

PROJECT PLANNING IN CONSTRUCTION INDUSTRY IN SAUDI

ARABIA: A CONTRACTORS' PERSPECTIVE

BY

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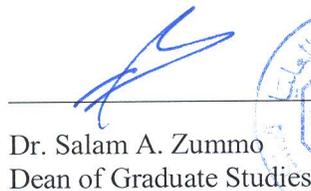
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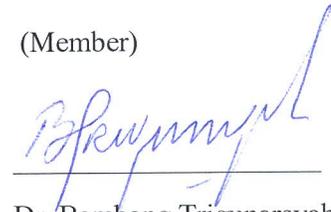
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**This thesis is dedicated to my family and my friends
for their endless love, support and encouragement.**

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ABSTRACT

Full Name : Mohammad Ibrahim Deab Atmeza.

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Costs and time are two issues of extreme importance to all stakeholders involved in a construction project .They are considered as the main reasons of whether a project will be successful or not. Regrettably, despite their protuberance, the rate of projects which invariably incur costs and time overruns still remains very high. A critical reason that may explain this contradiction is that the planning phase is rarely specific enough for project parties to act on. Thus, this study introduces the concept of planning phase. It goes through the required factors, parameters and procedures that should be well perceived and performed during this phase to emphasize its' effectiveness on the project success. The aim of this study was to identify and evaluate the planning procedures that followed by contractors in the Eastern Province of Saudi Arabia, and to identify the parameters which qualify an individual to be a planner for construction projects.

The required data was collected from grade1, 2 and 3 contractors, who are located in the Eastern Province of Saudi Arabia via two sets of structured questionnaires. Consequently, the collected data was analyzed to bring the study results. This study has found that the contractors in Saudi Arabia do planning for their projects, regardless of the project

duration and the project cost limits. Furthermore, it contributes to the project management knowledge by identifying most important planning procedures in the construction industry and makes specific recommendations to the project planning improvement for construction project managers and planners .Finally, this study recognized that the contractors are seeking about the one who have enough experience in the project management; especially in the project planning with excellent communication, coordination and decision making skills to do effective plans for their projects.

Keywords: Construction industry, Project management, Project evaluation, Project planning, Planner skills.

ملخص الرسالة

الاسم الكامل: محمد ابراهيم دياب اطميزه.

عنوان الرسالة: تخطيط المشروع في صناعة التشييد في المملكة العربية السعودية: منظور المقاولين.

التخصص: اداره وهندسه التشييد.

تاريخ الدرجة العلمية: ابريل, 2015

يعتبر الوقت والمال قضيتين ذو اهميه كبيره لجميع المشاركين في مشاريع البناء والانشاءات. و تعتبر من الاسباب الرئيسييه في نجاح المشروع من عدمه. للاسف, وبالرغم من اهميتها, فان نسبة المشاريع التي تعاني من زياده في التكلفة والوقت عن ما تم توقعه ما زالت كبيره. ان السبب المهم في تفسير هذا التناقض يعود الى ان مرحله التخطيط في المشاريع ما زالت غير واضحه بشكل كافي لطاخم المشروع حتى يتم التعامل معها بشكل صحيح. لهذا, فان هذه الدراسه تقدم وتوضح مفهوم مرحله التخطيط وذلك عن طريق توضيح العوامل والاساليب التي يجب ادراكها وتنفيذها بطرق سليمة حتى تكون هذه المرحله ذات فاعليه على نتائج المشروع. ان الهدف من اجراء هذه الدراسه هو معرفه وتقييم اساليب التخطيط المتبعه من قبل المقاولين في المنطقه الشرقيه بالمملكه العربيه السعوديه, اضافه الى ذلك فان هذه الدراسه تهدف الى معرفه الخصائص من مهارات ومؤهلات التي تؤهل الشخص من ان يكون مخطط ناجح لمشاريع البناء والانشاءات.

ان المعلومات المطلوبه لهذه الدراسه تم جمعها من المقاولين ذوو التصنيف الاول والثاني والثالث المتواجدين في المنطقه الشرقيه بالمملكه العربيه السعوديه بواسطه مجموعتين من الاستبان المنظم. بناء" على ذلك, فان المعلومات التي تم جمعها قد تم تحليلها للحصول على نتائج هذه الدراسه. لقد اظهرت الدراسه ان المقاولين بالمملكه العربيه السعوديه يقومون بعملية التخطيط للمشاريع بغض النظر عن تكلفه او مده هذه المشاريع. بالاضافه الى ذلك, فان هذه الدراسه حددت اهم اساليب التخطيط في قطاع البناء والتشييد. اخيرا", ان هذه الدراسه قد بينت بان المقاولين يبحثون

عن ذلك الشخص ذو الخبرة الكافية في اداره المشاريع بالاحص في مرمله التخطيط بالاضافه الى امتلاكه مهارات ممتازه في الاتصال والتنسيق وصنع القرار وذلك من اجل القيام بتحضير خطط فعاله لمشاريعهم.

كلمات مفتاحيه: صناعه الانشاءات والتشييد, اداره المشروع, تقييم المشروع, تخطيط المشروع, مهارات المخطط.

CHAPTER 1: INTRODUCTION

1.1 Background

A major part of activities performed in construction organizations deals with planning, executing, coordinating, and controlling projects, like issuing new facility. Although some project management practices differ across application areas and sectors, many other project management processes are applicable to all projects. For example, all projects involve aspects of scoping, scheduling, budgeting, and quality management (PMI, 2013).

Carrying out a project according to its plan does not necessarily ensure a successful outcome. If the planning is faulty, the project will not result in the expected outcome and vice versa; high quality planning increases the chances that the project will be properly executed and successfully completed.(Zwikael and Globerson, 2006)

Christiansen (2012) claimed that “Planning lies at the heart of construction project management”. Hence, construction project planning is considered as an important element and critical stage in the management and implementation of construction projects. Project planning specifies a set of decisions related to the ways that things should be done in the future, in order to execute the design for a desired product or service. It is generally described as processes that define and refine project goals and select the best of the alternative courses of action to acquire the objectives that the project was undertaken to address. Project planning is an effective managerial tool that improves all four dimensions of project success: cost overrun, schedule overrun, technical performance and customer satisfaction. (Zwikael & Sadeh, 2007). Also, it aims to

eliminate or reduce uncertainty, improve efficiency of the operation, obtain a better understanding of project objectives and provide a basis for monitoring and controlling work .(Kerzner, 2006).

Meredith and Mantel (2006) identify the components of project plan to include : overview, project objectives, general approach, contractual aspects, schedules, resources, personnel, risk-management plan, and evaluation methods in order to develop a project plan, several managerial processes should be executed. Possible lists of planning processes had been noticed in the literature review. Such as, Russell and Taylor (2003) identified seven planning processes, which include defining project objectives, identifying activities, establishing precedence relationships, making time estimates, determining project completion time, comparing project schedule objectives, and determining resource requirements to meet objectives. While, Kerzner (2006) identifies nine major components of the planning phase as objective, program, schedule, budget, forecast, organization, policy, procedure and standard.

1.2 Statement of Problem

After myriad studies that carried out the main causes of project failure; almost every project manager can perceive that the main reasons or factors responsible for project failure and project success. Despite this, the rate of failed projects still remains very high. One reason that may explain this contradiction is that the planning phase is rarely specific enough for project managers to act on. (Zwikael and Globerson, 2006)

Carrying out any project according to its plan does not necessarily indicate a successful output. If the planning is faulty, the project will not result in the expected outcome and vice versa; effective planning increases the chances that the project will be properly

executed and successfully completed. Researchers have identified planning as a critical success factor in a project .Moreover, the fact that planning is the first process being performed by the project manager allows him to make significant changes as well as to improve the baseline for future control purposes. Although its' importance is recognized, no focused tool has yet been developed for measuring the quality of project planning. Project planning is defined as the establishment of formal plans to accomplish the project' goals. Responsibility for planning lies entirely with the project manager, who must ensure that it is carried out properly to the complete satisfaction of all relevant stakeholders. Therefore, he should make sure not only that executions are carried out according to the plan's baseline, but also that this baseline is reliable.

Although the importance of project planning is recognized in many previous studies, no focused researches have yet been developed for identifying the procedures of project planning and the parameters of planner in Saudi Arabia.

The aim of this research is therefore to identify and evaluate the current planning procedures that followed by contractors in Eastern Province of Saudi Arabia and to identify the parameters which qualify an individual to be a planner for construction projects.

1.3 Research Questions

After statement of problem is addressed, there are some questions need to understand as mentioned below:

- 1) What are the commonly planning procedures that should follow for projects planning?

- 2) What are the parameters which qualify an individual of being a planner for construction contractors?
- 3) How do contractors evaluate their planning procedures?
- 4) How do contractors evaluate their planning engineer?

1.4 Objectives of the Study

This study will be conducted to achieve the following objectives:

- 1) Identify the procedures which are followed by contractors in the Eastern Province of Saudi Arabia to plan for a project.
- 2) Evaluate the current planning procedures which are followed by contractors in the Eastern Province of Saudi Arabia to plan for a project.
- 3) Identify the parameters which qualify an individual to be a planner for construction projects.

1.5 Significance of the Study

Saudi Arabia has performed in the last four decades a huge volume of work in the field of construction. The total value of ongoing projects in Saudi Arabia region currently stands at (\$875 billion, SR. 3.75 = \$1). This is because the riches resulting from the oil industry and the economic incentive it has given the country. This has resulted in very rapid growth and transformations during that period. The high living standards of the people of Saudi Arabia have created many manufacturing and building employment opportunities. The growth of cities has accelerated as a result of high population growth. Large and complex projects have been built, attracting contractors and construction companies from all over the world. Most of those contractors and their companies lack sufficient

comprehension of the social, cultural and physical environment of Saudi Arabia. This situation coupled with little attentions and concerns that paid forward project planning in Saudi Arabia and no researchers have addressed and figured out the parameters of planners in construction projects. These situations have led to inadequate project planning resulting in many changes to original plans, i.e. extended projects duration and cost overrun were noted, which in turn, minimize profit, increase conflicts and misunderstanding, increase deficiencies and decrease reputation. (Al-Dubaisi, 2000)

In this study, the aim is to study the planning procedures that followed by contractors in Eastern Province of Saudi Arabia, to find out the best planning procedures for construction projects and the effects they have on the project success. Moreover, it will address the parameters that should be found in a person who is responsible to prepare the project' plans and how do the contractors evaluate this person. This study should pave the road for future studies on the solutions of problems related to the project planning.

1.6 Limitations and Scope

Although planning is performed by many project stakeholders, this study is limited to the planning practices which are performed by grade 1, 2 and 3 of contractors classified by Ministry of Municipal and Rural Affairs in the Eastern Province of Saudi Arabia who have their main offices in the eastern province of Saudi Arabia, but the results and outputs of this study may be applicable to the construction projects in other places of Saudi Arabia because of the similarities of the rules, regulations and business environment. Furthermore, most of the large construction contractors have branches for their offices in other places of Saudi Arabia.

It is believed that planning for large projects is more complex and more serious than small projects. The geographical limitation is dictated by the limitation of the study duration and the study budget. Finally, the study will be limited only to the planning phase during construction stage.

CHAPTER 2: LITERATURE REVIEW

This chapter presents definitions, levels, components, processes and importance of construction planning from the previous studies. Also, it figures out the parameters and duties which qualify an individual of being a planner for construction organizations.

2.1 Construction Planning

This section presents a general description for the project life cycle, definitions and levels of construction planning. Also, it shows the parameters and inputs that required during the planning process for a construction project. Finally, the planning procedures that usually followed by contractors to do project planning will be well defined through an extensive explanation depending on the literature review.

2.1.1 Project Life Cycle

PMI (2013) is defined the project life cycle as series of phases that a project passes through, from its beginning to its closure. Although projects vary in size and complexity, all projects can be mapped to the following life cycle phases:

❖ **Initiation Phase:** This phase present what is the purpose from issuing a new project, it connects the project to the ongoing work of the performing organization. Projects are typically authorized as a result of one or more of the following strategic considerations:

- ✚ Market demand.
- ✚ Business need.
- ✚ Social need.
- ✚ Environmental consideration.

✚ Customer request

✚ Technological advance

✚ Legal requirement

❖ **Planning Phase:** this phase define and refine project goals and select the best of the alternative actions to attain the objectives that the project was undertaken to figure out.

Planning phase had major effects to the project outputs because the project involves doing something that has not been done before.

❖ **Executing Phase:** the function of execution phase is to coordinate human and other resources, such as equipment and material, to carry out the plan in order to perform the project.

❖ **Monitoring and Controlling Phase:** monitoring and controlling phase is summarized in ensuring the high quality and functionality of achievements of the project plan and updating it when necessary.

❖ **Closing Phase:** the function of closing and handing over phase is to shape and formalize approval of the project by its clients and other stakeholders and bring it to an orderly conclusion.

The interaction and relationship between different project phases is presented below in figure 2.1.

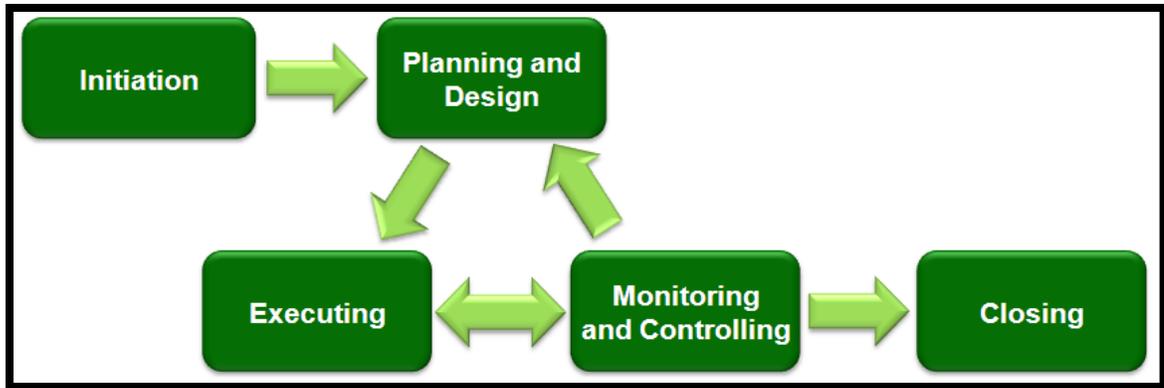


Figure 2.1 Relationship between different project' phases

2.1.2 Construction Planning Definitions.

Why plan? Who should plan? What and When should do plan? These critical issues related to construction planning raised by the author's long time ago.

An intensive literature review was conducted to answer these questions, this part will deal with the first question (what is the construction planning?).

Construction planning has been the concern of many studies. However, there is no consensus about the definition itself. (Lufer et.al, 1993)

Zwikael (2008) define the construction planning as the initiating of a set of directions in sufficient detail to tell the project team members exactly what must be done, when it must be done and what resources to use in order to produce the products and deliverables of the project successfully. Others present the construction planning as the process of decision making producing from a set of actions required to carry out the initial stage of project to the desired final stage, but planning in realty much more than just decision making.

Laufer (1990) adopted a comprehensive definition for the construction planning as it is a process composed of the following elements:"

- ✓ A decision-making process.
- ✓ A process of expected decision making to adjudge what and/or how to do actions due at some coming point.
- ✓ A process of related decisions into a system of decisions.
- ✓ A hierarchical process developed from general guidelines into objectives, to the preparation of means and restrictions that lead to a detailed set of actions.
- ✓ A process that consist part or all of a set of activities comprising: information search and analysis, development and design of alternatives, analysis and evaluation of alternatives, and choice making. Performance of the analysis phase is systematic and clear.
- ✓ Employment of formal procedures and techniques.
- ✓ Documented presentation.
- ✓ Execution.”

AACE (2006) defined the construction project planning as the assessments of a project's goals and aims with identification of the activities to be done, construction methods and resources to be used for satisfying the tasks, assignment of responsibility and duties, and establishment of an integrated plan to achieve completion as required.

However, the definition that will be followed in the study was addressed by PMI (2013) and it states that the construction planning processes is a procedure consists of those processes and actions performed to formulate the total scope of the work, define and refine the objectives, and develop the course of action required to attain those objectives. The planning processes develop the project management plan and the project documents that will be used to carry out the project.

2.1.3 Levels and Stages

There are four stages of construction planning explained briefly as follows:

- 1) **Pre-project Planning:** it is defined as a process of gathering enough information on a potential risk versus possible success, the owner should determine whether the project should be proceeded or cancelled. (Anderson et.al ,2004)
- 2) **Pre-bid Planning:** this stage performed by the contractor and start before submission of project proposal. It can last from few days to a number of months, it determined by the clients time calendar and the type of project.(Lufer et.al, 1993)
- 3) **Pre-construction Planning:** this stage start immediately after the contract is awarded and continues to a specific point in the construction, usually not more than two months after mobilization. (Lufer et.al, 1993)
- 4) **During construction Planning:** the study will concern on this stage, this stage will go through construction until the project is finished and constructed completely. (Lufer et.al, 1993).In general, it includes identifying written procedures that prepare the project team to execute an efficient job. (Cindly et.al 2005)

2.1.4 Construction Planning Process

1) Planning Development

Collecting requirements to facilitate project plan consider the initial stage of planning process and it is defined as the process of determining, documenting, and managing stakeholder needs. The key benefit of this process is that it provides the basis for defining and managing the project scope including product scope. (PMI, 2013)

The client or the owner wheather was a public entity or a private person, first grasps a need for facility or building process. From this initial effort, project planning initiates

with planning development phase, the most important elements that should be found in this phase are presented below in figure 2.2.

