitudinal and cross-sectional. The research procedure for this thesis consisted of questionnaires and interviews. Preliminary data were gathered through three phases of questionnaires (quantitative data) and two phases of interviews (qualitative data) related to the main purpose of this study. The phases were arranged chronologically as follows:

a) Personal interviews with managers (qualitative data)

b) Residents of Karbala questionnaire (quantitative data), sample size of 541 citizens.

c) Staff questionnaire (quantitative data)

d) Contractor questionnaire (quantitative data)

e) Focus-group interview with experts (qualitative data)

In addition, internal and external secondary data related to the research problem or study area was collected. Internal data included official information (that which was available) concerning the regional development projects of Karbala Province carried out during the period 2008-2016, related Iraqi laws, regulations and instructions and official Iraqi statistics. The external secondary data included materials such as global statistics, research, studies and published reports.

Quantitative data (questionnaires) in this study was limited to three main stakeholder groups: local residents (the beneficiaries), staff (clients and consultants), and contractors. This information was then statistically analysed using the software programs Microsoft Excel and SPSS. The findings and statistical analysis of these questionnaires are presented in tables and graphs. The aim of these questionnaires was to explore respondents' perspectives on the most important issues related to: (a) citizens' satisfaction with engineers, contractors, and the efficiency of projects; (b) administrative and corruption issues; (c) the efficiency of the organisation, use of IT, and organisational structure and culture; (d) practices in relation to quality, time, and financial and stakeholder management; (e) sustainability issues related to project management, such as the environmental impact, clean energy, health, social and financial issues; (f) efficiency of supervising, rights, morale and development of engineers, engineers' fear of the Commission of Integrity, and the knowledge and experience of engineers, as well as respondents' views on senior management.

Analysis of the qualitative data collected from the interviews began with manager interviews. The aim of these interviews was to explore current organisational structures and processes, responsibilities, relevant authorities, and the types and sizes of completed projects, as

well as the main problems and obstacles perceived by department managers in the directorates contributing to KPM. These one-to-one consultations were followed by analysis of focus-group interviews in order to classify the factors that affected the time, cost and quality of Karbala projects. Analysis of both sets of interviews was also conducted using Microsoft Excel and SPSS software, again presented in tables and graphs.

Chapter nine of this thesis presented the findings from the primary and secondary data (both qualitative and quantitative). An integrated approach (triangulation) was used to analyse the results of the primary and secondary data, the qualitative and quantitative findings and the literature in order to inform the final conclusions of the research. The advantages of using triangulation include the ability to cross-check in order to provide confirmation and comprehensiveness. The purpose of this process is to increase the credibility and validity of the results (Olsen, 2004; Yeasmin and Rahman, 2012). As such, this chapter aimed to investigate the impact of various factors on five constraints relevant to the sustainability of Karbala project management: time, cost, quality, social and environmental impact, and measurement of the performance of the project against key indicators. This investigation allows greater understanding of the research problem and how key constraint-related factors in KPM have contributed to the failure of projects. The data gathered will also inform KPM benchmarking.

Chapter ten was devoted to a discussion of the key issues and apparent causal relationships concerning project management in Holy Karbala Province. The issues of concern affecting KPM practice are those surrounding the problems related to the implementation of projects. This chapter critically analysed these in relation to the findings of other research introduced in previous chapters. Guidelines were then proposed for the development of a conceptual framework for project management to bring a shift towards successful implementation by merging the results

from this study with those from the existing literature. This conceptual development framework adopts several strategies based on the results from this research which address the roots of the problems identified; these issues included a lack of legislation, the limited capabilities of leaders, project teams and contractors, and organisational weaknesses. These key issues and causal relationships were then discussed in the ten subsections.

11.3 Conclusions

This research project has presented a model for the classification of the impact of internal and external factors on project practices, and has developed a conceptual framework to improve management practices in regional development projects in Iraqi provinces. Particular focus was given to Holy Karbala Province, as the management practices in regional development projects in other Iraqi provinces have been found to possess very similar characteristics. This section summarises the answers to the research questions. The below conclusions can be drawn from the study.

11.3.1 Findings with regard to Research Questions

A) Research Question 1

What are the current organisational structures and processes for regional development project management in Holy Karbala Province?

This research question concerns organisational structure, as stated in chapter eight (Section 8.2.2). Organisational structure, one of the major areas discussed in this dissertation, has a significant impact on the manner in which the organisation of Karbala's project management works. There are many types of organisational structure, as explained in the theories outlined in

the existing literature (Ruekert et al., 1995; Bohte and Meier, 2001; Ashkenas, et al., 2015; Teixeira, et al., 2012). In general, the organisational structure of the province of Karbala appears to be rather flat with a clear lack of hierarchy, especially in departments related to project management. The distribution of responsibilities and the overall span of control appear inefficient. Internally, within the organisational structure of Karbala's local administration, the Governor currently has 34 individuals who report directly to him. In addition, externally, he has (at least) 28 Federal Directorates operating within the province which report directly to him. This creates problems up and down the management structure as individuals needed for decision-making are increasingly unavailable for communication and collaboration. Quality of work is threatened, work backlogs is often left incomplete. Moreover, there are many unmanageable units and managers become physically and emotionally overwhelmed (burnt out) over time, regardless of their knowledge, experience and training.

Regarding project management processes, main processes are usually entrusted to one of the federal agencies or local departments in the province, such as municipalities, health or roads and bridges, without a unified management for all processes. In other words, there is an absence of project management officials, which causes an overlap in most processes between the roles of the directorates or departments and individuals. Furthermore, most current practices lack clear guidelines until policies or procedures have reached a certain degree of complexity, and delays in the decision-making process are not consistent with the progress schedule of projects.

The assessment outlined above highlights a general lack of clarity regarding who performs key processes such as initiation, planning, feasibility analysis, and referral to contractors. It is also as yet unclear as to how these processes are carried out because of the absence of efficient communication and information systems.

B) Research Question 2

What are the key issues in Karbala regional development project management in its current form, and what are the causal relationships?

Answers to this research question are stated in chapter 10 (sections 10.2 to 10.11). The results outlined in this chapter show that political changes, unqualified project leaders, financial and administrative corruption, regulatory changes, inappropriate organisational structure, lack of government legislation, lack of motivation and encouragement and slow decision-making had the most impact on the success of a project. Various factors that influence current practices were then explained in detail.

According to Iraqi provincial law 21 (2008) and laws governing the Iraqi federal budget for the years 2007-2016 in relation to reconstruction projects in the provinces, all financial, administrative and technical authority was proportioned to one person, the Governor, who is the highest executive authority in local government (Iraqi Parliament, 2007-2016). This was in addition to his other responsibilities concerning management of the province, in areas such as security, health, public services, education, agriculture, municipal, culture and citizens' affairs. Moreover, unqualified leaders (or the wrong people) were placed in post, representing an inadequate organisational model. Owing to a lack of knowledge and experience in business administration and organisational science, these leaders then did not hire experts in the field; this flawed process has caused, and still causes, a significant number of problems and obstacles. This in turn has influenced the outcome of projects, as detailed in chapter seven.

The results of this research show that corruption spreads horizontally and vertically in most of Iraq's governmental institutions, because of political status, organisational limitations, the selection of unqualified individuals and legislative weaknesses.

Among the several reasons that influence the choice of the lowest bidder is legislative weakness, in that the law does not cover all the necessary technical, administrative and legal requirements. Other factors include the lack of knowledge and experience of the members of the committees evaluating bids, political interference, and fear of the judicial authorities, in particular the Integrity Commission. The choice of the lowest bidder has greatly affected the implementation mechanism and the design and quality of materials used in the work. Delays also occur due to contractual financial deficit because of errors in estimating the actual contract cost.

Major reasons for excessive bureaucracy include federal and local legislation which has not improved performance in government institutions, as well as the employment of staff who are not qualified to lead the change towards e-government. In addition, a lack of development in the use of technology, particularly Information Technology (IT), in project management processes, impedes the progress of projects. This situation exists despite the fact that there are thousands of local individuals who have appropriate undergraduate and postgraduate qualifications.

Iraq's laws and regulations governing performance in public sector projects do not address the challenges faced by regional development projects on a holistic level. Project management, from design to delivery, is intended to integrate diverse functions, align efforts and stakeholders toward a common end and achieve the objectives of the project. This project management logic runs counter to the political forces and orientations, and has resulted in a highly fragmented, underdeveloped management and legal environment. One such force is the tendency in federal government to address management failures by strengthening individual management functions. These efforts often involve the creation or enhancement of senior executive positions including the position of Governor, moves which do not help attain project objectives.

C) Research Question 3

What is the impact of these key issues on regional development project management in Karbala?