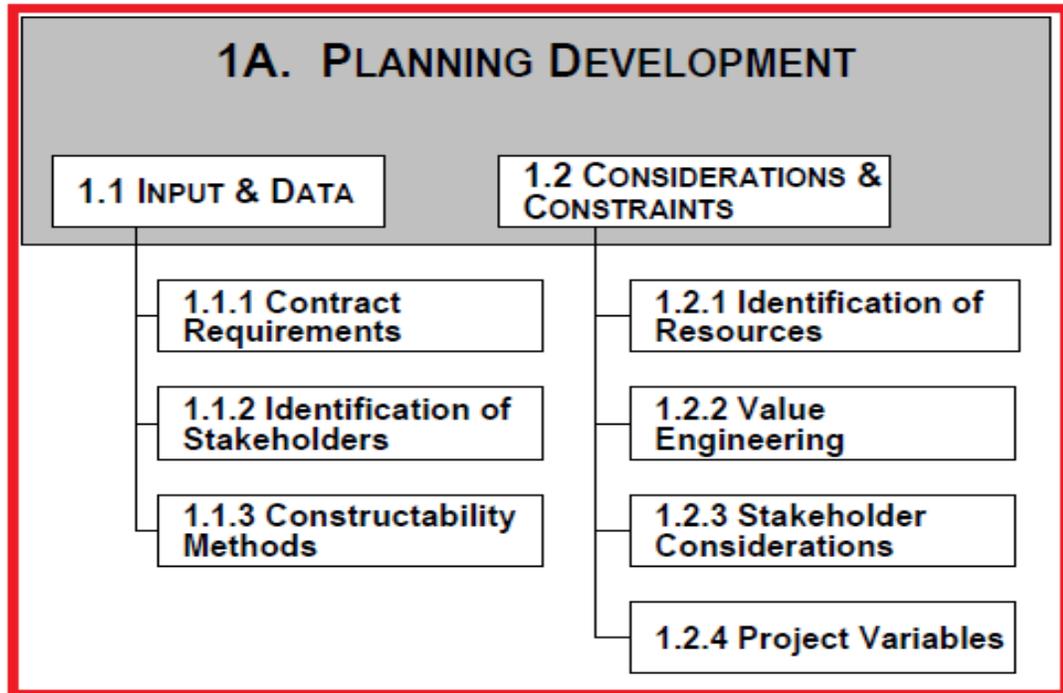


Figure 2.2 Planning development elements.

➤ **Input and Data**

PSP (2008) identify the data and inputs that required and should be considered during planning phase, and they classified it into three main categories which include contract requirements, stakeholder's identification and constructability methods.

- **Contract Requirements**

The main concern of the project team members during the planning phase is to realize the whole scope of the contract documents. It is very important that all project team' members belief and understand contract terms, conditions, requirements, and their relationship to the work. These terms and conditions will be the key for understanding the

importance of development and implementing effective planning and will influence on the outcome of planning process. (PSP, 2008)

The following are the most common terms related to the contract requirements that should be known during planning process:

- ✚ Basic types of contracts such as fixed price, unit price, cost plus (with fixed, incentive, or award fees), time and materials and guaranteed maximum price (GMP).
- ✚ Common delivery methods such as design-build, design-bid-build, EPC (Engineering-Procurement-Construction), design-build-operate or variations of any above.
- ✚ Planning, scheduling and reporting requirements such as notice to proceed (NTP), milestones, phases, resources, costing, substantial completion and project completion.
- ✚ General and special conditions: labour, Weather, Equipment, Material, Environment, Regional constraints or any other project-specific variables and requirements.
- ✚ Contract documents: such as specifications, plans, special requirements, e.g. permits, Contract formulation. (PSP, 2008).

- **Identification of Stakeholders**

Usually, in any project there are many different stakeholders, and each one of them has different objectives, goals and ambitions. These aforementioned, can effect and impact on the development and evolution of the plan, and on the behaviour of the team which implementing and facilitating this plan.

In general, stakeholders have an effect and influence throughout the life cycle of the project whether on a positive or negative way and on the outcome of planning process.

As a result, they will determine the success or the failure of the planning process. So,

acquiring consensus among the stakeholders by understanding their different goals and objectives will be the key success in the planning process. (PSP, 2008).

The following are the most common terms and parameters related to the project

Stakeholders that should be known during planning process:

- ✓ Types of stakeholders, which include:
 - ❖ Public agency like federal, State, local, school or university and utility district.
 - ❖ Private entities like owner, developer, individuals, social or political organizations, individuals and special interest groups.
 - ❖ Engineer and architects, contractors, subcontractors, consultants, vendors and the list goes on.
- ✓ Stakeholders' rights and responsibilities.
- ✓ Influence of stakeholders.
- ✓ Concerns of the stakeholders.
- ✓ Conflict resolution among stakeholders. (PSP, 2008)

- **Constructability Methods**

The constructability analysis process should start during first planning phases and continue throughout the entire planning cycle and into the execution phase of the project. The purpose from conducting constructability analysis during the project planning stage is to determine and evaluate the most effective and efficient ways to build the project. It is very important and vital that this process be done early in the planning phase to allow for alternatives to be considered and emerged into the design phase. Most critical and important part of constructability analysis is a determination and evaluation that what has been designed is really “constructible.”

By determining, evaluating, and assessing the most suitable alternative method, construction time and costs are decreased to provide a positive contribution to the results of project. (PSP, 2008).

The list mentioned below is important terms should be known regarding the constructability:

- ✓ Methods of constructability: modularization and prefabrication.
- ✓ Pre-assembly: design-build, material alternatives, means and methods analysis, design alternatives and constraints, health, safety and environmental (HSE) impacts.
- ✓ Costing constructability: time, labour, transportation, storage, site access and governmental requirement such as, permits, accessibility, inspections and compliance.
- ✓ Constructability analysis.
- ✓ Constructability process and methodologies.
- ✓ Constructability alternatives and evaluation.
- ✓ Constraints. (PSP, p30, 2008)

➤ **Considerations and Constrains**

In developing a plan for project there are many considerations and constraints that require identification and evaluation. Considerations and constraints are the key elements and play very important role during the planning process, all these considerations and constraints whether was human, social, and cultural should be identified and evaluated against the project plans.

The Considerations and Constraints consist of the following items:

- 1) Identification of Resources.
- 2) Value Engineering.

- 3) Stakeholder Considerations.
- 4) Project Variables.(PSP, p33, 2008)

- **Identification of Resources**

The one who carried out the plan for project must specify and identify the required resources to accomplish a certain work during the life cycle of a project and their relation and order. Numerous resource variables affect a project, so all these resources should be considered during the planning process not only focusing on labour issue.

Types and categories of resources and their data are mentioned below:

- ✓ Categories of resources, such as :
 - ❖ Labour: management, technical, supervisory, craft, subcontract.
 - ❖ Equipment: construction equipment, engineered (installed) equipment.
 - ❖ Material: type: availability, installation, and protection.
 - ❖ Human.
- ✓ Data sources:
 - ❖ Historical database.
 - ❖ Program or project specific data. (PSP, 2008).

- **Value of Engineering**

Value engineering should be considered during the planning process phase, because it is overlapping with many stages during the life cycle of the planning process and the project as a whole.

Value engineering' functions summarized in evaluating stakeholders' needs and requirements, prioritize required tasks, and assess their cost and schedule impact. The basic idea from the value engineering is to idealize the life cycle performance by

directing choosing of materials and installed equipment to increase their functionality and quality while decreasing their costs. Value engineering process comprise from six phases which include information, function analysis, creativity, evaluation, development and presentation. In spite of value engineering consider as a separate or independent process, but there is a relationship with constructability analysis. Value engineering is consider a strategic planning process while constructability analysis starts later in the planning process, usually continues through the execution and execution phase, and optimizes construction methods. Value engineering appears usually during design phase followed by value analysis after design, often by contractor analysis and recommendation. Jointly value engineering and value analysis embrace value management. Value engineering concentrates on maximizing value, by increasing its functionality and quality while decreasing its costs. Constructability phase concentrates on efficient and effective construction methods by which to best implement designed elements.

Figure 2.3 below depicts the major influence on the project will be in the scope of work definition which included in the planning phase and gradually decrease when it close to the execution phases. By contrast, the project expenditure had low influence in the scope of work definition, because no much resource required as execution phases. (PSP, 2008)

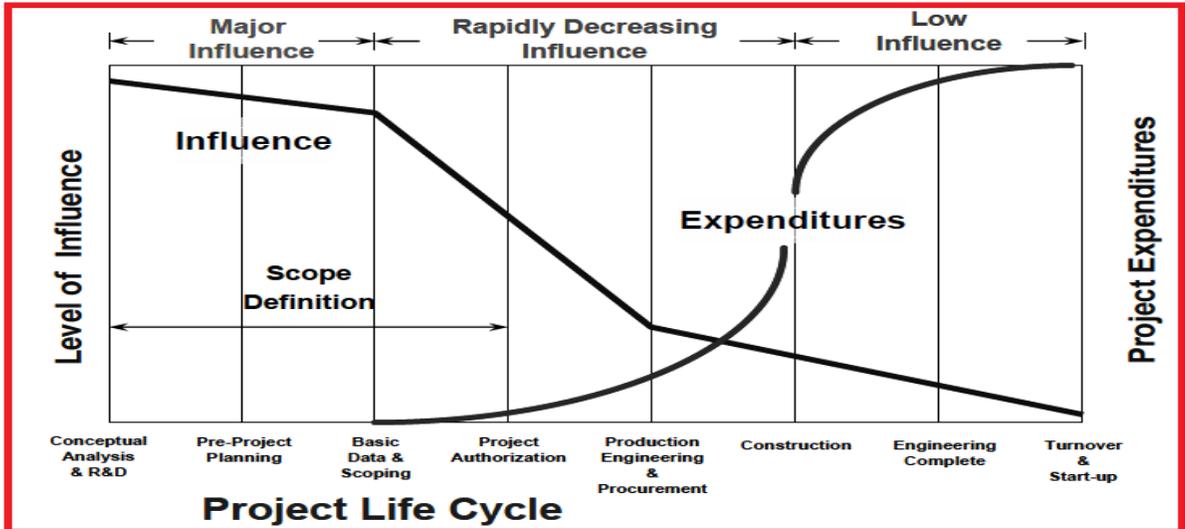


Figure 2.3 Cost influence curve

- **Stakeholder Considerations**

Stakeholder considerations and constraints must be identified, evaluated, and resolved to allow the planning process to proceed. Stakeholders of the project whether large or small will have an impact on the success or failure of a project. (PSP, 2008)

- **Project Variables**

Project variables such as physical environment, construction methods, funding, labour agreements, and delivery methods for a project must be identified and evaluated. These variables can be large or small in nature and should be identified and separated from other considerations and constraints. Project variables can be identified as an element, event or attribute that will have positive or negative influence and impact on the project plan. Project variables are critical to optimize the project planning process, so these variables should be identified, evaluated and resolved. As the planning process develops, the nature of the project variables may alter. Therefore, when a variable changes, then planning process change and must be evaluated again.

Examples of project variables that should be recognized during the planning process listed below:

- ✓ Project size: funding methods and scope.
- ✓ Site and local considerations: resources (labour, material, equipment, etc.), location (urban, rural, remote, etc.), Project Type (Undeveloped, Reuse, Renovation) and local environment and climatic conditions.
- ✓ Delivery methods: design-bid-build, design-build, EPC (Engineering-Procurement-Construction), design-build-operate or Variations of above.
- ✓ Infrastructure: access, utility availability and easements.
- ✓ Labour agreements.
- ✓ Productivity: Labour, Equipment.
- ✓ Risk and risk analysis. (PSP, 2008).

2) Planning Procedures

Planning procedures are repeated with each phase of work effort and involvement during the project's life cycle. When the scope of work developed, the information becomes more detailed and clearer, and the plan and schedule are more detailed, as well. This repeated review, development, and modification cycle is constant during the life cycle of the project. The scope of the planning procedure must be suitable to the phase of work. The components of a plan developed in the planning process must be equally weighted to achieve a balanced and usable product. When conditions change for the plan or any of its components, the planner should recheck and refresh it as necessary.

The plan for one stage is the prerequisite to developing a plan for the next stage, as well as for the project as a whole. The Project planning starts early and proceeds as the project

moves through phases of the project's life cycle, from conception until to completion, and handing over. Rather than a serial process, it is best thought of as a planning cycle. Effective implementation of a plan results in the ability to produce a credible schedule. Most project management professionals agree that there is a basic five-step process involved in developing a project plan. Essential questions answered during project planning:

What? (Scope).

How? Work breakdown structure (WBS).

Who? Organization breakdown structure (OBS).

When? first and final timeframe.

How much? Budget estimate. (PSP, 2008).

Russell and Taylor (2003) identify seven planning procedures, which initiates with defining project and going through objectives, identifying activities, establishing activities sequences, making time estimates, determining project completion time, comparing project schedule goals, and determine the required resource to meet goals.

Also, Kerzner (2006) identifies nine major components of the planning phase explained briefly as following:

- ❖ Objective: a goal, target, to be accomplished by a specified duration.
- ❖ Program: the strategy to be considered and major courses of actions to be taken in order to attain or exceed goals and objectives
- ❖ Schedule: a plan depicting when one or set activities or accomplishments will be initiated and/or finished
- ❖ Budget: planned expenditures required to attain or exceed goals and objectives

- ❖ Forecast: a prediction of what will happen by a specific timeframe
- ❖ Organization: design of the number and kinds of positions, along with corresponding duties and responsibilities, required to accomplish or exceed objectives
- ❖ Policy: a general guideline for decision-making and individual actions
- ❖ Procedure: a detailed method for carrying out a policy
- ❖ Standard: a level of individual or group performance defined as accurate or acceptable.

The Project Management Body of Knowledge (PMBOK) institute develop a list contains 44 processes, identified 21 as planning processes (PMI, 2013). Although the relevant planning processes have been identified, project managers and planners are often busy and are therefore unable to adequately implement all planning processes. As a result, they may choose to do the easiest planning processes, or those required to start a project.

Laufer (1990) described the project planning process in two different ways; the first one was divided into the following four major stages:

- 1) **Project Objectives:** pre-initiation planning. Starting by examining and testing needs, opportunities, ideas, problems and crisis, proceeding with: economic, technical and environmental feasibility studies, and ending up with setting the project objectives, and requesting project issuing.
- 2) **Conceptual Planning:** pre-design planning. In this stage, more accurate and well definition of the project, in particular the functional design criteria and other technical requirements are established and initiated. Then follows plotting of the execution plans (e.g., budget, schedule, organization, etc.), and the initial implementation related to project organization and contracting.

3) **Design Engineering:** pre-execution planning. In this stage the essence of basic and detailed engineering arrived. Execution plans are updated, expanded, and detailed. Procurement activities are at an advanced stage.

4) **Execution:** detailed construction planning. Field action is now in full swing. Planning and re-planning continue throughout execution. Not to be caught in the tail, planning of start-up and operation is tackled.

The second way was describing the planning evolution as a problem-solving process with intermediate products. This also divided into four main stages:

- 1) Define the problem, plot directions for solutions, and establish constraints to and expectations from the solutions. The product is a set of project objectives.
- 2) Decide on methods of solving the problem and selecting the means. The product is a project execution plan.
- 3) This stage differs from the aforementioned only by degree. Design drawings, procurement, and construction plans are worked out in greater detail. The product is a detailed execution plan.
- 4) Plans are implemented, the product being the physical facility.

Furthermore, PSP (2008) identify 12 planning procedures that usually followed by contractors during the planning phase, which include the following:

- Scope of work definition.
- Project goals definition.
- Work breakdown structure (WBS).
- Organization breakdown structure (WBS).
- Cost breakdown structure.(CBS)

- Project plan definition.
- Phase definition.
- Sequence and phase relationships.
- Cost estimate development.
- Stakeholders reviewing.
- Baseline plan development.
- Periodic forecasts development.
- Risk and recovery plans.(PSP, 2008)

Each planning procedure is necessary to the planning team product being complete and effective. Only when they fully developed will lead to a successful plan.

❖ **Scope Planning which include :**

✓ **Scope of Work Definition**

At the conceptualization stage of a project, the scope of the work is will be general description. As the project develops during the planning stage, the scope of the work is repeated and expanded to show current goals, objectives and requirements. In the stages of planning process, the level of detail regarding the scope will be reinforced and results in detailed drawings and specifications of the work. The scope of work is determined and showed as an attained result. A project scope of work is specific, and it is usually wider than an objective. As the planning process proceeds and goes ahead, the scope of work will become more defined and better comprehend. As a project entrant, each stakeholder may have different grasps of the initiated scope of work. Obtaining consensus perceptions about project scope is mandatory to assure stakeholder satisfaction and project efficiency and effectiveness. (PSP, 2008)

As a summary, understanding the purpose and development that the scope of work requires as an initial planning task. It gives and provides the owner conceptual statement of the project goal and objective, which is repeated again and expanded as planning process proceeds. The scope of work furnishes a basis from which the baseline plan for performance measurement is evolved during the scheduling phase of the project.(PSP, 2008)

✓ **Project Plan Definition**

Project stakeholders should agree on the project plan. An indispensable concept is the integration of all plan components with the work breakdown structure (WBS). The project plan is dynamic and repeatable. The project plan, when it becomes the baseline plan, serves as the starting point versus which progress, quality, and performance records are assessed and documented. The project plan considers a constant document, except any changes or alterations to the scope of the work cause major and significant changes to the original scope of work, in this case a new plan is required. Furthermore, any revised and repeated project plan should be agreed between project stakeholders to the level or degree that permitted for those stakeholders to provide and give such input into this plan. (PSP, 2008)

✓ **Phase Definition**

As the scope of work is defined and determined, the identification or breakdown of the project scope into different phases may be widened to commensurate and fit the project. A phase is a significant period of time or set of related activities within a project. A phase may involve several stages of planning and work. Phase definition is the initial identification and determinations of phase relationship and sequence planning, as defined

by the scope of work. Further, since planning is a repeated and phased process, the scope definition will improve over time. Phase definition can permit the initial evolution of cost estimations and control level and risks can be determined and evaluated for each phase. (PSP, 2008)

✓ **Work Breakdown Structure (WBS)**

The work breakdown structure (WBS) is a hierarchy section or division of the work scope components of the project to be implemented. The role and function of the WBS is to divide and slice the scope of work into tractable and manageable parts that match to milestones or phases with the aim to avoid any skip or omission of key elements and support in the communication of cost, time, quality, and resource performance data to stakeholders. The WBS is product-oriented or process-oriented. Identification of the WBS itself, like all stages in the planning process, may be dynamic and repeated.

A suitable WBS connects elements of the cost estimate and activities of the schedule. The WBS helps the project team to move the plan into the schedule, also it provides the basis for all projects reporting, including the monitoring and updating of data and predicting of cost and time directions. (PSP, 2008).

The following three figures show different samples of WBS.

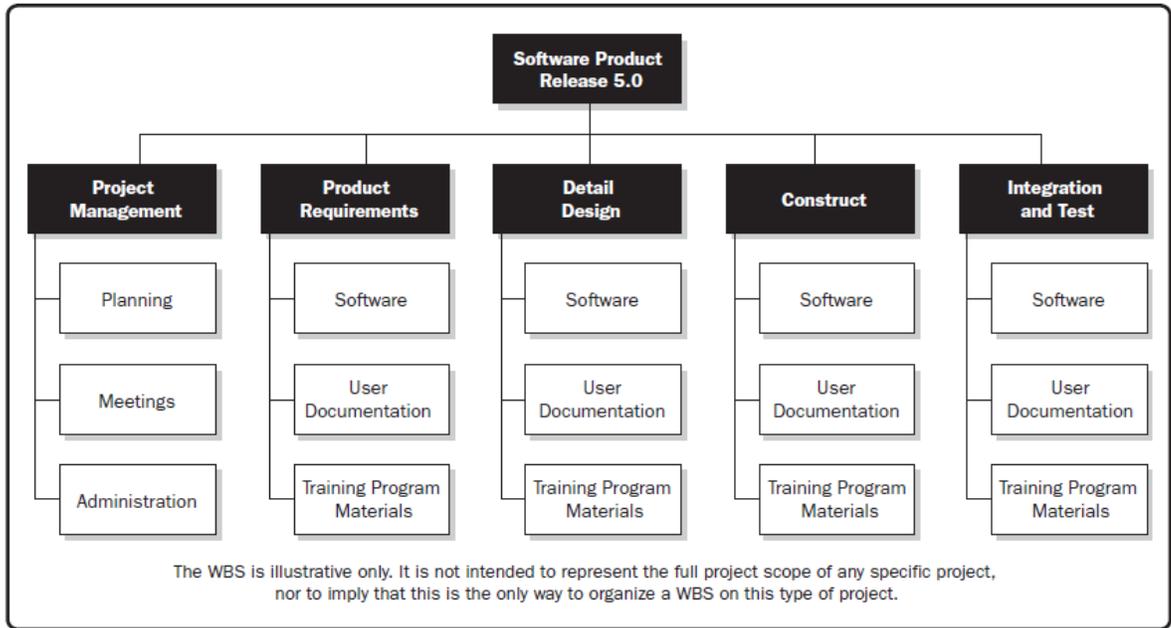


Figure 2.4 Sample of WBS organized by phase.

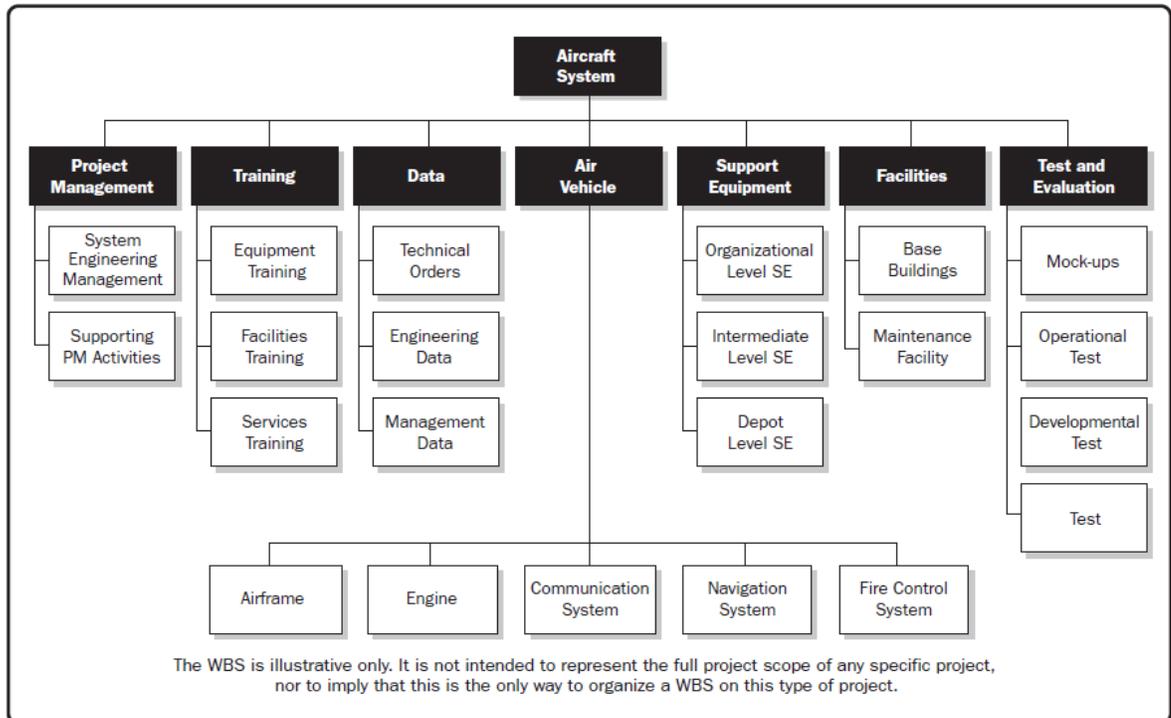


Figure 2.5 Sample of WBS with major deliverables.

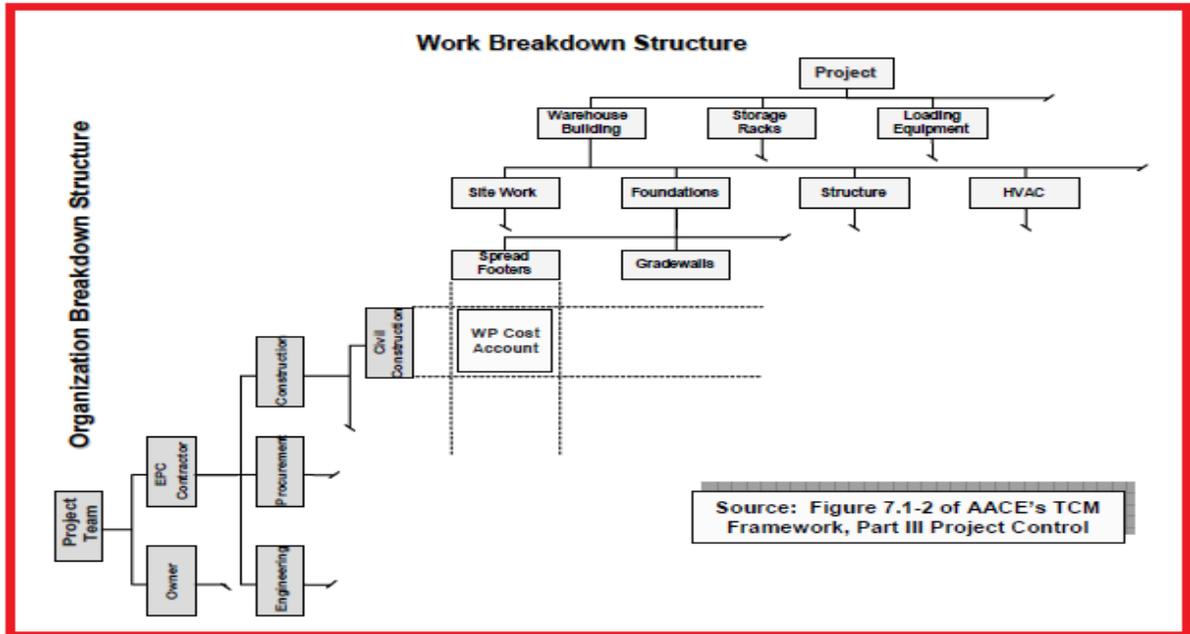


Figure 2.6 Sample of WBS/OBS structure.

❖ **Time Planning**

Time planning includes the processes that required managing the timely completion of the project. It had the most significant influence on the project success measures which includes cost overrun, schedule overrun, customer satisfaction and technical performances. Time planning procedure includes the following:

✓ **Activity Definition**

Define activities is the process of identifying and documenting the specific actions to be performed to produce the project deliverables. The key benefit of this process is to break-down work packages into activities that provide a basis for estimating, scheduling, executing, monitoring, and controlling the project work. Implicit in this process are defining and planning the schedule activities such that the project objectives will be met.

The Create WBS process identifies the deliverables at the lowest level in the WBS—the

work package. Work packages are typically decomposed into smaller components called activities that represent the work effort required to complete the work package.

✓ **Activity Sequencing**

A sequence activity is the process of identifying and documenting relationships among the project activities. The key benefit of this process is that it defines the logical sequence of work to obtain the greatest efficiency given all project constraints. Every activity and milestone except the first and last should be connected to at least one predecessor with a finish-to-start or start-to-start logical relationship and at least one successor with a finish-to-start or finish-to finish logical relationship. Logical relationships should be designed to create a realistic project schedule. It may be necessary to use lead or lag time between activities to support a realistic and achievable project schedule. Sequencing can be performed by using project management software or by using manual or automated techniques.

✓ **Activity Resource Estimating**

Estimate Activity Resources is the process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity. The key benefit of this process is that it identifies the type, quantity, and characteristics of resources required to complete the activity which allows more accurate cost and duration estimates. The Estimate Activity Resources process is closely coordinated with the Estimate Costs process. For example:

- A construction project team will need to be familiar with local building codes. Such knowledge is often readily available from local sellers. However, if the local labour

pool lacks experience with unusual or specialized construction techniques, the additional cost for a consultant may be the most effective way to secure knowledge of the local building codes.

- An automotive design team will need to be familiar with the latest in automated assembly techniques. The requisite knowledge might be obtained by hiring a consultant, by sending a designer to a seminar on robotics, or by including someone from manufacturing as a member of the project team.

✓ **Activity Duration Estimating**

Estimate Activity Durations is the process of estimating the number of work periods needed to complete individual activities with estimated resources. The key benefit of this process is that it provides the amount of time each activity will take to complete, which is a major input into the develop schedule process. Estimating activity durations uses information on activity scope of work, required resource types, estimated resource quantities, and resource calendars. The inputs of the estimates of activity duration originate from the person or group on the project team who is most familiar with the nature of the work in the specific activity. The duration estimate is progressively elaborated, and the process considers the quality and availability of the input data. For example, as more detailed and precise data is available about the project engineering and design work, the accuracy of the duration estimates improves. Thus, the duration estimate can be assumed to be progressively more accurate and of better quality. The Estimate Activity Durations process requires an estimation of the amount of work effort required to complete the activity and the amount of available resources estimated to complete the activity. These estimates are used to approximate the number of work periods (activity

duration) needed to complete the activity using the appropriate project and resource calendars. All data and assumptions that support duration estimating are documented for each estimate of activity duration.

✓ **Resource Levelling**

Resource levelling is a technique in which start and finish dates are adjusted based on resource constraints with the goal of balancing demand for resources with the available supply. Resource levelling can be used when shared or critically required resources are only available at certain times, or in limited quantities, or over-allocated, such as when a resource has been assigned to two or more activities during the same time period, as shown in Figure below, or to keep resource usage at a constant level. Resource levelling can often cause the original critical path to change, usually to increase.

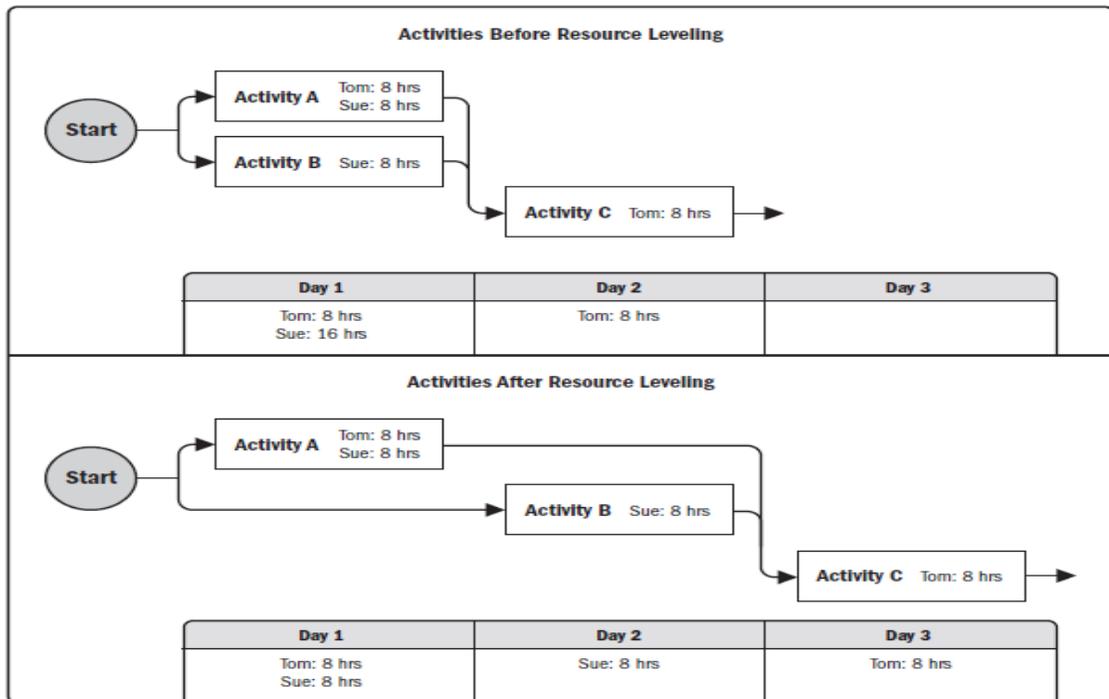


Figure 2.7 Resource levelling

✓ **Schedule development**

Develop Schedule is the process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model. The key benefit of this process is that by entering schedule activities, durations, resources, resource availabilities, and logical relationships into the scheduling tool, it generates a schedule model with planned dates for completing project activities. Developing an acceptable project schedule is often an iterative process. The schedule model is used to determine the planned start and finish dates for project activities and milestones based on the accuracy of the inputs. Schedule development can require the review and revision of duration estimates and resource estimates to create the project schedule model to establish an approved project schedule that can serve as a baseline to track progress. Once the activity start and finish dates have been determined, it is common to have project staff assigned to the activities review their assigned activities and confirm that the start and finish dates present no conflict with resource calendars or assigned activities in other projects or tasks and thus are still valid. As work progresses, revising and maintaining the project schedule model to sustain a realistic schedule continues throughout the duration of the project.

✓ **Schedule controlling.**

Control Schedule is the process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan. The key benefit of this process is that it provides the means to recognize deviation from the plan and take corrective and preventive actions and thus minimize risk. Updating the schedule model requires knowing the actual performance to date.

❖ **Cost Planning**

Project cost planning includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget. (PMI, 2013)

Cost planning procedure includes the following steps:

✓ **Cost Estimates Development**

Alternatives for resource options are developed and evaluated based on timeline and the projected budget considerations as they evolve during the planning process. This includes value engineering and constructability determinations as well as change or revision to the project. Ultimately the planning timeline, resource constraints, and budget projections form the basis for initial schedule and cash flow models. The budget planning and development process incorporates stakeholder expectations for the project. Budget projections are continually refined based on identified constraints and considerations. Budget projections are often revised to be in agreement with project goals, objectives, and timeline. Schedule risk should be evaluated when the scope of work, project plan, and phase definition develop into the initial cost estimate and schedule models.(PSP, p93, 2008).

✓ **Budget Determining**

The planner and scheduler must understand how the cost breakdown structure (CBS) is used for cost accounting and forecasting by management and the field during construction. A CBS is either a hierarchical ranking that rolls or aggregates budgeted resources into elements of cost which are most typical: labour, materials, and other direct

and indirect costs for a project; or a hierarchical ranking that defines the multiple project cost elements for cost accounting.(PSP,2008)

✓ **Cost controlling.**

Cost controlling furnish the means to recognize difference from the budgeted in order to take corrective action and minimize risk, to monitor the status of the project and to update the project costs, and managing changes to the cost baseline, which effectively impact on the aspects of project success like cost overrun. Other functions for cost controlling during the planning process are:

- ✓ Influencing the factors that create changes to the authorized cost baseline.
- ✓ Ensuring that all change requests are acted on in a timely manner.
- ✓ Managing the actual changes when and as they occur.
- ✓ Ensuring that cost expenditures do not exceed the authorized funding by period, by WBS component, by activity, and in total for the project.
- ✓ Monitoring cost performance to isolate and understand variances from the approved cost baseline.
- ✓ Monitoring work performance against funds expended;
- ✓ Preventing unapproved changes from being included in the reported cost or resource usage;
- ✓ Informing appropriate stakeholders of all approved changes and associated cost; and
- ✓ Bringing expected cost overruns within acceptable limits.“

❖ **Quality Planning**

Project quality planning is the process of identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will

demonstrate compliance with quality requirements. Failure to meet the quality requirements can have serious, negative consequences for any or all of the project's stakeholders. For example:

- Matching customer needs by overworking the project team may lead to decrease profits and increase project risks, employee exhaustion, errors, or rework.
- Matching project schedule objectives by rushing planned quality inspections may result in undetected errors, decreased profits, and increased post implementation risks.(PMI, 2013)

❖ **Human Resource Planning**

Human resource planning is the process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan. The key benefit of this process as it establishes project roles and responsibilities, project organization charts, and the staffing management plan including the timetable for staff acquisition and release, identification of training needs, team-building strategies, plans for recognition and rewards programs, compliance considerations, safety issues and the impact of the staffing management plan on the organization.(PMI, 2013)

❖ **Communications Planning**

Communications planning is the process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets. The key benefit of this process as it allows appropriate resources, such as time and budget, to be allocated to communication

activities, which means that the information is provided in the right format, at the right time, to the right audience, and with the right impact. (PMI, 2013)

❖ **Risk Management Planning**

Risk management planning is the process of defining how to conduct risk management activities for a project. The key benefit of this process is to ensure that the degree, type, and visibility of risk management are commensurate with both the risks and the importance of the project to the organization and to ensure that the risk management process is supported and performed effectively over the project life cycle. (PMI, 2013)

Recovery plan defined as plan used to provide potential solutions for effects caused by risks or alterations, these alterations may have either a positive or negative effect on the current plan. As the plan is grow up during a project, the project team should be aware from the risks that may arise, and they should implement which called a risk management plan. The risk management plan may be used to reduce and mitigate risks and ensure recovery throughout the project life cycle. As the plan develops, the project team should continually perform a risk evaluation on the plan to determine the feasibility of the plan. In some cases the risk may be great for the program to proceed, thus resulting in the cancellation of the program or major restructuring of the program.

Indeed, Planning for change should be part of the planning process and the project team should develop recovery plans as part of the planning process. Risk should be continually monitored as the project scope and plan develops.(PSP, 2008)

❖ **Procurement Planning**

Procurement planning is the process of documenting project procurement decisions, specifying the approach, identifying and evaluating potential sellers, evaluating the risks

involved with each make and reviewing the type of contract planned to be used with respect to avoiding or mitigating risks. The key benefit of this process is to determine whether to acquire outside support, and if so, what to acquire, how to acquire it, how much is needed, and when to acquire it. (PMI, 2013)

❖ **Stakeholders Reviewing**

Key stakeholders' detailed reviews and decision-making are critical at this point. This may result in favourable or unfavourable actions that require re-planning or stoppage. Minor stakeholders' review and input is also critical at this point. Failure to embrace these stakeholders in the planning process may cause social or political issues to be overlooked. This may result in additional planning and potentially significant cost and schedule impacts to project development and implementation.(PSP, 2008)

❖ **Baseline Plan**

The baseline plan is considered the final output of the planning process for a project. The baseline plan furnishes the full window for all progress, quality, performance and measurement evaluation as the plan is performed.