Chapter nine (sections 9.3 to 9.7) focuses on this research question. The key issues affecting Karbala's regional development projects have had a significant impact on project outcomes in the five dimensions (constraints/sustainability): time, cost, quality, and environmental and social issues. Regarding time constraints, the results show that 28% of projects were delivered on time, while 72% were delayed. In terms of cost (economic) constraints, 27% of projects were completed within the contractual cost, while 73% either went over budget or were completed less than a contractual cost. 42% of projects were deemed to be of good quality, but 58% of them were of poor quality. 33% of projects incorporated environmental requirements, while 67% failed to meet environment criteria. Finally, with regard to social criteria, 35% achieved the set criteria; in contrast, 65% did not meet these. Overall, all constraints-sustainability indicators for KPM were very low. Therefore, KPM's performance was concluded to be poor. This resulted in a deterioration of public services and the frustration of its citizens. This situation has angered many residents of Karbala.

D) Research Question 4

What constitutes best practice (structures and processes) for project management, and where are its applications in Iraq?

This research question regarding best practice in project management was answered in chapters two (section 2.9) and three (section 3.2.1).

In the case of Karbala project management, the best practices can be captured from external organisations (Kerzner, 2014). There are some external sources of benchmarking for identifying best practices, such as project management institute publications, standards, methodologies, processes, tools, techniques, competencies and graduate-level theses (Marnewick and Labuschagne, 2010; Kerzner, 2014).

Concerning the application of best practices in Karbala projects, according to isomorphism theory it is only possible to apply what is considered best practice in organisations which are situated in a common environment and resemble each other. Furthermore, only organisations which have been recognised by the external professional community should be used (DiMaggio and Powell, 1983). Forms, guidelines, templates, and checklists which are accredited by the Standard Institutes or Professional Associations. like ISO, BSI, PMI and APM should be used; use of these documents can affect the execution and success of the project.

E) Research Question 5

How can best practice in project management be developed for use in Holy Karbala Province?

The final objective of this thesis was to develop a conceptual framework for the development of best practice for project management in the provinces of Iraq, especially in Karbala. Such a framework is one of the components of this thesis that represents the answer to this research question, as mentioned in chapter ten, section 10.13.

The theoretical framework method began with the classification of the factors that caused the projects under study to fail. An extensive literature review was carried out to determine the factors that influence an organisation's strategic PM success. These results were used to determine

how successful governmental institutions in Iraq have been in implementing and establishing PM as a sustainable commodity. Through the literature review in chapters two, three and four, an understanding of the topic of this study, as well as of any key issues, was acquired. The results of the literature review were then analysed to provide the foundation for this new framework.

Based on the outcome of the above steps, a conceptual framework was developed. Figure 10.7 in Chapter 10 illustrates the main steps followed and the presumed relationships between them. This process was constructed using theory, logic and current practice (Olivier, 2009; Cusumano, 2010; McLaughlin, 2013; Kerzner, 2014; Scott, 2016). The purpose of this conceptual framework is to provide a proposal to decision-makers in the Iraqi government in order to address managerial and organisational weaknesses including issues around project leaders, project managers, project team and contractors, in the form of development frameworks and processes that aim to change practice in public-sector institutions in the provinces of Iraq. Based on the above, and in combination with the rating factors that led to the failure of projects in Iraq, four main development strategies with three sub-strategies for best practices have been identified:

- Strategy 1: Development of Government Legislation
- Strategy 2: Creating of Development Team and Hiring of Experts
- Strategy 3: Capacity Building
    - Strategy 3.1: Human Resource Development
    - Strategy 3.2: Project Management Office
    - Strategy 3.3: Components of Proficiency
- Strategy 4: Application of Competencies in Implementation

11.3.2 Other Conclusions

There is a lack of literature surrounding the assessment and improvement of project management practices about developing countries, especially Iraq. The current literature does not cover the needs of emerging organisations, such as how to improve organisational maturity and capacity-building of its employees in parallel with the application of best practices.

Several issues need to be considered when enhancing links between research and development of project management practices in the public sector. These issues can be divided along the organisational levels, ranging from government policy, development and reconstruction plans, the legislative system, qualifications of leaders and managers, organisational status, prevailing management practices and policies to practice development and implementation by institution leaders. One of the objectives of strengthening the research-practice nexus is to improve practitioners' understanding of scientific research and science.

According to the findings of this research, it can be concluded that the problems plaguing projects in Karbala are not partial problems (micro-problems), but instead are structural problems (macro-problems) related to the organisation of Karbala project management and its practices. This is connected to four axes:

a) Limited capabilities of leadership, project teams and contractors;
b) Organisational weakness and excessive bureaucracy;
c) Shortfalls in reconstruction plans;
d) Lack of legislation which could promote better development and capacity building;

The regional development organisation in Karbala has the right to develop the standards or methodologies that are meaningful for its organisation. However, this study concludes that the

practitioners in Karbala' project management did not use a set of globally followed project management standards, methodologies and techniques; this weakness led to significant impacts on the performance of project management and project effectiveness. As such, it can be said that practices of regional development organisations in Karbala were not systematic and standardised at the time of this study.

11.4 Contributions of the Research

This research and proposed framework of improvement makes several contributions on both theoretical and practical levels, as discussed in the following sub-sections:

11.4.1 Contributions to Knowledge

From a scientific perspective, these are the academic contributions made by this study:

One significant original contribution of this study is an in-depth understanding of the regional development project management practices in Iraq. A review of the literature in the field of the development of project management practices, especially in the Middle East, revealed the need for more empirical research on practices in emerging organisations This study therefore integrates and extends the studies conducted in this area which address the issue of project management best practice for sustainable regeneration and regional development programmes in local governments in particular. Accordingly, this research could be one of the first studies that has been applied specifically to the Iraqi regional development and reconstruction industry. This research study has introduced a model of investigation for practices of project management in the public sector which has never been previously adopted, to the best of the researcher's knowledge. Little attention has been devoted to the assessment of practices in emerging organisations in the

context of the public and private sectors (Johnsson et al., 2014; White and Fortune, 2002; Toney and Powers, 1997). Moreover, no attention has been paid to the simultaneous assessment of individuals and organisational levels.

Therefore, this research contributes to knowledge as being the first empirical study carried out of the development of project management practices in emerging organisations and makes a contribution to filling the gap between theoretical project management and practical evidence of best practices frameworks within the context of the construction industry. This study could be useful to researchers as it is a step towards theory-building in relation to development of project management practices for Iraqi reconstruction. A large body of knowledge from different schools of thought has been brought together on project concepts, project management concepts, best practices of project management, project management standards, methodologies and techniques, key factors affecting projects, construction management problems in the Middle East and developing countries and project team skills and knowledge assessments; in this research, these diverse schools of thought have been combined into one integrated perspective.

The literature review of PM practices in emerging organisations revealed that there are gaps and a need for more empirical studies to be conducted; therefore, this research integrates, refines and extends empirical studies previously conducted in these fields, and fills some of the related research gaps. This research has responded to the recommendations of many scholars such as Kerzner (2004), Marnewick and Labuschagne (2010), Abudi (2011), Marnewick and Labuschagne (2010), PMI (2014a), Fernandes (2014), and Alotaibi and Mafimisebi (2016), who have emphasised the need for more studies in the field of improvement of project management practices in general and in developing countries in particular.

This research is also regarded as one of the first academic studies in Iraq about the evaluation and development of project management practices, as no previously published academic research study has examined this topic in Iraq. Therefore, it could be a basis to support and develop further scientific research in this field.

11.4.2 Contributions to Managerial Practices

The results of this study have several important implications for the regional development projects in Iraq, including issues related to assessment and development of sustainable project management practices. It could be argued that, from a practical point of view, the proposed conceptual framework in particular offers numerous major contributions to the improvement of project management performance in the Iraqi public sector, by adapting to the latest globally recognised international standards and methodologies in project management best practices.

As many Iraqi organisations, especially those in local governments, do not use peer-reviewed project management methodologies and therefore achieve poor management levels when tested under these frameworks, this research is important because it has been undertaken in order to explain the importance of these recognised international standards and methodologies in enhancing project management best practices, especially PMO and processes. Accordingly, leaders and managers of projects can gain a better understanding of the influence that project management best practices have, providing valuable ideas, techniques and tools for all organisational levels and indicating what should be focused on in order to achieve success in projects managed by these organisations.

Understanding project management guidelines could help practitioners to apply an effective approach in order to change current practices that inhibit success in projects. As many

decision-makers in Iraqi government organisations feel that capacity development using project management guidelines is a waste of money and time with a low rate of return, many do not pay it the attention it is due. However, this research has provided a proposal of a road-map as to helpful guiding principles in the framework of the critical issues that can enhance success in management practices and the implementation of projects. It has provided a review of international standards, methodologies and techniques, as well as the skills and knowledge requirements of engineering leaders and managers.

All the related indicators of factors affecting practices, including the project management organisational structure and processes within reconstruction projects, have also been evaluated. From this study, leaders and managers can derive a better understanding of the role of research activities in the development of organisations, especially in the contemporary field of project management. It can help project management leaders to understand how they can better manage their activities, what they should focus on and what they need to do to change or improve their processes. Based on the findings of this research, and in order to develop sustainable project management practices in Iraq and identify real needs for improvement, leaders and managers in Iraqi local governments need to consider all of the findings and conclusions of this study.

With regard to Iraqi federal and local governmental organisations, this research could be helpful in persuading them of the importance of project management guidelines and of the need to develop practical policies for the rehabilitation of the long-term performance of project management organisations in the development and reconstruction industry by way of an effective capacity-building programme.

The study findings are also beneficial for parliamentarians, lawmakers and policy-makers. By evaluating current practice, it became apparent that there is limited awareness of how to plan

and implement long-term strategies to increase the productivity of projects and to enhance skills in the construction industry. In the global construction industry, managerial knowledge, skills and performance for leaders and engineers are becoming increasingly important issues for corporations (Leskiw and Singh, 2007). Therefore, training has been seen as highly relevant to the professional development of the knowledge, skills, behaviours, and attitudes of senior manager and engineers in construction organisations (Gruidl and Hustedde, 2003; Sherazi et al., 2011; Lafuente and Manning, 2016). Nevertheless, the identification and development of appropriate measures for leaders, engineers and workers in the construction industry in Iraq have yet to be explored. As such, it is hoped that Iraqi parliamentarians would be interested in this important aspect with regard to the approval of policies and curricula.

11.5 Limitations of the Research

Every research study faces several limitations that constrain the researcher. This investigation was subject to the following limitations:

1. This research is limited to project management practices in the Iraqi public sector, specifically of regional development projects in Holy Karbala Province, so the generalisation of the findings of the present study is limited to regional development projects in other Iraqi local governments.
2. There was a lack of literature on project management practices in Iraq and other neighbouring countries at the time when this study was undertaken. In addition, project management practice assessment in the construction sector is a relatively new concept, so there was a lack of related studies to help with formulating an accurate measurement of project management practice assessment. Previously conducted empirical studies in

the field of the research were lacking comprehensiveness in their assessment; as such, there was a lack of scales and measurements which could have been used to establish a cause-and-effect study for examining the relationship between practices and organisational performance.

3. Another limitation was time constraints, in relation to both the researcher and the sponsor of the study; the latter was obliged to discontinue financial support for this research in the last two years of the project, and the researcher had a specific timeframe within which to finish this research due to health and financial reasons and academic regulations.

This research was conducted using the mixed method with a triangulation approach to ensure the validity of the research. It investigated Karbala province and carried out research into a huge number of regional development projects, most of which were doomed to failure. It was concluded that the findings of the study could be applied to a wider context, namely to many Iraqi provinces that have the same circumstances (especially the central and southern provinces of Iraq). However, careful attention has to be paid when attempting to transfer the generalisation to other provinces which, for example, suffer from serious security problems; in such cases this extrapolation might be inappropriate.

In Iraq, generalisation for other business sectors like the private investment sector is impossible; this could be due to the differences between business environments and contexts, and to their different structures of legislation, organisational status, constraints, and economic and political issues.

11.7 Recommendations for Further Research

In this study a number of significant objectives have been addressed, and important contributions made, regarding the development of project management practices in the Iraqi construction industry. This has been achieved by identifying the major concerns and problems which face KPM practices, in addition to exploring the time, cost, quality, and environmental and social constraints/sustainability gaps in Karbala regional development projects in Iraq. The conclusions and implications derived from this research have been conclusive, but still some issues remain to be confirmed by similar studies using identical or alternative research methodologies. Further studies are therefore required to extend this research and to help improve practices of development and reconstruction projects in Iraq. Therefore, some recommendations are provided below for future research. They are:

1) As this study concentrated on regional development project management in Holy Karbala Province, it is recommended that future efforts should involve other Iraqi provinces which have a variety of backgrounds. Such studies could confirm the findings of this research.
2) As this study concentrated on the public sector in local government, replication of this study in other Iraqi public-sector areas, such as Federal Ministry companies, might extend the understanding of project management practices and could yield more valuable findings and provide the opportunity for comparison.
3) The researcher recommends further research to study the project management practices in the Iraqi investment sector from the perspectives of companies.
4) The researcher recommends that a focused study be conducted for the evaluation and development of contracting processes in Iraqi reconstruction projects.

5) The researcher recommends further research in the form of a focused study for the assessment and development of planning processes in Iraqi reconstruction projects.
6) A comparative study between public-sector organisations in the United Kingdom and Iraqi organisations that invest in people would also be useful.

11.8 Recommendations for Practice

After realising the aim and objectives of the research, the study provides the following general recommendations:

1) Project management methodologies have become the standard way of carrying out projects in today's global and competitive world, therefore Iraqi governmental institutions must adopt one of these methodologies in the management of their projects and set the agenda for project management training.
2) In creating or adopting an effective project management methodology, it needs to be appropriate to the specific project environment. In addition, it needs to be flexible and adaptable to the dynamic nature of projects and the demands of the stakeholder; it should also provide guidelines of best practices to ensure that the project objectives are achieved.
3) Iraqi project management organisations should adopt appropriate project management tools and techniques in their projects and commit more fully to their use.
4) Selection of project leaders and managers at any organisational level should be based on their project management qualifications and experiences.
5) A project manager must be appointed early enough in the project life to handle the

management from initiation to completion.

6) Iraqi legislation should be modified or developed in a way that is relevant to project management, to create a suitable business environment for the success of reconstruction plans and to ensure the improvement of services for citizens. Furthermore, efforts should be made towards the unification of adopted policies, standards and practices in project management.
7) Iraqi project management organisations must create formal project management offices (PMO) at three levels: portfolio, program and project. These offices must actively work to implement verified project management practices and integrate them across those levels. In addition, those organisations should align their project management strategies directly with their strategic business goals by way of their PMO.
8) Project managers and project team members at all organisational levels should be trained in line with accredited project management standards, methodologies, knowledge, skill sets and competencies.
9) In today's world, any business, small or large, needs to manage its projects wisely. One of the most important techniques to help materialise that vision is the enormous capacity of the information technology and digital world. As such, Iraqi project management organisations should update their practices in line with the rapidly growing information technology sector in order to make use of tools that may help project managers to improve their effectiveness and implement their projects more efficiently.
10) Iraqi project management organisations should take into account all of the

necessary measures to ensure that sustainability criteria are met in their project. They should also be aware of the need to increase investment in time, money and resources in order to build organisational expertise and improve organisational maturity.

11) It is very important that a thorough consideration of all of the critical success and failure factors of a project are carried out. These conclusions should then be linked to project effectiveness to ensure that the project has achieved its objectives in order to measure and increase project efficiency in the long term.
12) Periodic conferences, seminars and workshops should be organised to exchange best-practice libraries and lessons learned from completed projects and to transfer knowledge and experience in the field of project management.
13) All project management organisations in the public sector should focus on citizens' satisfaction and think of ways to provide better services to them through successful plans and projects.
14) Active participation of all stakeholders on the project team should be encouraged, increasing trust and transparency of information exchange.

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Appendices

Appendix 1. ***Approval to Collect Data***

جمهورية العراق

محافظة كربلاء المقدسة
الإدارة العامة

العدد: ٢٥٩
التاريخ: ٢٠١١/ ٧ /٤

محاربة الفساد خطوة مهمة لبناء المستقبل

إلى / دوائر المحافظة كافة

م / تسهيل مهمة

السلام عليكم...

بناءً على الطلب المقدم من قبل المهندس (صادق جعفر حسين الطرفي) حيث تم قبوله في إحدى الجامعات البريطانية لإكمال دراسته العليا للحصول على شهادة الدكتوراه عن موضوعه (التخطيط الاستراتيجي وإدارة المشاريع للاعمار) وتم منحه الإجازة الدراسية ولغرض تسهيل مهمته في البحث عن الموضوع المذكور . عليه نرجو إبداء المساعدة له في الاطلاع على المعلومات والتقارير ذات العلاقة بموضوعة وتزويده بها من اجل ضمان الحصول على أفضل النتائج النافعة لهذه المحافظة المقدسة ... مع التقدير .

المهندس
آمال الدين مجيد الهر
محافظ كربلاء المقدسة
٢٠١١/ ١/ ٥

نسخة منه إلى:

- محافظة كربلاء المقدسة / مكتب المحافظ / إشارة لهامش السيد المحافظ المحترم على مطالعة الموما إليه المرفقة صورتها طياً للتفضل بالاطلاع .. مع التقدير .
- محافظة كربلاء المقدسة / مكتب السيد النائب الأول للمحافظ / للتفضل بالاطلاع .. مع التقدير .
- أقسام وشعب الإدارة المحلية / لنفس الغرض اعلاه .. لطفاً .
- قسم الإدارة العامة / مع الأوليات.

قائد

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Tel : 032 – 320000

Appendix 2. ***Semi-structure interview guideline***

Appendix (2): semi-structure interview guideline

Section 1: Time and location		
Date:		
Time:		
Location:		
Section 2: Interviewee Data		
Name:		
Current Job:		
Specialization		
Organization Name:	Local Government:	Federal Government:
Contact Details: Telephone:	Email:	
Working Experience (general):	Years:	
Working Experience (Project management)	Years:	
Section 3: Interview Questions		
Q1: What is the organisational structure of your department?		
Q2: What are the processes for project management in your department?		
Q3: What are the duties and responsibilities of your department?		
Q4: What authority do you have?		
Q5: What type and size of projects are within your responsibilities?		
Q6: What are the main problems and obstacles that you face?		