All project parties should be agreed on the baseline plan for a project. The planning time for a baseline plan begins and develops within the planning process for a project. The baseline plan determines the basis for the initial schedule and cash flow paradigms and serves as the starting point versus which all records are assessed and documented. The baseline plan considers a constant document, except significant any changes or alterations to the scope of the work, these significant changes can lead to decrease the value of work status reporting ,in this case a new plan or re-planning for the previous baseline plan is required. Furthermore, any revised and repeated for initial baseline project plan should be

agreed between project stakeholders to the level or degree that permitted for those stakeholders provide and give such input into this plan, usually the budget, schedule, and percent of the complete status are all affected. As before, this new plan will serve for future measurements and forecasts.

Figure below shows example for a baseline project plan.

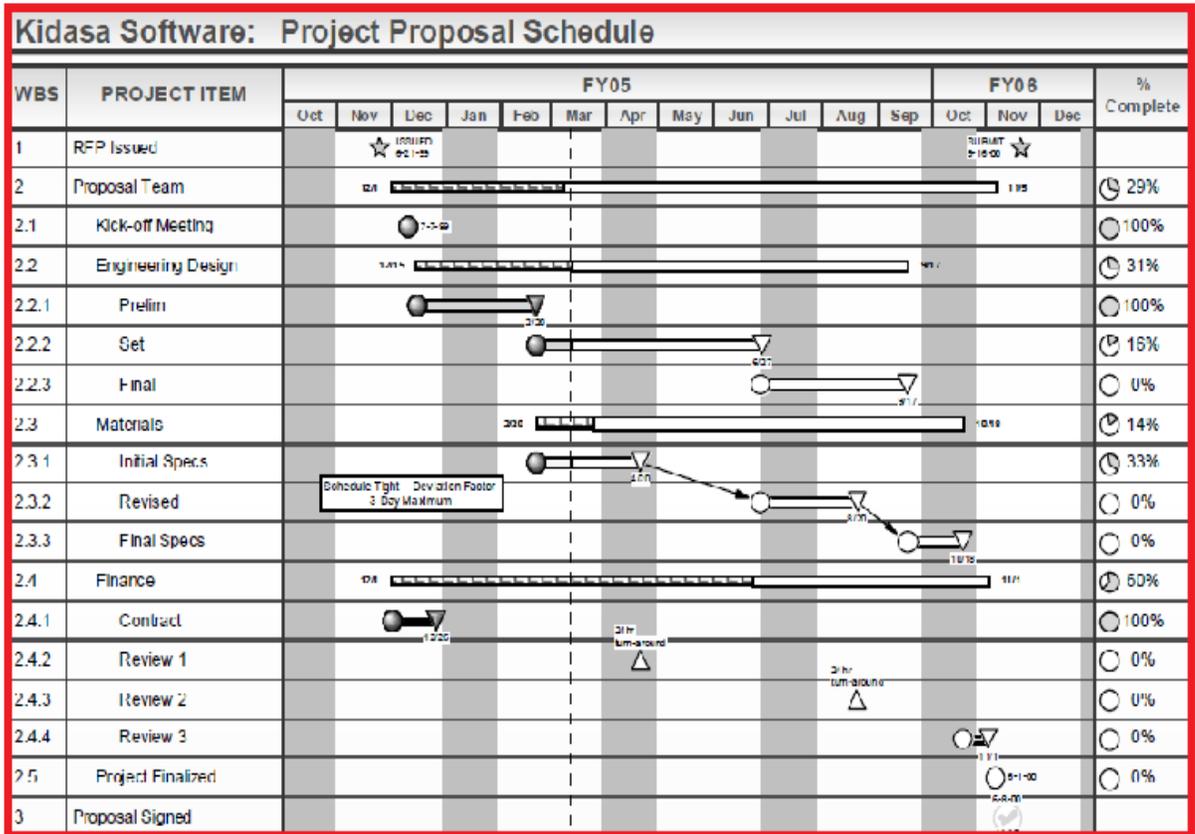


Figure 2.8 Baseline plan.

❖ **Periodic Forecasts**

A forecast defined as an expectation, estimation or prediction of future events and cases upon to real and factual information or judgment at the time of the assessment and evaluation. It is used to inform all concerned whether or not the project should be delivered timely and within the budget.

Periodic forecasts considered one of the products from planning process; it requires well identified scope, goals and plans for a project to be performed correctly and adequately.

Periodic forecasts produced usually on a regular period of time like, monthly or quarterly for assigned future period.

A special purpose forecast may be performed upon the conditions or it is already defined in the contract documents, the special purpose performed by one of the project stakeholders to give a proposed solution to a specific problem.

Finally, periodic forecasts used as the basis for controlling and reporting versus the project milestones. (PSP, 2008)

2.1.5 Construction Planning Importance

As shown in the previous section regarding the planning process, it was clear the wide ranges and typical areas that deal with it, for example:

- Project definition.
- Budget.
- Schedule.
- Organization.
- Systems.
- Logistics and supports.
- Physical and economic environment, vendors, agencies, etc. (Laufer, 1990).

Form these interventions, Laufer (1990) developed a list that showing the importance of planning in construction projects as follows:”

- 1) Setting objectives, their priorities and trade-offs, and determining project constrains.

- 2) Providing a basis for contractual commitments between owner and contractor, as well as between contractor and subcontractors.
- 3) Obtaining a better understanding of the objectives, to clarify them, and to maximize the probability of attaining them.
- 4) Define all required work to enable each project participant to identify and plan his share (tie project tasks and organizations together). Present planning facilitates effective planning in the future.
- 5) Preparing a preliminary model and general guidelines for future plans, to allow sufficient lead time and maintain continuity and global perspective.
- 6) Preparing action plan (process oriented decisions).
- 7) Developing a basis for accurate budgeting and scheduling, facilitating project approval at different milestones.
- 8) Enabling better coordination and integration of the multilevel (vertical integration), multifunctional (horizontal integration), and multistage (consistency) inputs and decision.
- 9) Avoid wrong decisions by probing the futurity of current decisions.
- 10) Improve affirmative planning by considering and analysing more alternatives.
- 11) Speed up response to future changes.
- 12) Provide a yardstick for monitoring, reviewing, and controlling project execution.
- 13) Utilizing the experience accumulated from managing and executing projects in a systematic learning process". (Laufer, 1990).

Also, Kerzner (2006) figure out the importance of construction planning into four major aspects as follows:"

- Eliminate or reduce uncertainty.
- Improve efficiency of the operations.
- Obtain a better standing of project objectives.
- Provide a basis for monitoring and controlling work.

2.2 Planners

This section covers the parameters which qualify an individual of being a planner for construction projects; also it will address his duties and responsibilities.

2.2.1 Introduction

There were considerable debates over the last decade or so on the effectiveness of construction project planning. But, there is remarkably poor and little research about what construction planners actually do, what are their characteristics and parameters that qualify them to be a planner for construction projects.(Graham &Kelsey,2005).

Construction planners add value for the contracting organization by ensuring that estimating and tendering are based on a sturdy perception of the methods, time and space required to perform the tasks for each construction contract and the corresponding risks implicated. Their output can be effective in acquisition tenders not based on purely monetary criteria. They have to implement both planning and other work in a time and information obliged environment which requires considerable use of inference based on judgement and experience based learning. Negotiation and communication skills are very important in the planners work and for this reason many of the procedures and task interconnection in their work are repeated. Their longer term objectives have to take account of potential long term relationships with operational management colleagues and

representatives of other organizations with whom they have to negotiate. (Graham &Kelsey,2005).

2.2.2 Planner Parameters

Regarding the characteristics and the parameters that should be found in the construction planner, there are a little debates talking about this topic.

🚧 Planner Skills

Connie and Ethan (1999) identify the skills that should found in the construction planners into five main areas with its components as follow:

✓ Writing skills which include:

- Clear, concise in house memo writing.
- Ability to write findings, draft ordinances, legislations, etc.
- Ability to write project reports, lengthier documents.
- Ability to write informative, engaging short pieces (e.g. brochures, etc.) for the general public.

✓ Communication skills which include:

- Working well with colleagues (within the organization).
- Coordination in a multidisciplinary team.
- Working with general public (those less familiar with planning methods and process).
- Understanding what the public/client wants.
- Speaking formally and informally with public and elected officials.
- Ability to communicate graphically.
- Ability to think and respond on their feet.
- Ability to express the collective good.

✓ **Analysis skills which include:**

- Understanding and articulating the rationale of planning.
- Ability to “follow a thin thread” to collect data and information.
- Clear and linear thinking.
- Ability to see multiple perspectives and reconcile into a single product.
- Ability to access and synthesize secondary data.
- Ability to conduct primary data collection.
- Ability to perform quantitative and qualitative reasoning.
- Understanding of law, legal institutions, codes, ordinance, etc.
- Comfort and willingness to work with numbers.
- Competency in basic computer programs (data base, spread sheets, etc.)
- Familiarity with the interaction of planning, implementation and markets.

✓ **Design skills which include:**

- Understanding of space, issues concerning the built environment.
- Ability to conceptualize plans into 3 dimensions.
- Competency with scenarios techniques.
- Understanding of physical planning alternatives, what others have tried.
- Competency in site analysis.

✓ **Decision making, Supervisory, Leadership and Management skills which include:**

- Self-starter.
- Ability to complete quality work on time and within the budget.
- Ability to develop and maintain budget.

- Understanding of the planning process (who's involved and timing and dynamic of involvement).

Also, university of Colombia suggest further skills for a planner as follow:

✓ **Research and investigation skills which include:**

- Utilize a variety of resources of information.
- Apply a variety of methods to test the validity of data.
- Identify of problems and needs.
- Formulate questions to clarify problems, topics, or issues.
- Identify appropriate information sources for problem solving.

✓ **Verbal and written communication skills which include:**

- Organize and present ideas effectively in formal and informal speeches and writing.
- Effectively participate in group discussions.
- Prepare concise and logically written materials.
- Listen carefully and respond to verbal and nonverbal messages.
- Respond appropriately to positive and negative feedback.
- Debate issues without being perceived as abrasive to others.
- Make effective use of media resources for public relations.
- Possess courteous telephone skills.

✓ **Decision making, Supervisory, Leadership and Management skills which include:**

- Understanding the steps involved with effective decision making.
- Implement sound decisions.
- Facilitate group participation in the decision making process.

- Take responsibility for decisions.
- Evaluate the effects and effectiveness of a decision.
- Be able to evaluate all options and make decisions to others.
- Motivate others toward common goals.
- Use appropriate management and monitoring skills with peers and/or subordinates.
(www.cce.columbia.edu).

Furthermore, other skills stated by (career education website) mentioned below:

✓ **Interpersonal/Teamwork and Teambuilding skills which include:**

- Collaborate on projects.
- Motivate team members to work toward common goals.
- Understand strength and weaknesses of members and use strengths to build team development.
- Support and praise members for reaching goals and accomplishments.

✓ **Critical thinking, problem solving and conflict resolution skills which include:**

- Understand the steps involved with critical thinking.
- Anticipate problems before they occur.
- Recognize if a problem needs to be addressed.
- Define the problem and identify possible causes.
- Facilitates group members in identifying and evaluating possible solutions.
- Identify range of solutions and select most appropriate ones.
- Develops plans to implement solutions.
- Be capable of handling more than problem at a time.(www.careereducation.edu).

PMI (2013) identify interpersonal skills that should be available in the project members such as project manager and planner and it was as follows:

➤ **Leadership**

Leadership involves focusing the efforts of a group of people toward a common goal and enabling them to work as a team. In general terms, leadership is the ability to get things done through others. Respect and trust, rather than fear and submission, are the key elements of effective leadership. Although important throughout all project phases, effective leadership is critical during the beginning phases of a project when the emphasis is on communicating the vision and motivating and inspiring project participants to achieve high performance.

Throughout the project, the project team leaders are responsible for establishing and maintaining the vision, strategy, and communications; fostering trust and team building; influencing, mentoring, and monitoring; and evaluating the performance of the team and the project.

➤ **Team Building**

Team building is the process of helping a group of individuals, bound by a common purpose, to work with each other, the leader, external stakeholders, and the organization.

The result of good leadership and good team building is teamwork.

Team-building activities consist of tasks (establish goals, define, and negotiate roles, responsibilities, and procedures) and processes (interpersonal behaviour with emphasis on communication, conflict management, motivation, and leadership). Developing a team environment involves handling project team problems and discussing these as team issues without placing blame on individuals. Team building can be further enhanced by

obtaining top management support; encouraging team member commitment; introducing appropriate rewards, recognition, and ethics; creating a team identity; managing conflicts effectively; promoting trust and open communication among team members; and providing leadership. While team building is essential during the front end of a project, it is an ongoing process. Changes in a project environment are inevitable. To manage these changes effectively, a continued or renewed team-building effort is required. Outcomes of team building include mutual trust, high quality of information exchange, better decision making, and effective project management.

➤ **Motivation**

Project teams are comprised of team members with diverse backgrounds, expectations, and individual objectives. The overall success of the project depends upon the project teams' commitment, which is directly related to their level of motivation.

Motivating in a project environment involves creating an environment to meet project objectives while providing maximum satisfaction related to what people value most.

These values may include job satisfaction, challenging work, a sense of accomplishment, achievement and growth, sufficient financial compensation, and other rewards and recognition the individual considers necessary and important.

➤ **Communication**

Communication has been identified as one of the single biggest reasons for project success or failure. Effective communication within the project team and between the project manager, team members, and all external stakeholders is essential. Openness in communication is a gateway to teamwork and high performance. It improves relationships among project team members and creates mutual trust.

To communicate effectively, the project manager should be aware of the communication styles of other parties, cultural nuances/norms, relationships, personalities, and the overall context of the situation. Awareness of these factors leads to mutual understanding and thus to effective communication. Project managers should identify various communication channels, understand what information they need to provide, what information they need to receive, and which interpersonal skills will help them communicate effectively with various project stakeholders.

Carrying out team-building activities to determine team member communications styles (e.g., directive, collaborative, logical, explorer, etc.), allows managers to plan their communications with appropriate sensitivity to relationships and cultural differences.

Listening is an important part of communication. Listening techniques, both active and passive give the user insight to problem areas, negotiation and conflict management strategies, decision making, and problem resolution.

➤ **Influencing**

Influencing is a strategy of sharing power and relying on interpersonal skills to get others to cooperate towards common goals. Using the following guidelines can influence team members:

- ✚ Lead by example, and follow through with commitments.
- ✚ Clarify how a decision will be made.
- ✚ Use a flexible interpersonal style and adjust the style to the audience.

Apply your power skill fully and cautiously. Think of long-term collaboration.

➤ **Decision Making**

There are four basic decision styles normally used by planners and project managers: command, consultation, consensus, and coin flip (random). There are four major factors that affect the decision style: time constraints, trust, quality, and acceptance. Project managers may make decisions individually, or they may involve the project team in the Decision-making process.

➤ **Negotiation**

Negotiation is a strategy of conferring with parties of shared or opposed interests with a view toward compromise or reaching an agreement. Negotiation is an integral part of project management and if done well then the probability of project success will increase.

The following skills and behaviours are useful in negotiating successfully:

- ✚ Analyze the situation.
- ✚ Differentiate between wants and needs, both theirs and yours.
- ✚ Focus on interests and issues rather than on positions.
- ✚ Ask high and offer low, but be realistic.
- ✚ When you make a concession, act as if you are yielding something of value, don't just give in.
- ✚ Both parties should feel as if they have won. This win-win negotiating style is preferred but not always achievable. If possible, don't let the other party leave feeling as though he or she has been taken advantage of.
- ✚ Listen attentively and communicate articulately.

➤ **Coaching**

Coaching is a means of developing the project team to higher levels of competency and performance. Coaching is about helping people recognize their potential through empowerment and development. Coaching is used to aid team members in developing or enhancing their skills or to build new skills required to enable project success.

Coaching can take many forms and approaches. In some instances, formal or informal training may be developed to increase technical skills or assist team-building efforts and facilitate consistent interpersonal interactions. Coaching is also used to address poor performance and to help team members overcome deficiencies in their skill sets.

Coaching is distinct from counselling. Counselling focuses on addressing situations where team members (won't do) something rather than (can't do). If the situation is one where the team member is not performing or meeting expectations due to a lack of skill, knowledge, or experience, coaching can be employed to help the team member to develop this skill and thus turn a (can't do) situation into one of (can do).

Coaching can be a powerful motivator for teams. As teams develop their skills, abilities, and confidence, their willingness to take on challenging or demanding tasks is increased. This can lead to more effective and productive teams.

➤ **Conflict Management**

Conflict is inevitable in a project environment. Incongruent requirements, competition for resources, breakdowns in communications, and many other factors could become sources of conflict. Within a project environment, conflict may yield dysfunctional outcomes.

However, if actively managed, conflicts can actually help the team arrive at a better solution. The project manager must be able to identify the causes for conflict and then

actively manage the conflict thus minimizing potential negative impacts. The project team is then able to deliver better solutions and increase the probability of project success.

Project managers must develop the skills and experience necessary to effectively adapt their personal conflict management style to the situation. Managing conflict in a project environment involves building the trust necessary for all involved parties to be open and honest, and to engage in seeking a positive resolution to the situation creating the conflict. Project managers strive to establish a collaborative approach among the team members involved in order to fully resolve the problems. In situations where a collaborative approach is not possible, the project manager must then revert to other active management styles for handling the conflict; e.g., assertiveness, accommodation, avoidance, or compromise.

Managing conflict is one of the biggest challenges a project manager faces. It draws upon all of the other interpersonal skills of a project manager in order to lead the team to a successful resolution of the situation in conflict.