Appendix 3. ***Questionnaire of Citizens in the Holy Province of Karbala (English form)***

University of Bolton
ENGINEERING, SPORTS AND SCIENCES

KARBALA LOCAL GOVERNMENT
PROJECT MANAGEMENT

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة
Research for improvement of project management for province of Karbala

People Questionnaire form — استمارة استبيان المواطنين

Dear Citizen: Thank you for your cooperation with us ... The questionnaire in order to stand on the fact and the reality of projects management in Karbala province. So, we recommend to read the questions as well and answer (x) in the appropriate field. The accuracy of information is a moral issue and a national service will help us to get better research results ... In order to Karbala and Imam Hussein (AS). Thank you for your cooperation with us again.

Educational attainment:	Gender: M	F	age:	Employer:
Place of Residence: Rural	Urban			

No.	Questions	Yes	No	I don't know
1	Do you think that the organisational status of Karbala project management is good? (In terms of distribution of tasks, authorities and responsibilities)			
2	Is the speed of the procedures and decision-making process during the implementation of projects by the government satisfactory?			
3	Did the administrative process impact on project time?			
4	Are you satisfied with the efficiency of the overseeing engineers involved in reconstruction projects in Karbala?			
5	Do you think that the process of planning projects meets citizens' needs in Karbala?			
6	Do you think that contractors are implementing the reconstruction projects in Karbala at an acceptable level?			
7	Are you satisfied with the reconstruction projects in Karbala?			
8	Do you think that the implementation of reconstruction projects in Karbala is of good quality?			
9	Is the period of implementation of reconstruction projects in Karbala acceptable?			
10	Does the local government take the views and suggestions of people for the development of project management?			
11	Does the management of projects in Karbala contribute to preserving the environment?			
12	Does Karbala project management contribute to reducing energy consumption and seek to increase the use of clean energy?			
13	Does Karbala project management contribute to improving the health of citizens?			
14	Does Karbala project management contribute to reducing the cost of projects and finding alternatives?			
15	Does the political factor have an effect on Karbala project management?			
16	Is there financial and administrative corruption in Karbala project management?			

* If there are comments, problems or suggestions in this regard you can write behind form please

Appendix 4. ***Questionnaire of Citizens in the Holy Province of Karbala (Arabic form)***

University of Bolton
ENGINEERING, SPORTS AND SCIENCES

محافظة كربلاء المقدسة
الإدارة المحلية

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة
Research for improvement of project management for the province of Karbala

People Questionnaire — استمارة استبيان المواطنين

عزيزي المواطن الكريم : شكراً لتعاونك معنا .. الاستبيان من اجل الوقوف على حقيقة وواقع إدارة المشاريع العمرانية في المحافظة من خلال مشاريع الدوائر الخدمية و مشاريع التنمية والاستثمار في المحافظة .. لذا نوصي بقراءة الأسئلة بشكل جيد والإجابة بـ (x) في الحقل المناسب ... إن دقة المعلومات أمانة شرعية وخدمة حسينية ووطنية وسوف تساعدنا على الحصول على نتائج بحثية أفضل .. من اجل كربلاء الحسين (ع) .. شكراً لتعاونك معنا مرة أخرى..

التحصيل العلمي:	الجنس: ذكر	انثى	العمر:	جهة العمل:
محل السكن:	حضري	ريفي		

ت	التفاصيل	نعم	لا	لا أدرى
1	هل ان تنظيم إدارة مشاريع الأعمار في المحافظة جيد (توزيع المهام والصلاحيات والمسؤوليات)؟			
2	هل أن سرعة الإجراءات واتخاذ القرارات أثناء تنفيذ المشاريع من قبل الحكومة جيدة؟			
3	هل أن الروتين الإداري الحكومي يؤثر على سرعة تنفيذ مشاريع الاعمار في المحافظة؟			
4	هل أنت راضٍ عن كفاءة المهندسين المشرفين على مشاريع الأعمار في المحافظة؟			
5	هل تعتقد أن عملية التخطيط لمشاريع الأعمار تتناسب وحاجة المواطن الكربلائي؟			
6	هل تعتقد أن المقاولين المنفذين لمشاريع الأعمار في المحافظة بمستوى مقبول؟			
7	هل أنت راض عن مشاريع الأعمار في المحافظة؟			
8	هل أن تنفيذ مشاريع الأعمار في المحافظة بنوعية جيدة؟			
9	هل مدة تنفيذ مشاريع الأعمار في المحافظة مقبولة؟			
10	هل يؤخذ بآراء المواطنين ومقترحاتهم في تطوير عمل إدارة المشاريع؟			
11	هل تساهم إدارة المشاريع في الحفاظ على البيئة؟			
12	هل تساهم إدارة المشاريع في تقليل استهلاك الطاقة واستخدام الطاقة النظيفة؟			
13	هل تساهم إدارة المشاريع في تحسين صحة المواطن؟			
14	هل تساهم إدارة المشاريع في تقليل كلف المشاريع وإيجاد البدائل نحو خدمات أفضل للمواطن؟			
15	هل يوجد تأثير للعامل السياسي على إدارة المشاريع (اختيار القادة والمدراء والتأثير عليهم مثلا)؟			
16	هل يوجد فساد المالي وإداري في إدارة المشاريع في المحافظة؟			

* إذا توجد ملاحظات أو مشاكل أو مقترحات بهذا الخصوص يمكن كتابتها خلف الاستمارة رجاءاً..

Appendix 5. ***Stff Questionnaire (English form)***

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ENGINEERING, SPORTS AND SCIENCES

KARBALA LOCAL GOVERNMENT
PROJECT MANAGEMENT

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة
Research for improvement of project management for province of Karbala

Engineer Questionnaire form — استمارة استبيان المهندسين

Dear engineer: Thank you for your cooperation with us. The questionnaire in order to understand the fact and the reality of projects management in Karbala province through project departments and development projects in the Karbala. So, we recommend to read the questions well and answer (x) in the appropriate field. The accuracy of information is an ethics issue and a national service will help us to get better research results. Thank you for your cooperation with us again.

Specialization:	**Years of Experience:**
Place of employment:	**Gender: M F**

No.	Questions	%0	%25	%50	%75	%100
1	What is the efficiency of the organisation of the reconstruction project management departments in Karbala?					
2	What is the speed of decision-making procedures by the project management departments during the implementation stages?					
3	What is the percentage of the effect of delaying decisions and administrative procedures on the cost of the project?					
4	What is the percentage of the effect of delaying decisions and administrative procedures on the duration of the project?					
5	What is the percentage of the effect of delaying decisions and administrative procedures on the quality of the project?					
6	What is the percentage of the opportunities available to train and develop the knowledge and skills of engineers?					
7	What is the efficiency of the supervising engineers?					
8	What is the efficiency of project planning before contracting?					
9	What is the effect of the administrative routine on the Karbala project management departments?					
10	What is the percentage of the rights given to engineers from the departments?					
11	What is the percentage of engineers' views and suggestions for development of project management that are taken on board?					
12	What is the percentage of weak points in Karbala project management?					
13	What is the percentage of strong points in in Karbala project management?					
14	What is the percentage of contribution of Karbala project management to preserving the environment?					
15	What is the percentage of contribution of Karbala project management to reducing energy consumption and increasing the use of clean energy?					

Appendix 6. ***Staff Questionnaire (Arabic form)***

University of Bolton
ENGINEERING, SPORTS AND SCIENCES

محافظة كربلاء المقدسة
الإدارة المحلية

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة
Research for improvement of project management for province of Karbala

Engineers Questionnaire — استمارة استبيان المهندسين

عزيزي المهندس: شكراً لتعاونك معنا .. الاستبيان من اجل الوقوف على حقيقة وواقع إدارة المشاريع العمرانية في المحافظة من خلال مشاريع الدوائر الخدمية ومشاريع التنمية والخطة الاستثمارية في المحافظة. لذا نوصي بقراءة الأسئلة بشكل جيد والإجابة بـ (X) في الحقل المناسب ... إن دقة المعلومات أمانة اخلاقية وخدمة وطنية وسوف تساعدنا على الحصول على نتائج بحثية أفضل .. نشكر تعاونك معنا.

الاختصاص:	عدد سنوات الخبرة:	جهة العمل:	الجنس:

ت	التفاصيل	%0	%25	%50	%75	%100
1	كفاءة تنظيم إدارة مشاريع الأعمار في المحافظة (توزيع المهام والصلاحيات والمسؤوليات)					
2	نسبة سرعة الإجراءات واتخاذ القرارات المطلوبة من قبل الدائرة وأثناء التنفيذ المشاريع					
3	نسبة تأثير تأخير الإجراءات والقرارات الإدارية على كلفة تنفيذ المشروع					
4	نسبة تأثير تأخير الإجراءات والقرارات الإدارية على مدة المشروع					
5	نسبة تأثير تأخير الإجراءات والقرارات الإدارية على نوعية تنفيذ المشروع					
6	نسبة الفرص المتوفرة للتدريب وتطوير مهارات المهندسين العاملين في إدارة المشاريع					
7	نسبة كفاءة المهندسين المشرفين الحاليين على المشاريع					
8	نسبة كفاءة التخطيط للمشاريع قبل الإحالة على المقاولين					
9	نسبة التعاون وتسهيل الأمور من قبل الدائرة اتجاه المقاول					
10	نسبة حصول المهندس على حقوقه من الدائرة					
11	نسبة الأخذ بآراء المهندسين ومقترحاتهم في تطوير عمل إدارة المشاريع					
12	نسبة السلبيات ونقاط الضعف في إدارة المشاريع العمرانية في المحافظة					
13	نسبة الايجابيات ونقاط القوة في إدارة المشاريع العمرانية في المحافظة					
14	نسبة مشاركة إدارة المشاريع في الحفاظ على البيئة					
15	نسبة مشاركة إدارة المشاريع في تقليل استهلاك الطاقة واستخدام الطاقة النظيفة					
16	نسبة مشاركة إدارة المشاريع في تحسين صحة المواطن					
17	نسبة مشاركة إدارة المشاريع في تقليل كلف المشاريع وإيجاد البدائل نحو خدمات أفضل					
18	نسبة كفاءة العلاقة والتنسيق بين الدوائر الخدمية والمحافظة ومجلس المحافظة					
19	نسبة تأثير العامل السياسي على إدارة المشاريع (اختيار القادة والمدراء والتأثير عليهم مثلا)					
20	نسبة وجود عامل التحفيز والتشجيع على الإبداع من قبل الدائرة للمهندسين					
21	نسبة الروح المعنوية للمهندس اتجاه وضع إدارة المشاريع الحالية					
22	نسبة المرونة في الإجراءات والقرارات الإدارية المتخذة من قبل الدائرة اتجاه المقاول					
23	نسبة تأثير الخوف من الجهات الرقابية (النزاهة مثلاً) على المهندسين العاملين في المشاريع					
24	نسبة قناعة ورضا المواطن عن مشاريع الأعمار في المحافظة					
25	نسبة التخصص والخبرة والمعرفة لدى القياديين في إدارة المشاريع في المحافظة					
26	نسبة التخصص والخبرة والمعرفة لدى المهندسين في إدارة المشاريع في المحافظة					
27	نسبة استخدام التكنولوجيا في إدارة المشاريع في المحافظة					
28	نسبة وجود الصراعات بين الأفراد والجهات المسئولة عن إدارة الأعمار في المحافظة					
29	هل تعتقد أن جميع العاملين في إدارة المشاريع يسعون لتحقيق هدف واحد					
30	نسبة الفساد المالي والإداري في إدارة المشاريع في المحافظة					
31	نسبة التخصص والخبرة والمعرفة لدى المقاولين المنفذين للمشاريع في المحافظة					
32	كفاءة إعداد الكشوفات (التندر) للمشاريع قبل الإحالة على المقاولين					
33	نسبة التأثير السلبي للتشريعات والقوانين العراقية على أداء إدارة المشاريع بصورة أفضل					
34	كفاءة ونوعية المشاريع المنفذة في المحافظة خلال 4 سنوات الماضية					

* إذا توجد ملاحظات أو مشاكل أو مقترحات بهذا الخصوص يمكن كتابتها خلف الاستمارة رجاءاً..

Appendix 7. ***Contractors Questionnaire (English form)***

University of Bolton
ENGINEERING, SPORTS AND SCIENCES

KARBALA LOCAL GOVERNMENT
PROJECT MANAGEMENT

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة
Research for improvement of project management for province of Karbala

Contractor Questionnaire form — استمارة استبيان المقاولين

Dear Contractor: Thank you for your cooperation with us. The questionnaire in order to understand the fact and the reality of projects management in Karbala province through project departments and development projects in the Karbala. So, we recommend to read the questions well and answer (x) in the appropriate field. The accuracy of information is an ethics issue and a national service will help us to get better research results. Thank you for your cooperation with us again.

Classification and specialization:	**Years of Experience:**
Place of employment:	

No.	Questions	%0	%25	%50	%75	%100
1	What is the efficiency of the organisation of the reconstruction project management departments in Karbala?					
2	What is the speed of decision-making procedures by the project management departments during the implementation stages?					
3	What is the percentage of the effect of delaying decisions and administrative procedures on the cost of the project?					
4	What is the percentage of the effect of delaying decisions and administrative procedures on the duration of the project?					
5	What is the percentage of the effect of delaying decisions and administrative procedures on the quality of the project?					
6	What is the percentage of the opportunities available to train and develop the knowledge and skills of engineers?					
7	What is the efficiency of the supervising engineers?					
8	What is the efficiency of project planning before contracting?					
9	What is the effect of the administrative routine on the Karbala project management departments?					
10	What is the percentage of the rights given to contractor from the departments?					
11	What is the percentage of contractor' views and suggestions for development of project management that are taken on board?					
12	What is the percentage of weak points in Karbala project management?					
13	What is the percentage of strong points in in Karbala project management?					

14	What is the percentage of contribution of Karbala project management to preserving the environment?					
15	What is the percentage of contribution of Karbala project management to reducing energy consumption and increasing the use of clean energy?					
16	What is the percentage of contribution of Karbala project management to the improvement of citizens' health?					
17	What is the percentage of participation of Karbala project management in reducing the costs of projects and finding alternatives?					
18	What is the percentage of the efficiency of the relationship and coordination between the departments involved in Karbala project management?					
19	What is the percentage of the negative impact of the political factor on project management? (e.g. choice of leaders and managers)					
20	What is the percentage of the stimulus and encouragement of creativity among contractor by Karbala project management?					
21	What is the percentage of the morale of contractor about the current state of project management in Karbala?					
22	What is the flexibility of the decision-making taken by the Karbala project management departments?					
23	What is the percentage of the impact of engineers' fear of the Commission of Integrity and the judiciary on projects?					
24	What is the percentage of citizens' satisfaction with the reconstruction projects in Karbala?					
25	What is the percentage of skills, experience and knowledge of Karbala project management leaders?					
26	What is the percentage of experience and knowledge of the engineers?					
27	What is the percentage of the use of information technology (IT) in Karbala project management departments?					
28	What is the percentage of the conflicts between individuals and agencies responsible for managing the projects in Karbala province?					
29	Do you think that all staff in the Karbala project management are aiming to achieve one goal?					
30	What is the percentage of financial and administrative corruption in the Karbala project management departments?					
31	What is the percentage of experience and knowledge of contractors?					
32	What is the efficiency of tender documents of projects before contracting?					
33	What is the percentage of the negative impact of the Iraqi legislation and the law on Karbala project management?					
34	What is the percentage of the quality of projects implemented in Karbala during the last 4 years?					

* If there are comments or problems or suggestions in this regard can be written behind form please.

Appendix 8. ***Contractors Questionnaire (Arabic form)***

University of Bolton
ENGINEERING, SPORTS AND SCIENCES

محافظة كربلاء المقدسة
الإدارة المحلية

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة
Research for improvement of project management for the province of Karbala

Contractors Questionnaire — استمارة استبيان المقاولين

عزيزي المقاول: شكراً لتعاونك معنا. الاستبيان من اجل الوقوف على حقيقة وواقع إدارة المشاريع العمرانية في المحافظة من خلال مشاريع الدوائر الخدمية ومشاريع التنمية والخطة الاستثمارية في المحافظة. لذا نوصي بقراءة الأسئلة بشكل جيد والإجابة بـ (X) في الحقل المناسب ... إن دقة المعلومات أمانة اخلاقية وخدمة وطنية وسوف تساعدنا على الحصول على نتائج بحثية أفضل .. نشكر تعاونك معنا.