 **Planner's Qualifications which contain:**

- Educational degree
- Experience in planning.
- Experience in construction work
- Certification
- Training in planning
- Software Knowledge

2.2.3 Duties and Responsibilities

Key participants in any planning team are those who have experience in the planning procedure, process and the ability to conceptually schedule work. The planning team members and participants should be familiar with the key of project work and specialize in their organizational duties and disciplines. These planning capabilities are required in both the early conceptual planning and next construction execution phases. Planners must grasp the work to be done and also be prepared to coordinate and communicate with those individuals who lack full perception and understanding of the proposed project work. The planning process for data input requires an understanding of the constraints, restrictions and major considerations specific to the end product and/or project. Equally important is identification of the stakeholders who will be involved throughout the various phases of the project. Effective project planning begins and ends with the efforts of the project team. How well the project team identifies the scope of work and develops the associated project plan will contribute to the success or failure of the project. The planning effort must be the collective product of the project team in order to optimize the opportunities for project success. Effective schedule planning depends on the project team's commitment to the concept of the plan prior to implementation. Once the plan is developed and accepted, the detailed schedule development process is implemented. The planner is responsible for development of the project schedule, while the project management team is responsible for the overall project planning effort. The planner provides professional assistance and guidance to the project team in developing and implementing the project plan, monitoring project progress, and recording the effect of changes monitoring, status and predicting an integrated project schedule, so that a

project may be executed in an efficient manner. The planner must also incorporate changes as efficiently as possible while maintaining and updating the schedule as the project progresses. (AACE International Practice, 2011). American association of cost engineers develop a list of duties and responsibilities of the construction planner which will assist the project management team in developing, monitoring, and updating an integrated project plan and schedule, is shown below:"

- 1) Assisting with the development and implementation of acceptable planning and scheduling techniques and methods.
- 2) Preparing procedures and guidelines for project planning and related scheduling management and control.
- 3) Supporting the project team efforts toward the development of the project plan and translating that project plan into the project schedule.
- 4) Leading development and analysis of project schedules, software implementation, time impact and delay analysis, and review of periodic schedule updates.
- 5) Monitoring and updating accurate schedule progress toward achieving the desired project completion date and informing the project management team of changes to schedule outcome.
- 6) Prepare and provide schedule progress reports, trending charts, and schedule analysis. Maintain records of scope changes, trends, and variances that potentially affect schedule performance.
- 7) Assuring the credibility of the information contained in the schedule.
- 8) Assisting with the preparation of project time and cost claims.

9) At the completion of the project, assists in developing and recording the project's historical schedule information and "lessons learned", for use on future enterprise projects.(AACE, 2006).

10) Recognition of the cyclical and iterative nature of the planning process.

Additionally, maintaining open-mindedness and communication throughout the planning process leads to the identification of the most appropriate concepts for the success of the project. (AACE, 2011).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the steps that were followed to achieve the objectives of the study.

A scheme of flow chart will be used on research methodology to demonstrate the methodology that was followed in this study.

Remenyi et al (2003) defined the methodology as it is a general approach to a problem which could be put into practice in a research process, from the theoretical upholding to the collection and analysis of data. Also, Collis and Hussey (2009) described the methodology as the overall approach to the entire process of the research study.

Wedawatta et al (2011) reported that research methodology is concentrated on the problems to be investigated in a research study and hence is changed according to the problems to be investigated.

The following steps will be included in the methodology of the study:

- 1) Research strategy.
- 2) Data required.
- 3) Data collection.
- 4) Population and sampling.
- 5) Data analysis.

3.2 Research Strategy

Saunders et al (2009) defined research strategy as it is “the general plan of how the researcher will go about answering the research questions”.

Bryman (2008) defined research strategy as “a general orientation to the conduct of research”. In this study, a quantitative approach was used to identify and evaluate the planning procedures that followed by contractors in Eastern Province of Saudi. Also to identify the parameters which qualify an individual of being a planner for construction contractors. The following figure depicts the research methodology steps that were followed in the study.

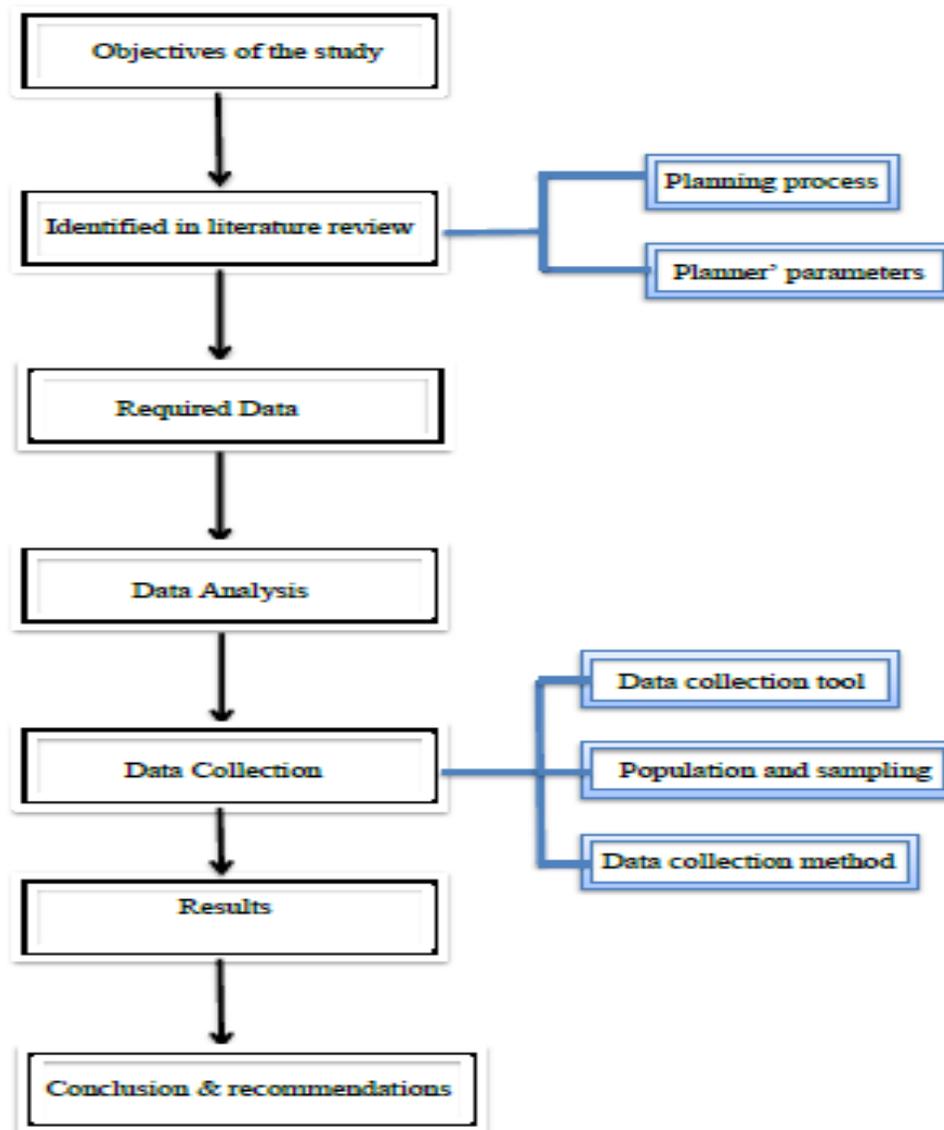


Figure 3.1 Scheme of research methodology

3.3 Required Data

To accomplish the objectives of the study there is a mandatory data was collected in the following fields:

A) Planning process.

There are many steps should be performed during planning process for a project were demonstrated in the literature review ,from which the most suitable steps that can be applicable to Saudi Arabian construction projects are identified as follows:

❖ Collecting requirements ((Planning Inputs)) which include :

1) Contract requirements which cover :

- ✓ Basic types of contracts such as: unit price, cost incentive and lump sum.
- ✓ Common delivery methods, for example: design build, design bid build.
- ✓ Planning, scheduling and reporting requirements
- ✓ General and special conditions
- ✓ Contract documents: Specifications, Plans, Special requirements, e.g. permits.

2) Construction methods which contain :

- ✓ Constructability analysis.
- ✓ Constructability process and methodologies.
- ✓ Constructability alternatives and evaluation.
- ✓ Constraints.

3) Value engineering which include the following phases :

- ✓ Information
- ✓ Function analysis
- ✓ Creativity

- ✓ Evaluation
- ✓ Development
- ✓ Presentation

4) Stakeholder Considerations.

The considerations and constraints of the stakeholders must be determined, evaluated and resolved, such as, needs and requirements, functional prioritization, alternative selection, cost evaluation and schedule impacts.

5) Project Size, such as :

- ✓ Small
- ✓ Large
- ✓ Mega
- ✓ Others

6) Project Type, for example :

- ✓ Commercial
- ✓ Building
- ✓ Industrial
- ✓ Infrastructure
- ✓ Utility

7) Project Location

Project location which is urban, rural or remote should be considered during planning phase to avoid any regional constraints.

8) Weather Data

Commonly weather and climate in the project location should be studied carefully to be impacted correctly on the project plans.

9) Productivity Data for :

✓ Equipment

✓ Labour.

10) Materials

✓ Type.

✓ Availability.

✓ Timing and phasing (need-by dates and logistics).

✓ Installation.

11) Human Resources

✓ Management.

✓ Technical.

✓ Supervisory.

✓ Craft.

✓ Subcontract.

12) Equipment

✓ Construction equipment.

✓ Engineered (installed) equipment.

❖ Planning Procedures with all their steps which include:

1) Scope Planning which include :

- ✓ Scope of Work Definition
- ✓ Project Plan Definition
- ✓ Phase Definition
- ✓ Work Breakdown Structure (WBS)

2) Time Planning which include :

- ✓ Activity definition.
- ✓ Long lead item.
- ✓ Activity sequencing.
- ✓ Activity duration estimating.
- ✓ Resource levelling.
- ✓ Schedule development.
- ✓ Schedule controlling.

3) Cost Planning which include :

- ✓ Cost Estimates Development
- ✓ Budget Determining
- ✓ Cost controlling

4) Quality Planning

5) Human Resource Planning

6) Communications Planning

7) Risk Management Planning

8) Procurement Planning

9) Stakeholders Reviewing

10) Baseline Plan

11) Periodic Forecasts

B) Planner Parameters

There are many parameters that should be found in the construction planner to do his job in effective and efficient way were demonstrated in the literature review ,from which the most suitable parameters that can be applicable to Saudi Arabian contractors are identified as follow:

1) Planner's Qualifications which contain:

- ✓ Educational degree
- ✓ Experience in planning.
- ✓ Experience in construction work.
- ✓ Certification
- ✓ Training in planning
- ✓ Software Knowledge

2) Planner's Skills which include:

❖ Writing skills which cover:

- ✓ Ability to write findings, draft ordinances, legislations, etc.
- ✓ Ability to write project reports, lengthier documents.

❖ Communication skills which cover:

- ✓ Working well with colleagues (within the organization).
- ✓ Coordination a multidisciplinary team.

- ✓ Working with general public.
- ✓ Understanding what the public/client wants.
- ✓ Speaking formally and informally with public and elected officials.
- ✓ Ability to communicate graphically.
- ✓ Ability to express the collective good by (Connie and Ethan, 1999).
- ✓ Organize and present ideas effectively in formal and informal speeches and writing.
- ✓ Effectively participate in group discussions.
- ✓ Prepare concise and logically written materials.
- ✓ Listen carefully and respond to verbal and nonverbal messages.
- ✓ Respond appropriately to positive and negative feedback.
- ✓ Debate issues without being perceived as abrasive to others.
- ✓ Make effective use of media resources for public relations.
- ✓ Possess courteous telephone skills. (www.cce.columbia.edu).
- ❖ **Analysis skills which include:**
 - ✓ Understanding and articulating the rationale of planning.
 - ✓ Ability to “follow a thin thread” to collect data and information.
 - ✓ Clear and linear thinking.
 - ✓ Ability to see multiple perspectives and reconcile into a single product.
 - ✓ Ability to access and synthesize secondary data.
 - ✓ Ability to conduct primary data collection.
 - ✓ Ability to perform quantitative and qualitative reasoning.
 - ✓ Understanding of law, legal institutions, codes, ordinance, etc.
 - ✓ Comfort and willingness to work with numbers.

- ✓ Competency in basic computer programs (data base, spread sheets, etc.)
- ✓ Familiarity with the interaction of planning, implementation and markets by (Connie and Ethan, 1999).

❖ **Design skills which include:**

- ✓ Understanding of space, issues concerning the built environment.
- ✓ Ability to conceptualize plans into 3 dimensions.
- ✓ Competency with scenarios techniques.
- ✓ Understanding of physical planning alternatives, what others have tried.
- ✓ Competency in site analysis. (Connie and Ethan, 1999).

❖ **Decision making, Supervisory, Leadership and Management skills which include:**

- ✓ Self-starter.
- ✓ Ability to complete quality work on time and within the budget.
- ✓ Ability to develop and maintain budget.
- ✓ Understanding of the planning process (who's involved and timing and dynamic of involvement). (Connie and Ethan, 1999).
- ✓ Understanding the steps involved with effective decision making.
- ✓ Implement sound decisions.
- ✓ Facilitate group participation in the decision making process.
- ✓ Take responsibility for decisions.
- ✓ Evaluate the effects and effectiveness of a decision.
- ✓ Be able to evaluate all options and make decisions to others.
- ✓ Motivate others toward common goals.

- ✓ Use appropriate management and monitoring skills with peers and/or subordinates.
(www.cce.columbia.edu).

❖ **Research and investigation skills which include:**

- ✓ Utilize a variety of resources of information.
- ✓ Apply a variety of methods to test the validity of data.
- ✓ Identify of problems and needs.
- ✓ Formulate questions to clarify problems, topics, or issues.
- ✓ Identify appropriate information sources for problem solving.
(www.cce.columbia.edu).

❖ **Interpersonal/Teamwork and Teambuilding skills which include:**

- ✓ Collaborate on projects.
- ✓ Motivate team members to work toward common goals.
- ✓ Understand strength and weaknesses of members and use strengths to build team development.
- ✓ Support and praise members for reaching goals and accomplishments.

❖ **Critical thinking, problem solving and conflict resolution skills which include:**

- ✓ Understand the steps involved with critical thinking.
- ✓ Anticipate problems before they occur.
- ✓ Recognize if a problem needs to be addressed.
- ✓ Define the problem and identify possible causes.
- ✓ Facilitates group members in identifying and evaluating possible solutions.
- ✓ Identify range of solutions and select most appropriate ones.
- ✓ Develops plans to implement solutions.

- ✓ Be capable of handling more than problem at a time. (www.careereducation.edu)

3.4 Data Collection

Data Collection is an important aspect of any type of research study data, which is required in order to attain the objectives of the study. Inaccurate data collection can impact on the results of the study and ultimately lead to invalid results. Method of data collection comprises the following aspects:

3.4.1 Key Informant

It is very important to identify the key informant from which the required data to achieve the objectives can be obtained. Choosing of the key informant is very significant as it determines the validity and reliability of the information gained about a particular character of the company which are planning procedures and planners' parameters in this study. The required data for this study obtained from individuals who responsible on projects planning and from the top management.

3.4.2 Tools

It is mandatory to select a tool that is capable depict the goals of the study, collect the data required, consider the concern of recipients and the importance of the reporter or the key informant. After careful considerations, this study intends to use a structured closed questionnaire to collect the required data, for the following benefits:

- It is easier and quicker for respondents to answer.
- The answers of different respondents are easier to compare.
- Answers are easier to code and statistically analysed.
- The response choices can clarify question meaning for respondents.

- Respondents are more likely to answer about sensitive topics.
- There are fewer irrelevant or confused answers to questions.
- Less articulate or less literate respondents are not at a disadvantage.
- Replication is easier.

- **Questionnaire Layout**

Two sets of the questionnaires joined with a covering letter were emailed and mailed to the grade 1, 2 and 3 contractors, who are located in the Eastern Province of Saudi Arabia.

The letter was indicated to the objectives of the study and explained to the respondents that the results of the questionnaires will be used to identify and evaluate planning procedures that followed by contractors in Eastern Province of Saudi Arabia, also to identify the parameters which qualify an individual of being planner for construction organization. One questionnaire was directed to the planning department in the organization or any related department, and the other one was directed to the top management in the organization. The questionnaire that directed to the planning department or any related department was contained the following parts:

- 1) **Organization Profile:** This part contained questions that investigate information related to the contracting company profile such as name, organization age, number of employees, size, annual investment, typically projects involved, commonly delivery types of projects and organization's ownership.
- 2) **Respondents Profile:** This part contained questions exploring information related to the respondents profile such as age, educational level, position in the organization structure and experience.

3) **Planning Procedures in the Organization:** This part contained questions seeking information related to the planning department' characteristics such as number of employees, job titles, functions and department' age. It also investigate information related to the current planning procedures in the organization such as persons involved during the planning process, types of softwares used, methods that used to prepare work break down structure , how they level the resources during execution phase and planning' starting time.

4) **Planning Inputs:** This part contained questions seeking information related to the required data and inputs during the planning process.

5) **Planning Procedures:** This part contained questions seeking information related to the planning procedures which perform during the planning process.

6) **Planning Procedures evaluation:** This part contained questions seeking information about the reasons for the level of satisfaction about the current planning procedures in the organization.

To insure the reliability of the information on the subject of the study, another questionnaire was used and directed to the top management in the same organization. It was contained two parts as shown below:

1) **Planners' Parameters:** This part contained questions seeking information related to planners' skills and qualifications that the contractor believes to be required in the planner for construction projects.

2) **Planner Evaluation:** This part contained questions seeking information about the reasons for the level of satisfaction about the planner.

Finally, full contact information of the surveyors such as name, address, email and mobile number was included in the covering letter for the respondents to contact if they need any clarification regarding the questionnaires. A copy of the questionnaires appears in appendix A and appendix B respectively.

The structure of the questionnaires that was used is presented in the following two figures.