التصنيف والاختصاص: عدد سنوات الخبرة: جهة العمل:

ت	التفاصيل	0%	25%	50%	75%	100%
1	كفاءة تنظيم إدارة مشاريع الأعمار (توزيع المهام والصلاحيات والمسؤوليات)					
2	سرعة الإجراءات واتخاذ القرارات المطلوبة من قبل الدائرة و أثناء التنفيذ المشاريع					
3	تأثير تأخير الإجراءات والقرارات الإدارية على كلفة تنفيذ المشروع					
4	تأثير تأخير الإجراءات والقرارات الإدارية على مدة المشروع					
5	تأثير تأخير الإجراءات والقرارات الإدارية على نوعية تنفيذ المشروع					
6	نسبة الفرص المتوفرة للتدريب وتطوير مهارات المقاولين المنفذين للمشاريع في المحافظة					
7	نسبة كفاءة المهندسين المشرفين الحاليين على المشاريع					
8	كفاءة التخطيط للمشاريع قبل الإحالة على المقاولين					
9	التعاون وتسهيل الأمور من قبل الدائرة اتجاه المقاول					
10	نسبة حصول المقاول على حقوقه من الدائرة					
11	نسبة الأخذ بآراء المقاولين ومقترحاتهم في تطوير عمل إدارة المشاريع					
12	نسبة السلبيات ونقاط الضعف في إدارة المشاريع العمرانية في المحافظة					
13	نسبة الايجابيات ونقاط القوة في إدارة المشاريع العمرانية في المحافظة					
14	نسبة مشاركة إدارة المشاريع في الحفاظ على البيئة					
15	نسبة مشاركة إدارة المشاريع في تقليل استهلاك الطاقة واستخدام الطاقة النظيفة					
16	نسبة مشاركة إدارة المشاريع في تحسين صحة المواطن					
17	نسبة مشاركة إدارة المشاريع في تقليل كلف المشاريع وإيجاد البدائل نحو خدمات أفضل					
18	نسبة كفاءة العلاقة والتنسيق بين الدوائر الخدمية والمحافظة ومجلس المحافظة					
19	نسبة تأثير العامل السياسي على إدارة المشاريع (اختيار القادة والمدراء والتأثير عليهم مثلا)					
20	نسبة وجود عامل التحفيز والتشجيع على الإبداع من قبل الدائرة للمقاولين					
21	الروح المعنوية للمقاول اتجاه وضع إدارة المشاريع الحالية					
22	نسبة المرونة في الإجراءات والقرارات الإدارية المتخذة من قبل الدائرة اتجاه المقاول					
23	نسبة تأثير الخوف من الجهات الرقابية (النزاهة مثلاً) على المهندسين العاملين في المشاريع					
24	نسبة قناعة ورضا المواطن عن مشاريع الأعمار في المحافظة					
25	نسبة التخصص والخبرة والمعرفة لدى القياديين في إدارة المشاريع في المحافظة					
26	نسبة التخصص والخبرة والمعرفة لدى المهندسين في إدارة المشاريع في المحافظة					
27	نسبة استخدام التكنولوجيا في إدارة المشاريع في المحافظة					
28	نسبة وجود الصراعات بين الأفراد والجهات المسئولة عن إدارة الأعمار في المحافظة					
29	هل تعتقد أن جميع العاملين في إدارة المشاريع يسعون لتحقيق هدف واحد					
30	نسبة الفساد المالي والإداري في إدارة المشاريع في المحافظة					
31	نسبة التخصص والخبرة والمعرفة لدى المقاولين المنفذين للمشاريع في المحافظة					
32	كفاءة إعداد الكشوفات (التندر) للمشاريع قبل الإحالة على المقاولين					
33	نسبة التأثير السلبي للتشريعات والقوانين العراقية على أداء إدارة المشاريع بصورة أفضل					
34	كفاءة ونوعية المشاريع المنفذة في المحافظة خلال 4 سنوات الماضية					

* إذا توجد ملاحظات أو مشاكل أو مقترحات بهذا الخصوص يمكن كتابتها خلف الاستمارة رجاءاً..

Appendix 9. ***Focus group Interviews questions***

University of Bolton
ENGINEERING, SPORTS AND SCIENCES

The Local Government in The Holy Karbala

بحث تطوير إدارة المشاريع لمحافظة كربلاء المقدسة

Research for improvement of project management for the province of Karbala

Interview questions about: Causes that affect on the time, cost and quality of projects

Educational attainment:	specialization:	Job Title:	Years of Experience:	Age:	SEX:	Workplace:

Importance index in causing: 1 (very little), 2= (little) , 3= (medium) , 4= (great) , 5= (extremely)

A. Government related causes		**COST كلفة المشروع**					**QUALTIY جودة المشروع**					**TIME وقت المشروع**					**الأسباب المتعلقة بأقسام و دوائر الحكومة:**	
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
A1	Finance and payments of completed work																تأخر السلف المالية المدفوعة إلى المقاول عن الأعمال المنجزة	1
A2	Owner interference																تدخل المسئولين الحكوميين في المشاريع	2
A3	Slow decision-making																بطئ عملية اتخاذ القرارات	3
A4	Lack of staff experience																افتقار الموظفين إلى الخبرة	4
A5	Excessive bureaucracy in project owner operation																البيروقراطية المفرطة والروتين الإداري في الإجراءات	5
A6	Inappropriate overall organisational structure linked to the project																الهيكل التنظيمي العام غير ملائم لربط المشروع	6
A7	Lack of appropriate legislation and government laws																عدم ملائمة أو نقص التشريعات والقوانين الحكومية	7
A8	Selection of non-qualified project management leaders for political reasons																اختيار قادة إدارة المشاريع لأسباب سياسية وغير مؤهلين	8
A9	Financial and administrative corruption																الفساد الإداري والمالي	9
A10	Non-use of information technology																عدم استخدام تكنولوجيا المعلومات	10
A11	Weaknesses of quality assurance/control																الضعف في الرقابة وضمان الجودة	11
A12	Lack of or inadequate experience of consultants																النقص وعدم كفاية خبرة الاستشاريين	12
A13	Underperforming employees																ضعف اداء الموظفين	13
A14	Lack of trust among employees and government departments																انعدام الثقة بين الموظفين والدوائر الحكومية	14
A15	Lack of motivation and encouragement																عدم وجود الحافز والتشجيع	15
A16	Staff fear of Anti-Corruption Commission																خوف الموظفين من هيئة مكافحة الفساد	16

B. Contractor related causes		COST كلفة المشروع					QUALTIY جودة المشروع					TIME وقت المشروع					الأسباب المتعلقة بالمقاولين:	
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
B1	Subcontractors																ضعف المقاولين الثانويين	1
B2	Poor site management and supervision																سوء إدارة الموقع و الاشراف	2
B3	Construction methods																سوء أساليب البناء	3
B4	Improper planning																سوء تخطيط المقاول للتنفيذ	4
B5	Delay in the project timetable																تأخير في الجدول الزمني للمشروع	5
B6	Inadequate contractor experience																خبرة المقاول غير كافية	6
B7	Financing by contractor during construction																ضعف التمويل المالي من قبل المقاول خلال العمل	7
B8	Controlling subcontractors by main contractor in the execution of work																ضعف السيطرة المقاول على المقاولين الثانويين في تنفيذ العمل	8
B9	Mistakes in construction work																الأخطاء في أعمال البناء	9
B10	Poor quality of construction work																نوعية رديئة من أعمال البناء	10
B11	The selection of unskilled workers by the contractor to work on site																اختيار العمال غير المهرة من قبل المقاول للعمل في الموقع	11
B12	Inadequate equipment used																عدم كفاية المعدات المستخدمة	12
B13	Personnel safety issues																قضايا سلامة العاملين	13
B14	Unavailability of engineers on the project's site																عدم توفر مهندسين في موقع المشروع	14

C. Contract related causes (Consultant)		COST كلفة المشروع					QUALTIY جودة المشروع					TIME وقت المشروع					أسباب متعلقة بالعقد	
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
C1	Change orders																أوامر التغيير	1
C2	Mistakes and discrepancies in contract document																الأخطاء والاختلافات في وثائق العقد	2
C3	Lack of contract document																نقص في وثائق العقد	3
C4	Lack of communication and coordination between parties																عدم التواصل و التنسيق بين الطرفين	4
C5	Maladministration in disputes and negotiations																سوء إدارة النزاعات والتفاوض	5
C6	Unrealistic contract duration and requirements imposed																غير واقعية مدة العقد ومتطلباته الأساسية	6
C7	Tendering system that obligates the choice of the lowest bidding value																الإحالة على أقل العطاءات في العقود الحكومية	7
C8	Delays in obtaining permits from municipality or related bodies																الحصول على تصاريح من البلدية أو الجهات ذات العلاقة	8
C9	Lack of preparation of work site																عدم تهيئة موقع العمل خالي من الشواغل	9
C10	Insufficient data collection and survey before design																بيانات غير كافية والمسح قبل التصميم	10

D. Material related causes		COST كلفة المشروع					QUALTIY جودة المشروع					TIME وقت المشروع					أسباب متعلقة بالمواد	
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
D1	Quality of material																نوعية المواد	1
D2	Shortage of material																نقص في كميات المواد	2
D3	Material transfer problems																مشاكل نقل المواد	3
D4	Inaccurate material testing																عدم الدقة في اختبار المواد	4
D5	Delays in the test material																التأخير في اختبار المواد	5

E. Labor and equipment category causes		COST كلفة المشروع					QUALTIY جودة المشروع					TIME وقت المشروع					أسباب متعلقة بالعمالة والمعدات	
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
E1	Lack of local labour supply																عدم توفر اليد العاملة المحلية	1
E2	Lack of labour productivity																قلة إنتاجية العمل	2
E3	Lack of modern equipment																عدم توفر المعدات الحديثة	3
E4	Unskilled local operators																عدم مهارة العمال المحليين	4
E5	Lack of commitment and discipline by local labourers																عدم الالتزام والانضباط من قبل العمال المحليين	5
E6	Lack of foreign labour because of the security factor																عدم وجود العمالة الأجنبية بسبب عامل الأمن	6

F. External causes		COST كلفة المشروع					QUALTIY جودة المشروع					TIME وقت المشروع					أسباب خارجية	
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
F1	Weather conditions																حالة الطقس	1
F2	Regulatory changes																التغييرات التنظيمية	2
F3	Problems with neighbours																مشكلة مع الجيران	3
F4	Unforeseen site conditions																حالة الموقع غير متوقعة	4
F5	Social and cultural factors																العامل الاجتماعي والثقافي	5
F6	Security factor																العامل الأمني	6
F7	Political changes																التغيرات السياسية	7
F8	Public holidays																العطل الرسمية	8
F9	Unavailability of utilities on site (such as water, electricity, etc.)																عدم توفر المرافق في الموقع (مثل المياه، الكهرباء، الخ)	9
F10	Effects of subsurface conditions (e.g. soil, high water table, etc.)																آثار الظروف تحت السطحية (مثل التربة والمياه الجوفية، الخ)	10

Appendix 10. ***Iraqi Law no. 21 2008 Footnoted February 2011***

PART II
HEADS OF ADMINISTRATIVE UNITS

ARTICLE 22:

Each administrative unit shall have a juridical character[47] and financial and administrative independence. In the performance of its functions, it may:

First: Collect taxes, duties, and fees in accordance with the federal laws.[48]

Second: Exercise the competencies granted to it in accordance with the *Constitution*.