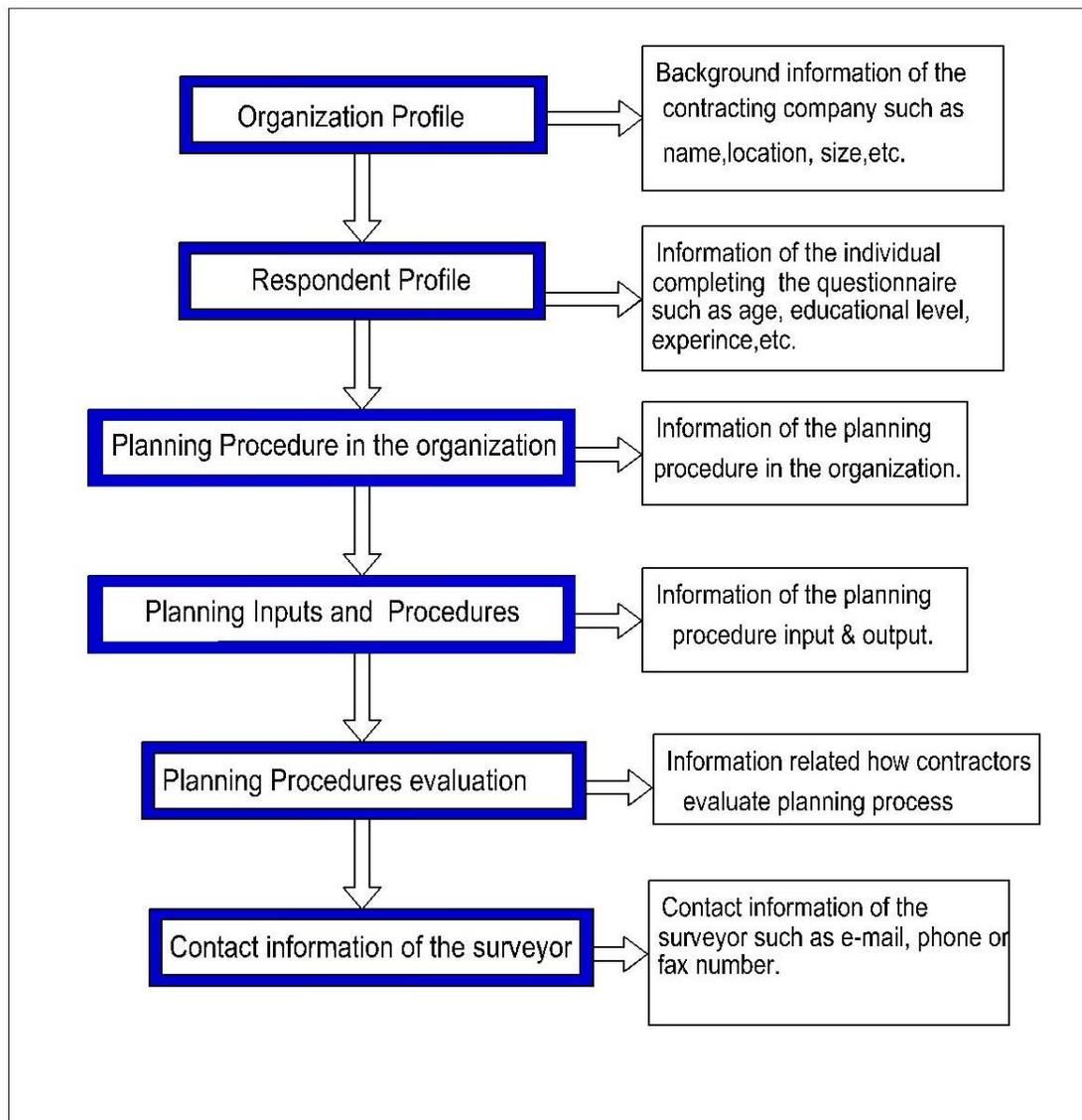


Figure 3.2 Scheme of the questionnaire that directed to the planning department

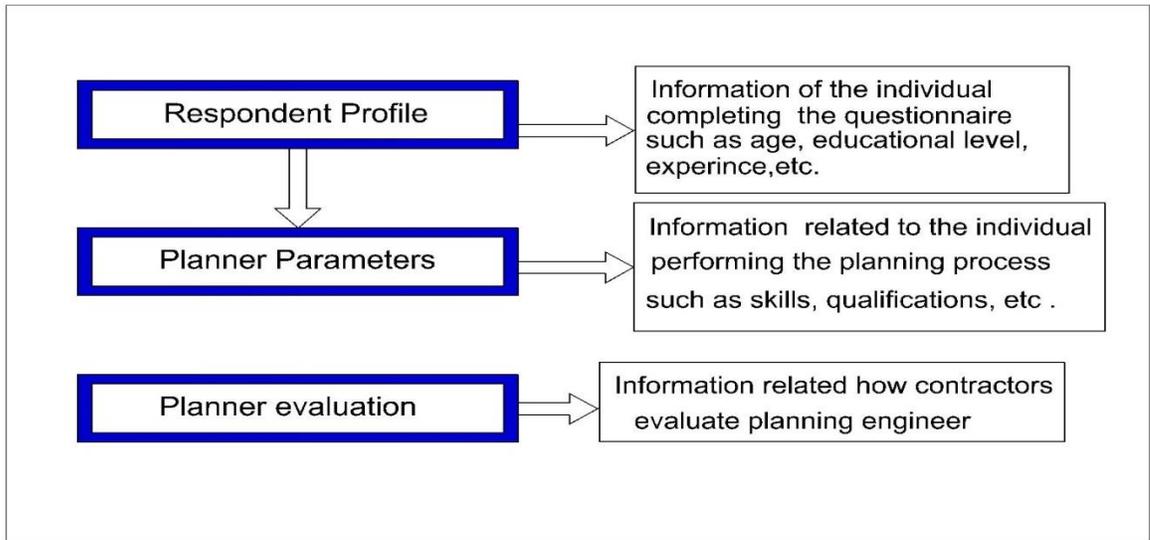


Figure 3.3 Scheme of the questionnaire that directed to the top management

3.4.3 Method

The two sets of the questionnaires that appear in appendix A and appendix B respectively, was sent through e-mails and mails to collect the required data to achieve the objectives of the study. Each respondent invited to participate in the questionnaire was followed up by e-mails and phone calls.

3.5 Population and Sampling

3.5.1 Population

According to the University of Missouri, populations are “a complete set of elements (persons or objects) that possess some common characteristic defined by the sampling criteria that was established by the researcher “. It includes two groups as follow:

- 1) Target population: the entire group of people or objects to which the researcher wishes to generalize the study findings, for example all people with Cholera.

2) Accessible population: the portion of the population to which the researcher has reasonable access; may be a subset of the target population, for example all people with Cholera in France.(www.umsl.edu)

Upon the above classifications, the study followed the second group which is accessible population, because the population of this study was grade 1, 2 and 3 construction contractors in the Eastern Province of Saudi Arabia as per classified by the ministry of municipality and rural affairs .

3.5.2 Sampling

Sample is defined by the University of Missouri as the selected elements (people or objects) chosen for involvement or participation in a study. People are indicated to as subjects or participants. Sampling is considered as the process of selecting a group of people, events, behaviours, or other elements with which to conduct a study.

In addition, sampling frame is a list of all the elements in the population from which the sample is drawn, frame is needed so that everyone in the population is identified so they will have an equal opportunity for selection as a subject (element).

Because of the total number of grade 1, 2, 3 construction contractors in Eastern Province of Saudi Arabia are only 86, therefore the questionnaires were sent to all of them.

(www.contractors.momra.gov.sa)

3.6 Ranking System

3.6 .1Questionnaire to Planning Departments

The initial three parts of the questionnaire wasn't really require any type of ranking system because they are related to the profile of the organization, respondent and

planning procedure in the organization respectively. Hence the usage of ranking system started at the level of calculation of weighted scores to determine the ranks.

Planning Inputs

In this part, respondents were asked to rank the data and inputs that required during the planning process, the employed ranking system was a scale of 1 to 5 where (1) represents Highly Important, (2) represents Important, (3) represents Moderately Important, (4) represents Little Important, (5) represents Not Important.

Planning Procedures

In this part, respondents were asked to rank the planning procedures that should be performed during the planning process, the employed ranking system was a scale of 1 to 5 where (1) represents Highly Important, (2) represents Important, (3) represents Moderately Important, (4) represents Little Important, (5) represents Not Important.

Planning Evaluation

In this part, respondents were asked to express their satisfaction level about current planning procedures in the organization, the employed ranking system was a scale of 1 to 5 ,where (1) represents extremely satisfied , (2) represents highly satisfied, (3) represents moderately satisfied, (4) represents low satisfied, (5) represents not satisfied. After that, they were asked to rank the potential reasons that pushed them to express such satisfaction level, the employed ranking system was a scale of 1 to 5 where (1) represents Strongly Agree, (2) represents Agree, (3) Neutral, (4) represents Disagree, (5) represents Strongly Disagree.

3.6 .2 Questionnaire to Top Managements

+ Planners' Parameters

In this part, respondents were asked to rank the required parameters that should be found in the planner for a construction projects, the employed ranking system was a scale of 1 to 5 where (1) represents Highly Important, (2) represents Important, (3) represents Moderately Important, (4) represents Little Important, (5) represents Not Important.

+ Planners Evaluation

In this part, respondents were asked to express their satisfaction level about their planner in the organization, the employed ranking system was a scale of 1 to 5 where (1) represents extremely satisfied , (2) represents highly satisfied, (3) represents moderately satisfied, (4) represents low satisfied, (5) represents not satisfied. After that, they were asked to rank the potential reasons that pushed them to express such satisfaction level , the employed ranking system was a scale of 1 to 5 where (1) represents Strongly Agree, (2) represents Agree, (3) Neutral, (4) represents Disagree, (5) represents Strongly Disagree.

3.7 Data Analysis

Data obtained from the respondents on the questionnaires was analyzed by using (IBM SPSS Statistics 22) and (Microsoft Excel 2010), and was used to achieve the objectives of the study and to answer the research questions as shown in chapter 1.

Statistical analysis methods performed to explicate the results. The analyzed data will be shown in the following chapter in tabulated format and figures. Graphical representations have a tendency to make the comparisons clearer and thus used for showing the most

important planning inputs, planning procedures and planners' parameters from the contractor's perspective.

By carefully studying the results of the surveys, a better understanding will be achieved about the current situation of the planning procedures and the planner parameters in the construction projects from a local contractor's point of view. This will also help in recommending the next approach for further studies of the subject.

CHAPTER 4: RESULTS ANALYSIS AND DISCUSSION

This chapter presents the data analysis and discussion of the results from the questionnaires survey, focused on the study objectives, i.e. identify and evaluate the current procedures which are followed by contractors in the Eastern Province of Saudi Arabia to plan for a project, also to identify the parameters which qualify an individual to be a planner for construction projects. Mainly, the respondents profile, planning process in organizations, planning inputs, planning procedures and planner' parameters are discussed in detail in the following sections.

4.1 Data Collection

Two sets of questionnaires were distributed to 86 contracting organizations in the Eastern Province of Saudi Arabia in different regions i.e. Dhahran, Khobar, Dammam, Jubail, Hassa. One questionnaire was directed to the planning department in the organization or any related department, and it brought data on the necessary aspects related to the planning process. For example, characteristics of the planning department, planning inputs, planning procedures and planning evaluation. In the other hand, the other questionnaire was directed to the top management in the organization, and limited to bring data related to the parameters of the planners and how contractors evaluate their planners. The total number of the questionnaires that received from planners and top management participating contractors was 35 and 32 respectively.

In order to increase the reliability of data collected, only questionnaires that had at least 80 percent completed data were considered in the final data analysis (Zwikael and Globerson, 2004). Using this criterion, 28 questionnaires remained from each set for the final analysis. This represents a valid return rate of 33 percent for each set.

The distribution of the number of questionnaires sent, valid and valid returned from the planners and top management is presented in table 4.1 below

Table 4.1: Number and Percentage of: sent, returned and valid returned questionnaires received from respondents

Number of Questionnaires	Questionnaires' Distribution	
	Planners	Top Management
Sent	86	86
Returned	35	32
Percentage of returned	41%	37%
Valid returned	28	28
Percentage of valid returned	33%	33%

4.2 Reliability of the Data Collected

The reliability of the used questionnaires survey was calculated using two statistical tests. First, Cronbach's alpha value was calculated, and its value (0.86) was considerably higher than the minimum value required by the statistical literature (0.70) (Garmezy et al., 1967 and Hair, 2006). Another reliability test involved the calculation of the required sample size of the study depending on the population size by using the following formula:

$$n = \frac{no \times N}{no + (N - 1)} \quad ,, \quad no = \frac{Z^2}{e^2} \times P(1 - P)$$

Where:

Z: is the z value (e.g., 1.645 for 90% confidence level, 1.96 for 95% confidence level, and 2.575 for 99% confidence level).

e: is the margin of error (e.g., .09, .07 etc.)

P: is the estimated value for the proportion of a sample that will respond a given way to a survey question (e.g., .50 for 50%).

n0: is the sample size without considering the finite population correction factor.

N: is the population size (N= 86 for this study).

n: is the new sample size with considering the population size.

By assuming the following:

N=86, P=90% e=0.09 Z=1.645 for 90% confidence level.

And apply in above equations:

$$no = \frac{Z^2}{e^2} \times P(1 - P) \rightarrow no = \frac{1.645^2}{0.09^2} \times 0.9(1 - .09) = 31$$

$$n = \frac{no \times N}{no + (N - 1)} \rightarrow n = \frac{31 \times 86}{31 + (86 - 1)} = 23.18$$

≈ 24 Questionnaires required

The calculation above is indicated that the required sample size (24 questionnaires) was less than what has been received from the respondents (28 questionnaires).

4.3 Characteristics of the Participants

This section presents the characteristics of the participating contractors, the planners and the top management.

4.3.1 Characteristics of the Contractors

This section presents the participating contractors' characteristics in term of their classification, organization age, number of employees, size of projects, annual revenue, and types of projects.

❖ Contractors' Classification

The results indicated that 43%, 32% and 25% of the participating contractors are grade1, grade 2 and grade 3 respectively. This indicates that a major ratio of the contractors about (75%) is grade1 and 2. That's means they have enough experience and knowledge in the Saudi construction industry, which in turn absolutely will improves the reliability of the data collected.

❖ Organization Age

The results indicated that grade 1, majority of grade 2 (84%), and (32%) of grade 3 participating contractors were established more than 10 years ago as shown below in table 4.2. It is interesting to notice that 68% of grade 3 participating contractors were established in the last 10 years. It seems that most of these contractors are foreign or joint venture with good experience and capabilities in the construction business. This indicates that a major ratio of the participating contractors have been established for a long time and have sufficient experience and knowledge in the Saudi construction industry.

Table 4.2 Organization Age

Organization Age (Years)	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Less than 10	22	0	16	68
10 or more	78	100	84	32

❖ **Number of Employees**

It has been founded that the number of employees among the participating contractors were significantly high .The results indicated that (67%) of grade 1 participating contractors have employed more than 1000 personnel in their organization. Also, (24%) of grade 1 and (16%) of grade 2 participating contractors have employed between (500-999) personnel in their organization as shown below in table 4.3. This indicates that they are very well equipped with large crew and are capable to perform huge projects.

It is important to notice that grade 3 participating contractors have employed less than 500 personnel in their organization. This may refer that due to the majority of these contractors (68%) were established in the last 10 years, and they need more time to be able of having a large crew to carry huge projects.

Table 4.3 Number of Employees in the Organization

Number of Employees	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
less than 500	56	9	84	100
500-less than 1000	15	24	16	0
1000-less than 1500	4	9	0	0
1500 or more	25	58	0	0

❖ **Average Size of Projects & Annual Revenue**

The results indicated that grade 1 participating contractors have performed projects that have more than 100 million SR value with annual revenue exceeded 40 million SR. Also, the results showed that the majority of grade 2 (78%) participating contractors have performed projects that have more than 60 million SR value with annual revenue exceeded 30 million SR as shown below in figures 4.1 and 4.2 respectively. This

indicates that a major ratio of the participating contractors have performed high cost projects with large annual revenue due to their strong financial capital and large manpower and they are not interested in small value projects. It is interesting to notice that the value of projects performed and the annual revenue for grade 3 participating contractors were less than 40 million and less than 20 million respectively. This is may be due to their limited financial capital and their small number of employees (less than 500 employees). These aforementioned causes may not enable them to carry large projects. This distribution among the participating contractors related to the values of the performed project may enrich the study results as it furnishes the study with different aspects and findings.

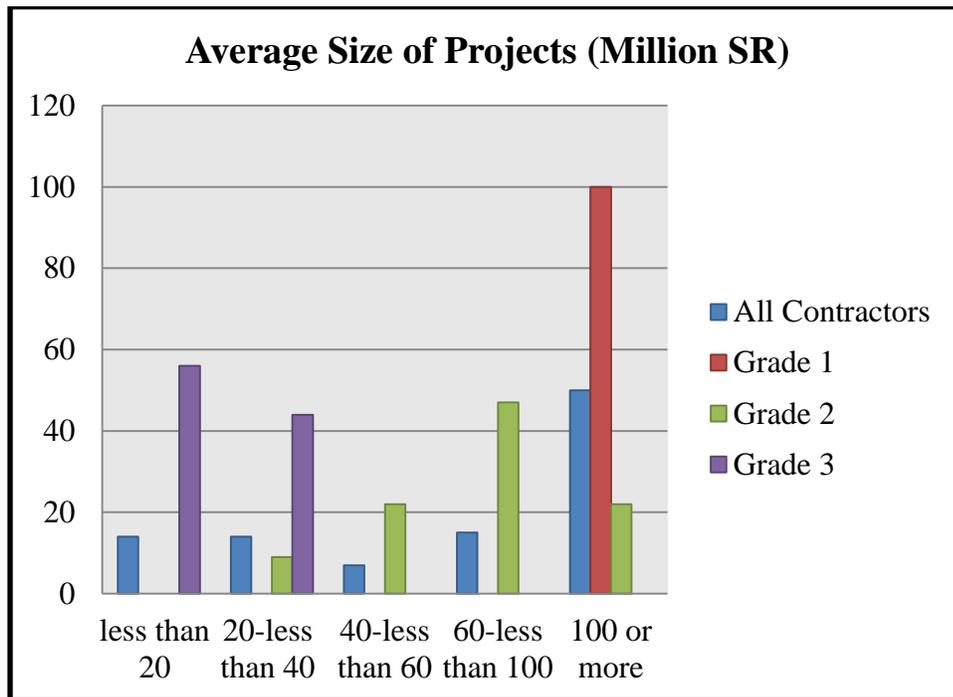


Figure 4.1 Average Size of Organization' Projects in Saudi Riyals

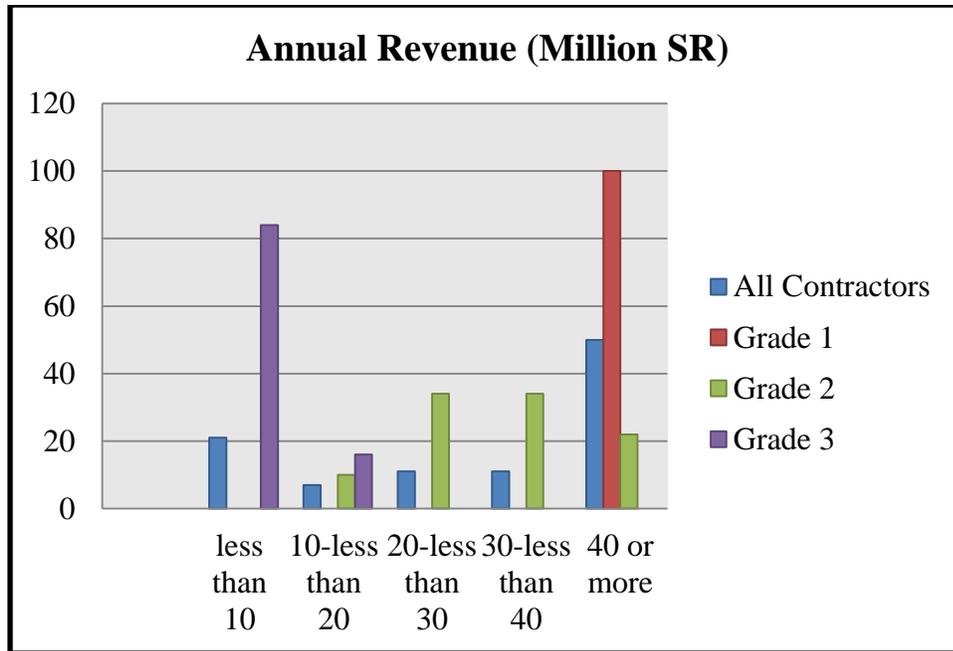


Figure 0.2 Annual Organization' Revenue in Saudi Riyals

❖ **Type of Projects Performed**

The results indicated that the participating contractors are performing various types of projects. The majority (more than 90%) of the participating contractors are performing building projects. In addition, about half of grade 1 and 2 participating contractors perform industrial, utilities and highway projects. This variation in the performed projects will furnish the study results, because each type of these projects may need different planning processes and inputs, due to their different characteristics. The distribution of projects type among the participating contractors is shown below in figure 4.3.

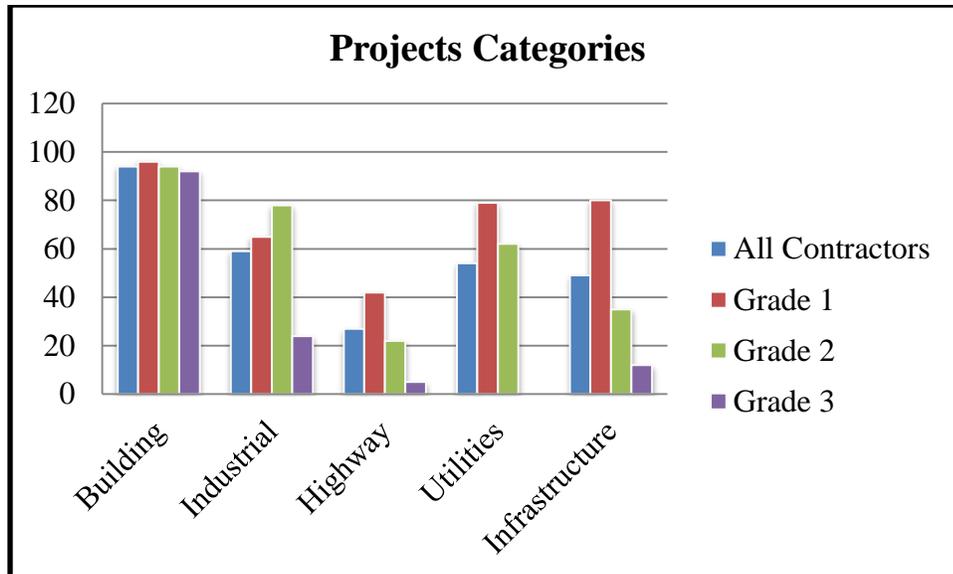


Figure 0.3 Types of performed projects

❖ **Organization' Ownership**

All contractors reported that the ownership of their organization is private and no governmental partner or any other consort. This may refer that the considerations of the contractors in regard to the planning process will not be affected by others.

4.3.2 Characteristics of the Respondents

This section presents data related to the responding planners and responding top management. Mainly, the educational level, position in the organization structure, experience in present organization and the total experience in the Saudi construction industry will be discussed in detail in the following sections to determine the knowledge and experience of the respondents which will assure the quality of the data collected.

❖ **Characteristics of Responding Planners**

This section presents information related to the responding planners. For example, educational level, position in the organization structure, experience in present organization and the total experience in the Saudi construction industry.

- **Educational level**

The results indicated that more than (70%) of the participating planners hold bachelor degree in engineering, especially civil engineering. In addition, (30%) of grade 1 and (16%) of grade 2 participating planners hold master degree in engineering as shown below in table 4.4. This shows that the participating planners have good academic background and sufficient knowledge which enable them to understand the survey' questions properly thus ensuring the quality of the data collected.

Table 0.4 Planners Educational Level

Educational Level	All Planners (%)	Planners in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Bachelor	82	70	84	100
Master	18	30	16	0

- **Position in the Organization Structure**

The results indicated that the planners in grade1, 2 and (36%) of grade 3 belong to the planning department with different job titles ,such as planning engineer, planning manager, scheduler and cost controller. This indicates that the information acquired from such respondents regarding project planning are given by the personnel who are conscious of the important procedures and processes that their organization carries and undertakes during the planning phase which in turn will ensure that the required data on project planning was obtained from reliable and well experienced experts and thus increasing the confidence of the results obtained.

The remaining planners of grade 3 are varying between the project manager and project engineer. This variation in the job titles among the participating planners may enrich the

study results as each job title has different characteristics and various functions. This may lead the participants to express their perceptions and beliefs in the study depending on their positions. The distribution of the planners' position in the contracting organization is presented below in table 4.5.

Table 0.5 Planners' Position in the Organization Structure

Position	All Planners (%)	Planners in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Planning Engineer	35	49	38	12
Planning Manager	24	26	40	0
Cost Estimator	13	19	9	8
Scheduler	12	5	19	16
Project Manager	16	1	3	44
Project Engineer	5	0	0	20

- **Experience**

The results indicated that the level of the accumulative experience comparing with the level of experience in the present organization among the participants were significantly different. The results indicated that the majority (54%) (65% of grade 1, 72% of grade 2 and 24% of grade 3) of the participating planners have more than 20 years of accumulative experience in the Saudi construction industry. This indicates that a major ratio of the participating planners has sufficient experience and knowledge in the Saudi construction industry and in the subject of the study. This will ensure that most of these respondents answered the survey questions accurately and thus enhancing the quality of the information collected.

In the other hand, it is interesting to notice that only (15 %) of planners in grade1 contractors have more than 20 years' experience in their present organization and without

the presence of grade2 and grade 3 participants. This indicates that most of these respondents are working in their respective organization for sufficient time in order to be aware of the methods, procedures and practices that their organization carries to plan for a project.

The distribution of the accumulative experience in the construction industry and the experience in the organization for the participating planners are presented respectively in table 4.6 and 4.7 below.

Table 0.6 Planners' Total Experience in Construction Industry

Experience (Years)	All Planners (%)	Planners in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
less than 5	7	0	0	28
5-10	21	12	22	36
11-20	18	23	16	12
more than 20	54	65	72	24

Table 0.7 Planners' Experience in Present Organization

Experience (Years)	All Planners (%)	Planners in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
less than 5	36	7	40	80
5-10	29	32	41	8
11-20	29	46	19	12
more than 20	6	15	0	0

❖ **Characteristics of Responding Top management**

This section presents information related to the responding top management for example educational level, position in the organization structure, experience in present organization and the total experience in the Saudi construction industry.

- **Educational Level**

The results indicated that the top management in (51%) of grade 1, in (75%) of grade 2 and in grade 3 contractors hold bachelor degree in engineering. In addition, about half of the top management in grade 1 and quarter in grade 2 contractors hold master degree in engineering as shown below in table 4.8. This indicates that the participating top management have a good academic background and sufficient knowledge which enable and qualify them to identify and evaluate the required parameters that should be found in the successful construction planners

Table 0.8 Top Management Educational Level

Educational Level	Overall Top Management (%)	Top Management in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Bachelor	71	51	75	100
Master	29	49	25	0

- **Positions in the Organization Structure**

The results indicated that the general manger and the operational manager positions are the most positions appeared among the participating top management, followed by the development manager' position. It is interesting to notice that the director and the technical manager positions are mostly appeared in the grade 3 participants. This variation in the job titles among the participating top management may enrich the study results as each job title has different characteristics and various functions. This may lead them to express their perceptions and beliefs in the survey questions depending on their positions. The distribution of the participating top management' position in their organization is presented in table 4.9 below.

Table 4.9 Top Management Positions in the Organization Structure

Position	Overall Top Management (%)	Top Management in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
General manager	35	47	38	12
Operational manager	27	33	25	20
Development manager	13	12	9	20
Director	15	8	16	24
Technical manager	10	0	13	24

- **Experience**

The results indicated that the level of the accumulative experience comparing with the experience in the present organization among the participating top management were significantly different. The top management in (88%) of grade 1, in (84%) of grade 2 and in (60%) of grade 3 contractors have more than 20 years of accumulative experience in the Saudi construction industry. This indicates that a major ratio of the participating top management have sufficient experience and knowledge in the Saudi construction industry, which may enrich and ensure the creditability of the results that acquired from this study. In the other hand, the results indicated that majority (46%) of the top management respondents (52% of grade 1, 44% of grade 2 and 28% of grade 3) are working with their present organization for more than 20 years. This shows that most of these respondents are working in their present organization for sufficient time in order to be conscious of the methods, procedures and practices that their organization use to evaluate their planners.

The distribution of the accumulative experience in the construction industry and the experience in the organization for the participating top management are presented respectively in table 4.10 and 4.11 below.

Table 0.10 Top Management Total Experience in Construction Industry

Experience (Years)	Overall Top Management (%)	Top Management in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
5-10	3	0	0	12
11-20	15	12	16	28
more than 20	82	88	84	60

Table 0.11 Top Management Experience in Present Organization

Experience (Years)	Overall Top Management (%)	Top Management in		
		Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
less than 5	7	0	0	28
5-10	12	14	13	8
11-20	35	28	43	36
more than 20	46	52	44	28

In general, the results indicated that the qualifications of the responding top management such as the educational level and the experience are better than the qualifications of the responding planners.

4.4 Planning Department

This section presents a general description related to the planning department in the participating contractors' organization in term of its' positions, functions, number of employees, department age, department name and its' head name, and softwares that are used in this department.

The results indicated that grade1, 2 and (16%) of grade3 participating contractors have formed planning department that do planning functions for their projects. This indicates that the major ratio of the participating contractors values and appreciates the effective role of the planning department in preparing and performing a proper and efficient

project plans. It seems that most of these contractors perceive that the planning department' team have sufficient experience and knowledge in the planning aspects such as time, cost and human resource planning rather than individuals. Also, it seems that most of these contractors especially who perform large projects realize the planning effects on the project success such as schedule overrun and cost overrun, as a result, they designate a separate planning department to perform the planning functions for their projects in a proper and efficient way . The results indicated that the remaining participating contractors (84% of grade 3) who haven't planning department are varying in regard to the responsible entity or person for performing project planning functions in their organization, most of their responses was indicated to the project manager, project engineer and scheduler. This is may be due to the most of these contractors are performing small projects which don't need for a complete planning department or due to their weak and limited income which don't enable them to form a separate planning department. This indicates that there is a lack of planning professionals in these contracting organizations.

The distribution of the entities that responsible on the projects planning is presented in figure 4.4 below.

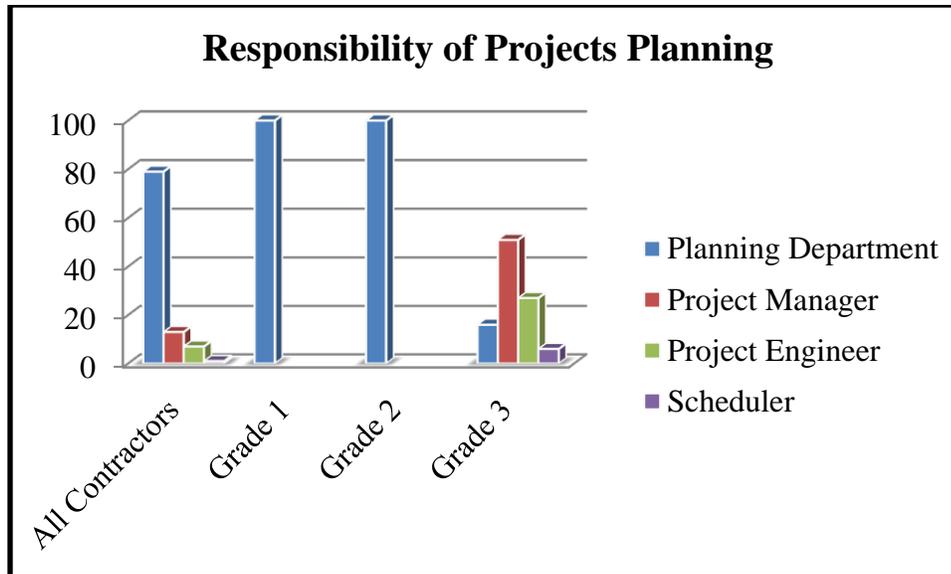


Figure 0.4 Responsibility of Projects Planning

The contractors were given a choice to proceed to next (7) questions in this section if they have a separate planning department in their organization and skip them if they do not have it. Thus, the results obtained for the next 7 questions in this section are given by the 79% respondents.

❖ **Department Name and its' Head Name**

It has been noted that there is no consensus among the participating contractors either on the name of the unit with a planning functions or on its' head name. It looks like due to the different functions that applied in this unit. The results indicated that (51%) of grade 1, (31%) of grade 2 and (16%) of grade 3 participating contractors called a unit with a planning functions as a planning department and called its' head as a planning manager. The rest of the participating contractors provided more definitions for the name, such as planning and costing department along with planning and costing manager, planning and

evaluation department along with planning and evaluation manager, planning and controlling department along with planning and controlling manager.

This variation in the name of the planning department may take effect in the following parts that related to the planning department in the study, such as job titles and functions.

The distribution of department name and its' head name are presented below in table 4.12.

Table 0.12 Department' name and its' head name

Planning Department' Name and its' Head Name	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Planning Department/ Planning Manager	36	51	31	16
Planning and Costing Department/ Planning and Costing Manager	10	2	6	28
Planning and Evaluation Department/ Planning and Evaluation Manager	7	3	6	16
Planning and Scheduling Department/ Planning and Scheduling Manager	25	30	25	16
Planning and Controlling Department/ Planning and Controlling Manager	22	14	32	24

❖ **Department' Age.**

The results indicated that (58%) of grade 1, (22%) of grade 2 participating contractors have established their planning department more than 15 years ago. This indicates that they have sufficient experience and knowledge in the planning aspects which in turn will improve the results of the study. It is important to notice that the grade 3 of the participating contractors have established their planning department less than 5 years ago.

It seems that these contractors finally realized the importance of issuing a separate planning unit for the success of their projects and this department are still in its early stages and they have to make this department stronger to utilize them at full potential. The distribution of the planning department' age among the participating contractors is presented below in table 4.13.

Table 0.13 Planning Department' Age

Planning Department' Age	All Contractors (%)	Grade1 (%)	Grade 2 (%)	Grade 3 (%)
Less than 5	36	0	37	100
5- Less than 10	23	31	28	0
10- Less than 15	9	11	13	0
15 or more	32	58	22	0

❖ **Number of employees**

The results indicated that (67%) of grade 1, (16%) of grade 2 participating contractors have more than 20 personnel in their planning department as shown below in table 4.14. This indicates that they are very well equipped with large crew for planning jobs and are capable to perform huge projects. It is important to notice that grade 3 participating contractors have less than 10 personnel in their planning department. This is may be because of these contractors have recently established their planning department, and they still need more time to be able of having a large crew. This diversity in the planning department' age and its' number of employee refers to the structure of the contractors' organization. Also, it may vary due to the applied functions in the planning department. This variation may enrich the study results, as each planning team has different characteristics in terms of their experience and their knowledge during the planning process.

Table 0.14 Number of Employees in the Planning Department

Number of Employees	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
less than 10	35	7	22	100
10-less than 20	31	26	62	0
20 or more	34	67	16	0

❖ **Functions**

The results indicated that grade 1, 2 and 3 participating contractors are performing project planning task through their planning department. It seems that these contractors consider the project planning as the main task for their planning team in the department. Also, the results indicated that about half of grade 1 and 2 participating contractors have performed others tasks in their planning department, such as organization strategic planning, project controlling and project monitoring. It seems that most of these contractors perceived the importance of these functions during the life cycle of the project and due to their critical role in the project success. It is interesting to notice that about (9%) only of the participating contractors have applied a task for project costing. It seems that most of these contractors don't consider the project costing as a main function for planning department and it should done by other concerned department like cost estimation department. The distribution of the applied functions in the planning department is presented below in table 4.15.

Table 4.15 Planning Department' Functions

Functions	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Project Planning	100	100	100	100
Project Monitoring	64	70	69	48
Project Control	50	58	47	40
Organization Strategic Planning	54	55	84	16

Project Costing	9	9	9	8
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❖ **Job Titles**

The results indicated that the participating contractors are varying in regard to the job titles that applied in the planning department. The results indicated that grade 1, 2 and 3 participating contractors have applied the planning engineer position in their planning department. This indicates that they are very well perceived that the planning engineer is the most important staff that should be found in the planning department. This is due to his vital role in preparing and carrying the planning process in the right way because of his sufficient experience and knowledge in the planning aspects. Also, the results indicated that the participating contractors have applied other positions in the planning department with different portions like cost estimator, scheduler and surveyor. It seems that the most of these contractors perceive the effective role and highly contribution of these positions in ensuring the successful planning process.

The full distribution of the applied job titles in the planning department is presented below in table 4.16

Table 0.16 Planning Department' Job Titles

Job Titles	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Planning Engineer	100	100	100	100
Scheduler	45	70	38	12
Cost Controller	62	58	94	28
Surveyor	50	53	41	20

❖ **Position in the Organization Structure**

The results indicated that the majority of the planning departments in grade 1 (70%) and in grade 3 (80%) contractors positioned directly below the general manager of their

organization, i.e. the one who receive the periodic reports from the department is the general manager. In the other hand, the majority (87%) of the planning departments in grade 2 contractors located directly below the operational manager of their organization as shown below in table 4.17. This indicates that the planning department are reporting to different personnel for each contractor due to the difference in the organization structure among the participating contractors but these personnel belong to the top management of the contractors' organization

Table 0.17 Position in the Organization Structure

Position	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
General Manager	54	70	13	80
Operation Manager	46	30	87	20

❖ **Software used**

The results indicated that the majority of grade 1 (93%) and grade 2 (73%) participating contractors are using (Primavera software) to facilitate the planning process for their project as shown in below table 4.18. It seems that the most of these contractors realize the advanced capabilities, features and accurate estimations for this software in developing the planning process in many fields like time management, cost management and human resources management .This will effect greatly in the project success, such as schedule and cost overruns. In the other hand, the results indicated that the majority (92%) of grade 3 participating contractors are using (MS project software) to facilitate the planning process for their projects as shown also in below table 4.4.7. It seems that most of these contractors have no restriction or requirements from their clients on the type of planning software.