Third: Fulfill the duties and functions it is entrusted with in accordance with the laws and in a manner that will not contradict the *Constitution*.

ARTICLE 23:

The governor and the qada'a and nahiya administrators are the highest executive employees in their respective administrative units and shall have authority over staff of each, and subject to the *Civil Service Law*[49] in terms of their rights and employment in a manner that would not contradict this law.

Chapter I
The Governor

ARTICLE 24:

The governor shall be considered the highest-ranking executive officer in the governorate at the rank of a deputy minister as regards rights and service.

ARTICLE 25:

1. The candidates for the position of the governor shall meet the requirements stipulated for membership of the governorate council and shall hold a university degree or its equivalent.
2. The requirement referred to in Paragraph "First" of this Article shall be applicable to the two deputy governors.

47 The legal personality afforded to the administrative unit of a province does not appear to be identical to that of a provincial council. In other words, provincial councils have not been recognized as provincial governments. Instead, they appear to be treated as one of several governmental bodies operating in the territory of a province. Their territorial jurisdiction may be the same, but the subject matter jurisdiction of those bodies remains separate. See Note 11, *supra*. This distinction explains why the Federal Supreme Court could refuse to hear cases from provincial councils between August and September of 2010, despite a grant of authority to resolve disputes between the "central" and "provincial governments" in its statute of jurisdiction, Law 30 of 2005. See Note 29 *supra*. It also explains why the Nongovernmental Organization Bureau could refuse to recognize the Iraqi Local Government Association (ILGA) as a parastatal organization, because its constituent members, the provincial councils themselves, were deemed to lack legal personality and, therefore, the legal capacity to constitute an organization. So, while the Supreme Court recognizes the legal personality of the provincial council because it is one of the several government bodies operating in the territory of the province, the Court does not consider the provincial council to be an aspect of or an equivalent of the provincial government.

48 Whatever the drafters of Law 21 anticipated as being the authority of provincial councils to collect taxes, the central government has consistently denied provincial councils that ability. Since the restoration of sovereignty in 2004, each Prime Minister has denied provinces the authority to collect taxes. In addition, in July 2010, the Council of Ministers' legal committee stated that Basrah provincial council was not within its rights in attempting to impose a surcharge on the issuance of passports and national identity cards because the Constitution, in Article 28, *First*, states that no such tax shall be imposed "except by law." The denial of taxation by successive Prime Ministers and the Council of Ministers Secretariat (COMSEC) notwithstanding, shortly after Law 21 had been adopted but before it had been implemented, the Supreme Court issued an advisory opinion, No. 16, recognizing the authority of provincial councils to raise local revenues. It is perhaps significant that the question was presented to the court by Najaf province, where at least one form of tax seems to be imposed without central government challenge. That is a pilgrims' tax on religious tourists, something formally recognized in Article 2, *Second*, of the annual, national budget law, No. 10 of 2010. A similar provision is to be found in the draft budget law for 2011.

49 Law No. 24 of 1960, as amended.

ARTICLE 26:

First: The appointment of the governor shall be under a republican decree[50] issued within 15 days from the date of his election, and he shall commence his duties from the moment of his appointment.

Second: The governorate council may elect the governor from within or outside the council.[51]

ARTICLE 27:

First: Each governor shall have two deputies[52] elected by the council. Their orders of appointment shall be issued by the governor within 15 days from the date of their election by the council. Each of the deputy governors shall hold the rank of director general and they may be elected from within or outside the council.

Second: Each deputy shall be required to meet the requirements for membership of the governorate council stipulated in Article 5 of this Law and shall hold a university degree.

ARTICLE 28:

If the governor fails to fulfill his duties for reasons of health for a period exceeding three months, he shall be superannuated and the council shall elect a new governor pursuant to Paragraph "Seventh" of Article 7 of this Law, and the governor's first deputy shall be the acting governor until such election is conducted.

50 Law 159 of 1969 granted the provinces extensive authorities, including security, public services, the protection of freedoms and properties, and even controlling the borders and the agreements related to them, because the governor used to bear the title of مُتصرّفْ (*mutaserrif*). The term *mutaserrif*, current until 1969 and the implementation of Law 159, was an approximate synonym of the term governor, our current term. According to the Provinces Administration Law No 58 of 1927, the *mutaserrif* was in charge of various affairs in the province. During the era of dictatorship, however, the central government gradually began to take away the provincial powers until the governor was merely an employee who followed the orders and prohibitions of the central government with regard to provincial affairs. After the fall of the regime in 2003, the demands for decentralization, and the desire to award the provinces with extensive authorities, returned to the political forefront. Provincial council elections were held, and it was intended for those councils to handle the function legally entrusted to them and according to the Constitution

51 Law 21 required that the provincial councils choose a governor within 30 days of their first session. Due to the number of challenges to the results of the elections in January 2009, several councils were not finally seated until April, resulting in the process of governor selection not being concluded until May.

52 Although the law authorizes the governor to have two deputies, it does not designate the priority relationship between them. In other words, the law does not specify that one is to be the "first deputy" and the other the "second deputy." More than just a problem of semantics or of status, this absence of distinction opens the way to a succession crisis if a governor is incapacitated.

On December 30, 2009, a car bomb exploded near the police station and government building in Ramadi, the provincial seat of Anbar province. Following the blasts, the governor, his top security advisor, and several provincial council members went outside the building to inspect the site of the blast. A man in a uniform walked up to them and detonated a concealed suicide vest. The second blast killed the security chief and one provincial council member and caused serious injury to the governor himself. The governor was medevaced out and surgery performed to try to save his hand, but in his absence, the law left it unclear who was to rule. Although the governor of Anbar had two deputies, each had the same status as the other, leaving it to the provincial council to decide which of the two men should temporarily assume the duties of governor, and possibly the full responsibilities should the governor die or not be able to return to work. Although the council and deputies reached an amicable solution, with the Deputy for Technical Affairs becoming acting governor rather than his colleague, the Deputy for Administrative Affairs, the absence of a clear order of succession forced the issue to be resolved by a political process rather than a legal process. Had the province been experiencing a widespread security crisis, for instance, or had the two deputies been political rivals, the succession question could have destabilized the province.

ARTICLE 29:

The heads of administrative units, the two deputy governors, and the head and members of local councils shall take the following oath before the highest provincial judiciary authority before assuming their duties: "I swear by Allah the Almighty to sincerely safeguard the federal republican system, guard the public interest and the safety of the homeland, uphold the Constitution and the law, and discharge my duties sincerely, faithfully, and impartially, and may Allah be my witness."[53]

ARTICLE 30:

The governor, his two deputies, and the heads of the administrative units shall continue to discharge their daily responsibilities after the expiration of the electoral term of the councils until their respective successors are elected by the new councils.[54]

ARTICLE 31:

The governor shall exercise the following powers:

First: Draft the general budget of the governorate[55] in accordance with the constitutional standards, except for those which fall within the jurisdiction of the federal government, and submit the budget to the governorate council.

Second: Execute the decisions of the governorate council[56] as long as they are consistent with the applicable laws and the provisions of the *Constitution*.

Third: Execute federal general policy within the boundaries of the governorate.[57]

53 (Amended by Law 15 of 2010.) As in Article 21, the use of "head of the administrative unit" here refers to the governor. Although the text of the oath prescribed was not changed, the number of elected officials expected to take it expanded from just the governor and his two deputies to include all council members and their corresponding executives, the مُدير ناحية (*mudeer nahiya*), and the قائم مقام (*qa'im maqam*).

54 Legally, a province can have only one governor at a time. Since coming into force, Law 21 has been tested on this principle in three different ways. The first way this principle was tested, in the spring of 2009, was after the last round of provincial elections, when outgoing governors continued in office until the new councils could choose new ones. This is remarkable, given an average turnover rate of over 80% of council members. The second test occurred as a result of the incapacitation of the governor of Anbar by a would-be assassin in December 2009. That attempt on the governor's life sent him to the hospital and put the province into a brief succession crisis until one of the two deputy governors could be elevated by the provincial council. See Note 52 *supra*. Following the governor's convalescence, however, he returned to his duties and the deputy to his, without controversy. The third way the principle has been tested involved removal proceedings. The most complicated of these proceedings took place in Salah ad Din province. Here, one governor, who had been formally removed by the council but had appealed; a replacement governor, designated by the governorate council; and eventually a military officer sent from Baghdad, all claimed the governor's office at the same time.

55 The law gives the governor responsibility for preparing the general budget and for submitting it to the provincial council. The above suggests that the governorate is one government body with jurisdiction over the entire province, but the budget that the governor prepares is only the operations budget for the provincial council and the governor's office (GO), plus a so-called capital budget or investment budget used for mini projects executed by the GO and known as the Accelerated Reconstruction and Development Program (ARDP).

56 Article 2 gives the provincial council the authority to legislate and "issue" local laws. Article 12 obligates the provincial council to publish its "decisions" and "opinions" in a provincial gazette. See Note 26, *supra*. Article 31 only obligates the governor to enforce the decisions of the council and makes no mention of either "legislation" or "opinions." The qualification on the governor's obligation to execute decisions of the council—that they are consistent with the Constitution and other applicable laws—is consistent with the supremacy clause of the Iraqi Constitution—Article 13, *First*—as well as with the council's obligation to conform to higher order laws in Article 2, *First*, and the Council of Ministers' authority to object to decisions of the provincial council in Article 2, *Second*.

57 This obligation extends from the era of Ba'athist control in which the governor bore overall responsibility for central government policies and execution of decisions within the province.

Fourth: Oversee and inspect[58] public facilities in the governorate except for courts, military units, universities, colleges, and institutions.

Fifth: Represent the governorate at the conferences, symposia, and general forums to which he is invited and which are relevant to the governorate affairs and local administrations. He may delegate any of the governorate employees to carry out these functions in accordance with the law and applicable rules and regulations.

Sixth: Establish universities, colleges, and institutes in the governorate in coordination with the Ministry of Higher Education and Scientific Research within the governorate budget and with the approval of the council by an absolute majority of the council members.

Seventh:

1. Issue official letters of appointment for local employees in the governorate from grade 5 and below[59] in the employment scale stated in the *Federal Civil Service Law* upon the recommendations of the offices concerned and in accordance with the staffing plan approved by the council.
2. Appoint local employees in the governorate on a permanent basis from grade 4 upward in the employment scale stated in the *Federal Civil Service Law* except for the senior positions upon the recommendations of the offices concerned and in accordance with the guidelines prepared by the council.

Eighth: Take legal and administrative measures against the directors general and employees[60] in the governorate with the approval of the council by a simple majority.

Ninth:

The governor may:

1. Order the police to investigate the crimes that take place within the administrative boundaries of the governorate according to the law and to present the investigation reports to the concerned judge, provided that the governor has been informed of the investigation outcome.
2. Establish or abolish police stations with the approval of the council by the absolute majority of the council members in accordance with the relevant laws and guidelines of the Ministry of Interior.

Tenth:

1. The governor shall have direct authority over the local security agencies and all authorities tasked with protection duties relating to peace and order within the governorate, except for the armed forces (army units).
2. If the governor is convinced that the security agencies in the governorate are unable to fulfill their duties in maintaining peace and order on account of insufficient numbers, he shall promptly inform the Minister of Interior with a recommendation as to the size of the numbers required to fulfill their responsibilities.

58 In this paragraph the governor is given arguably more power over public facilities than the provincial council. The council is instructed by the law to "monitor," and the local executive, according to Article 76—the governor—is given the authority to "oversee and inspect." In practice, provincial councils have exercised an authority to inspect, frequently paying visits to the locations of investment projects. Complicating matters, the Arabic terms for monitoring and oversight (*الرقابة* [*riqaba*] and إشراف [*ishraff*]) are not clearly distinguished in meaning. What appears clear, however, is that the governor, as chief executive, inherently bears responsibility for ensuring that both the decisions of the provincial council and the decisions of the central government are enforced, and that enforcement implies a responsibility to inspect.

59 Law of Public Sector Salaries, No. 22 of 2008, rescinded CPA Order 30 of 2003, and included a revised schedule of grades.

60 At the provincial level, several government bodies are operating with concurrent territorial jurisdiction but separate subject matter jurisdiction.

Eleventh:

1. The governor shall have the right to object[61] to the decisions of the governorate council or the local council in the following cases:
   A. If they contradict the Constitution or applicable laws
   B. If they are not within the competence of the council
   C. If they contradict the general plan of the federal government or the budget.
2. The governor shall communicate to the council concerning the reasons for his objection together with the decision of the council within 15 days of the notification of the decision.
3. If the council concerned affirms its decision or amends it without removing the violation communicated by the governor, the matter shall be referred to the Federal Supreme Court for conclusive decision.

ARTICLE 32:

The ministries and offices not affiliated with ministries shall notify the governor of their correspondence with their offices and public utilities within the governorate so that the governor may monitor the implementation of the instructions in such correspondence. The heads of the offices and public utilities in the governorate shall abide by the following:

First: Notify[62] the governor of official correspondence with their respective offices.

Second: File reports to the governor on matters that he has referred to them.

Third: Notify the governor of their activity on matters that relate to security and important issues as well as on matters that relate to more than one office within the governorate or the conduct of their personnel.

Fourth: Notify the governor when they commence and end their work.

Fifth: Fulfill the functions that the governor assigns and the work of the committees that the governor requires to be formed.

ARTICLE 33:

First: The governor shall have a maximum of five assistants[63] for administrative and technical affairs and they shall fulfill the tasks assigned by the governor and work under his supervision and guidance.

Second: The assistants shall have at least 10 years of experience in their specialization and shall meet the requirements stipulated for deputy governors.

Third: The assistants shall hold the rank of deputy director general.

61 Though given responsibility to execute the decisions of the provincial council by Article 31, *Second*, the governor retains discretion to exercise his best judgment and can object to decisions that he finds violate the Constitution or other applicable laws, or are outside the subject matter jurisdiction of the council. Interestingly, only the decisions of the council are referenced. Notwithstanding, this paragraph has been understood by provincial councils to outline a legislative process in which the governor either approves of legislation or essentially vetoes it by filing his objections, thereby setting in motion a process by which the council can amend their legislation to conform to the governor's objections, or in the absence of resolution, refer the matter to the Supreme Court.

62 This paragraph imposes a notice requirement on ministerial departments in the provinces over the performance of their duties, but does not involve submitting to the governor's jurisdiction. Presumably, routine correspondence within the department or between a department head and his superiors in Baghdad would not be shared with the governor, only notice of the communication would be. To obtain detailed information as to department business, the law places an affirmative obligation on the governor to request it.

63 Law 21 provides for a staff of five assistants for administrative and technical support, without specifying their expertise.

ARTICLE 34:

First: An advisory board consisting of not more than seven advisors[64] specialized in legal, technical, and financial affairs chosen by the governor shall be formed in each governorate. The advisory board shall report directly to the governor and shall function under his supervision and guidance.

Second: The advisors shall have 10 years of experience in the areas of their specialization. Each of them shall hold the rank of assistant director general.

Third: The board referred to in Paragraph "First" of this Article shall assume the responsibility of studying matters referred to it by the governor, each according to his area of specialization, and shall submit relevant written recommendations.

ARTICLE 35:

The governor may delegate some of his powers to his deputies and assistants. The governor shall not delegate powers exclusively vested in him.

ARTICLE 36:

The services of the governor's experts of the advisory board, assistants, and heads of administrative units who are permanent public employees shall be transferred to the staff of the administrative units in which they are elected or appointed for such positions for the duration of their tenure.

ARTICLE 37:

First: The governor, his two deputies, and heads of administrative units may submit their resignation to the councils that elected them. The resignations are deemed accepted as of the date of their submission.[65]

Second: Their replacements shall be elected pursuant to the procedures stipulated in this Law.

These procedures are stipulated in the following articles of the Law of Governorates:

- Article 5
- Article 8, "Third"
- Article 12
- Article 25
- Article 26.

ARTICLE 38:

The provisions for removing the governor stipulated in this Law shall be applicable to the two deputies of the governor.

64 In addition to the five assistants accorded to the governor, he may also appoint up to seven advisors, specialized in areas of the governor's choosing. This advisory board can change composition and specialties as required. Both the assistants of Article 33 and the advisors in Article 34 must be included in the governor's operations and maintenance budget to be paid. Because the operations and maintenance (O&M) budget was due to the Ministry of Finance shortly after councils were seated and governors selected in 2009, very few governors' offices had a full complement of assistants and advisors in 2010 because they had not been included in the budget.

65 Three southern provinces of Iraq have recently experienced political turmoil, two of them directly as a result of recent political demonstrations, which have been popularly described as "Days of Rage." The three governorates are Babil, Basrah, and Wasit. In each governorate, the governor has been replaced or is in the process of being replaced.