Table 0.18 Software Used

Software' Name	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Primavera	70	93	78	20
MS Project	60	23	53	92

4.5 Planning process

This section discusses in detail information the planning process in the contractors' organization such as when it is carried, at what stage it is carried out, personnel involved during the planning phase, required data and inputs , procedures that followed and how it is evaluated.

The results indicated that grade 1, grade 2 and (28%) of grade3 participating contractors perform planning for every project irrespective of cost and time and 1 projects awarded regardless the time or the cost thresholds as shown in figure 4.5. This indicates that the major ratio of contractors appreciate and pay serious attention to the planning phase due to its' impact over the project lifecycle and they believe that it is essential and should be performed for every project irrespective of time or cost limits. The remaining participating contractors of grade 3 (72%) do planning only for projects with cost exceeding certain threshold value. It seems that most of these contractors pay more attention toward the project' cost rather than other project parameters and they believe that the planning practices are essential to be performed only in this type of projects.

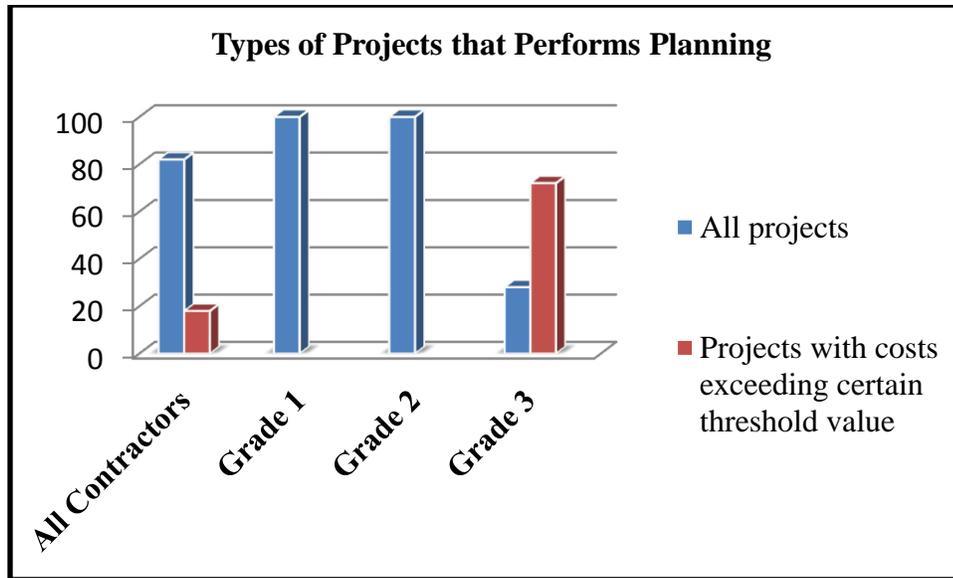


Figure 4.5 Types of Projects that Performs Planning

4.5.1 Planning Commencement Time

The results indicated that (81%) of grade 1, (69%) of grade 2 and (60%) of grade 3 participating contractors start planning for a project at the same time they decide to bid for that project as shown below in table 4.19. This indicates that the major ratio of the contractors are well comprehend and understand the value of the planning phase from the beginning, and they start it as early as possible to help them in establishing and setting competitive project schedules and project prices. The remaining participating contractors from all classification reported that they start planning for a project after awarding contract of project. It seems that most of these contractors do not need to plan for a project at the same time for preparing the bill of quantity (BOQ) for that project.

Table 4.19 Planning Commencement Time

Commencement Time	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
At the decision to bid	72	81	69	60
At the award of a contract	28	19	31	40

4.5.2 Personnel Involved in the Planning Process

The results indicated that the most involved person in the planning process for a project is the planner, followed by the potential project manager for that project. It seems that most of the participating contractors know and perceive the critical and an effective role of the planner in setting a project plans in an efficient and accurate ways due to his good experience, skills, qualifications and sufficient knowledge in the planning aspects. Also, most of the participating contractors from all classification believed strongly that the potential project manager should be involved in the planning process for a project. It may refer because of his sufficient experience and knowledge in the practical field, which in turn will enable the planning team to exchange the knowledge and experience and to remove any ambiguity and realizing the information during the planning phase. Other persons are figured out by the participating contractors to be involved in the planning process for a project like scheduler, material manager and cost estimator. This indicate that the participating contractors believed that the aforementioned persons are important and should be involved during the planning process due to their function in emphasizing and pushing the planning process in the right way.

The distribution of the persons that should be involved in the planning process among the participating contractors is presented in table 4.20 below.

Table 4.20 Personnel Involved in the Planning Process

Personnel involved	All Contractors (%)	Grade 1 (%)	Grade 2 (%)	Grade 3 (%)
Planner	68	93	68	32
Potential project manager	75	59	87	88
Cost estimator	36	37	38	32
Scheduler	39	51	50	16
Material manager	21	37	16	0

4.5.3 Planning Inputs

Collecting requirements to facilitate and develop project plans are considered as the initial stage of the planning process and it is defined as the process of determining, documenting, and managing stakeholder needs. The key benefit of this process is that it provides the basis for defining and managing the project scope including product scope. The literature review, especially project management institute (PMI) has addressed many parameters, factors and inputs that should be taken into consideration during the planning process without any order or prioritization for these parameters in term of importance. However, it was noted from the results that the participating contractors (in each grade) prioritize the parameters that should be considered during the planning process in term of importance. This indicates that the participating contractors differentiate between these parameters depending on their impacts on the planning phase and on the entire project life cycle.

In this section importance of the different planning inputs by all the participating contractors and by each grade of contractor are separately analyzed and discussed. The results acquired for each input are discussed in detail below.

The results indicated that the participating contractors consider contract documents as a highly important planning input while available resources, project variables, technical requirements, delivery methods, productivity data, construction methods, type of contracts, government requirements, and type of stakeholders are considered as important planning inputs, also value engineering and weather data are considered as planning inputs of moderate important and each of these inputs is discussed in more detail below.

Table 4.21 Planning Inputs

Inputs	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Contract documents	1.29	1.27	1.33	1.28
Available resources (materials, human resources, equipment...etc.)	1.54	1.36	1.64	1.71
Project variables (size, type, location, duration...etc.)	1.57	1.50	1.44	1.86
Technical requirements	1.75	1.83	1.78	1.57
Delivery methods	1.93	1.91	1.90	2
Productivity data	1.93	1.92	1.78	2.14
Construction methods	1.93	1.48	2.25	2.29
Type of contracts	2.04	2.05	1.99	2.08
Government requirements	2.04	1.92	1.89	2.43
Type of stakeholders	2.21	2.5	1.67	2.43
Value engineering	2.57	2.17	2.77	3
Weather data	3.04	2.92	3	3.29
Note: 1=High important, 5=Not important.				

The results indicated that the participating contractors have been considered **Contract documents** as a highly important planning input as shown above in table 4.21. This shows that the participating contractors are seriously concerned to consider the contract document during the planning process. The contract documents are one of the most important pieces that will guarantee a successful project and they are defined as documents comprising a construction contract. The most common documents that must form part of every construction contract are agreement, plans, drawings, specifications, bill of quantities, special and general conditions, modifications, and changes. These

documents will help the contractors to identify the scope of work very well and to ensure that the project includes all the work required, and only the work required, to complete the project with minimum cost, time, and desired quality. Also, the contract documents consider as a base for contractors to calculate their cost. If there is misinterpretation of these documents then there is high probability of rework and change order which will result in changing the project cost and the project schedule which not only costs to the owner but also to the contractor as most of the contractors utilize their resources on more than one project.

The results indicated that the participating contractors have been considered **Available resources** as an important planning input. More specifically, grade 1 contractors consider it as a highly important planning input while grade 2 and 3 contractors consider it as important planning input as shown above in table 4.21. Resources are critical to the planning effort and, if not fully considered, may result in adverse impact to the project. Considering available resources such as labours, material and equipment during the planning process will help the contractors to identify the required resources to accomplish a specified work during the life cycle of a project which will enable them to calculate the required duration and cost for each activity in the project and as result for the entire project. Also, considering available resources will let the contractors to plan for constrains that may arise during the life cycle of the project. **Project variables** have been considered as an important planning input by the participating contractors.

Precisely, it has been considered as a highly important planning input by grade 1 and 2 contractors while grade 3 contractors consider it as important planning input as shown above in table 4.21. A project variable is an event, element, or feature that will have an

impact on the project plan. It can have a positive or negative effect on the project. Considering project variables like project size and type, physical environment, contractor methods, financial and economic considerations, labour agreements, and delivery methods mainly support contractors to understand and grasp the general scope of project which will aid them to identify the scope of work. Also, it enables them to investigate the potential risks, obstacles, and problems that may appear during execution phase thus making the contractors to take more precautions in order to avoid losses and delays. As the planning process proceeds, the nature of the variables may change. Therefore, when a variable changes, planning dynamics change and must be re-evaluated. Some variables are not reconcilable in the best interest of all stakeholders, thus resulting in potential unresolved conflict. **Technical requirements, Delivery method, Productivity Data and Type of Contracts** have been considered as an important planning input by the participating contractors as shown above in table 4.21. It seems that the participating contractors consider these inputs as important parameters to be considered due to their vital effects during planning phase. For example, understanding the **technical requirements** for each activity in the project will help the contractors to distinguish between the activities in term of time, cost, required resources and risks. Clear example on this situation, construct foundation or column are different from planning aspects due to their different technical requirement, even these activities have alike characteristics such quantity or material. Also, it seems that the participating contractors value the critical role of **delivery method** in specifying the entire planning process for a project, because each delivery method has different associated risks, procurement procedures, roles, responsibilities and construction method. In speaking of

productivity data, the participating contractors believed that it is important to consider this type of data when they do project planning. It is defined as a technique that measures the time and number of people it takes to produce a good or deliver a service. Hence, if the contractors understand the role of productivity data in predicting the production rate of the resources such as labours and equipment during the life cycle of the project, this will help them to estimate the resources that required to accomplish a specific work which will lead them to calculate the project duration and cost precisely. Contractors reported that the **type of contract** is also an important parameter to be considered when they do project planning as shown above in table 4.21. It seems that most of these contractors differentiate between different types of contract from planning aspects and they understand the relation between the type of contract and risk allocation, i.e. each type of contract has different amount of risk for example, if the contract is lump sum then the contractor is fully responsible to plan for all risks are allocated to that project. By contrast, if the contract is cost plus then the owner is in charge of all risks allocated. Hence, the type of the contract should be known and well understood to specify the most suitable and efficient planning process. **Construction method** has been considered as important planning input by the participating contractors. In detail, grade 1 contractors consider it as a highly important planning input while grade 2 and 3 contractors consider it as important planning input as shown above in table 4.21. It seems that the participating contractors (especially grade 1 contractors) understand the purpose and effect of constructability analysis on project planning. Constructability is defined to be the optimum use of construction knowledge and experience in planning, engineering, procurement, and field operations to achieve overall project objectives. It

should begin during initial planning phases and continue throughout the entire planning cycle and into the execution phase of the project. Constructability analysis during the planning process examines the methods and cost of installed equipment and materials, technology, site conditions, resources, and related infrastructure. The benefit of the constructability analysis process is to reduce both time and cost impact to project. It is often done throughout the life cycle of a project in order to optimize cost, plan, and schedule while mitigating risk. It is most critical during the earliest stages of the project. The results indicated also that the participating contractors have been considered **Government requirements** as important planning input. Minutely, grade 1 and 2 contractors consider it as important planning input while grade 3 contractors consider it as moderately important planning input as shown above in table 4.21. Contractors believe that the government requirements such as safety issues and permits will effect on the project plan either in term of cost or time, i.e. contractors will consider the required cost and time for each activity that needs these requirements or for the entire project cost and schedule and thus ensuring the accurate estimation of the project cost and time which will effect positively on the project success. Also, considering government requirements during the planning phase means that the contractors are aware to get the required approvals from government agencies as soon as possible and prepare project documents effectively and efficiently. **Identification of stakeholders** has been considered as important planning input by the participating contractors. In particular, grade 1 and 3 contractors consider it as moderately important planning input while grade 2 contractors consider it as important planning input as shown above in table 4.21. It seems that the participating contractors understand the key benefits of this

parameter, i.e. stakeholders have an influence throughout the life cycle of the project whether on a positive or negative way, and specifically on the outcome of planning process, as a result they will determine the success or the failure of the planning process. Hence, the contractor should be able to understand how the goals and objectives of different stakeholders affect the planning process and schedule development. **Value engineering** has been considered as moderately important planning input by the participating contractors. More specifically, it has been considered as moderately important planning input by grade 2 and 3 contractors while grade 1 contractors consider it as important planning input as shown above in table 4.21. This shows that the contractors understand the concept of value engineering and its impact on cost, schedule, and quality of materials and equipment during the planning process. Value engineering is a strategic planning process occurs during design phase and lasts through project life cycle, it is related to provide functional and project alternatives. In its relationship to the planning process, value engineering must consider all stakeholders' needs and requirements, prioritize required functions, and evaluate their cost and schedule impact. It will optimize life cycle performance by guiding selection of materials and installed equipment to maximize their functionality and quality while minimizing their costs .Finally in regard to the planning inputs, the participating contractors have been considered **Weather data** as moderately important planning input as shown above in table 4.21. Considering weather data during the planning phase will help the contractors in preparing more reliable, flexible, and effective project schedule by taking into consideration all weather conditions that may appear during the project

life cycle which may have an adverse impact on the work progress. Also, it will aid them to plan for contingency and to prepare alternative plans.

4.5.4 Planning Procedures

In this section, importance of different planning procedures by all the participating contractors and by each grade of contractor are separately analyzed and discussed. All the procedures were categorized into 7 groups including scope, time, human resources, cost, quality, risk management and procurement based on their order and sequence. The results acquired for each of the group are discussed in detail below.

Table 4.22 Planning Procedures

Knowledge Area	Procedures	Overall Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Time	Activity definition	1.46	1.40	1.56	1.43
	Long lead items	1.53	1.50	1.44	1.69
	Activity duration estimating	1.57	1.33	1.44	2.14
	Activity sequencing	1.57	1.58	1.44	1.71
	Schedule development	1.68	1.67	1.67	1.71
	Activity resources estimating	1.79	1.77	1.78	1.87
	Schedule controlling	1.82	1.70	1.73	2.14
	Resource Levelling	1.95	1.85	1.86	2.24
Scope	Scope of work definition	1.46	1.14	1.56	1.88
	Project plan definition	1.75	1.83	1.56	2
	Work breakdown structure	1.75	1.70	1.78	1.80
	Project goals definition	1.79	1.75	1.67	1.86

	Phase definition	2.07	2	2	2.29
Human resources	Human resources planning	1.82	1.79	1.83	1.86
Cost	Cost controlling	1.75	1.59	1.66	2.14
	Cost estimates development	1.82	1.74	1.68	2.14
	Budget determining	1.93	1.83	1.89	2.14
Risk management	Risk management planning	1.96	1.92	2	1.98
Quality	Quality planning	2.00	1.85	1.86	2.51
Procurement	Procurement planning	2.11	2.07	2.11	2.18
Communications	Communications planning	2.50	2.43	2.42	2.71
Note: 1=High important, 5=Not important.					

➤ **Scope Planning**

Scope planning includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Planning the project scope is primarily concerned with defining and controlling what is and is not included in the project. This group consists of 5 planning procedures. The results indicated that the participating contractors consider scope of work definition as a highly important planning procedure while project plan definition, work breakdown structure, project goals definition, and phase definition are considered as important planning procedures and each of these procedures is discussed in more detail below.

The result indicated that **Scope of work definition** has been considered as a highly important planning procedure by the participating contractors. More specifically, grade 1 contractors consider it as a highly important planning procedure while grade 2 and 3 contractors consider it as an important procedure as shown above in table 4.22 .This shows that the contractors in Saudi Arabia are concern to perform the scope of work

definition during planning process which mainly developing a detailed description of the work. This procedure will help the contractors in describing the project by defining which of the requirements collected will be included in and excluded from the project scope. This result supported by the results of Zwikael (2009) and Zwikael et al (2005) in which the scope definition has been ranked as one of the most important procedure that contractor perform during the planning process. The result indicated also that **Project goals definition** has been considered as an important planning procedure by the entire grade 1, 2 and 3 contractors as shown above in table 4.22. Every project must have established achievable goals in order to be successful. This procedure will aid the contractors in identifying, reviewing and recommending incremental goals upon which stakeholders act because the contract may only represent definable and achievable goals. **Work breakdown structure (WBS)** has been considered as an important planning procedure by the participating contractors as shown above in table 4.22. This indicates that the contractors in Saudi Arabia are seriously worry to establish the work breakdown structure during planning process because it provides a structured and organized vision of what has to be produced and delivered during project lifecycle, i.e. it divide and slices the scope of work into tractable and manageable parts that match to milestones or phases of project. It has been noted from the results that there is no consensus about the method which followed by the participating contractors to prepare the Work breakdown structure. The results indicated that (33%) of grade 1, (75%) of grade 2 and (60%) of grade 3 of the participating contractors are using established templates to prepare the wok breakdown structure for their projects. It looks that most of these contractors created these templates over the life of their organization .Also, the results indicated that (60%) of grade 1 and

(9%) of grade 2 of the participating contractors are preparing the work breakdown structure for their projects according to the Construction Specification Institute (CSI) formats. It seems that the most of these contractors follow the (CSI) because their projects' categories, specification and classification are established according to these formats. Finally, the results indicated that the rest of the participating contractors are using their own formats to prepare the work breakdown structure for their projects. This indicates that most of these contractors have no restrictions or requirements from their clients on the method that used in preparing the work breakdown structure for their projects. **Phase definition** has been considered also as an important planning procedure by the entire grade 1, 2 and 3 contractors as shown above in table 4.22. Phase definition is the initial identification and outlining of phase relationship and sequence planning, as defined by the scope of work. Furthermore, since planning is an iterative and phased process, the scope definition will improve over time. Phase definition can permit the initial development of cost estimates and control level schedules, and risks can be determined and analyzed for each phase. Finally regarding scope planning, **Project plan definition** has been considered as an important planning procedure by the participating contractors as shown above in table 4.22. This result supported by the results of Zwikael (2009), Zwikael and Globerson (2004) and Zwikael and et al (2005) in which the project plan definition has been ranked as an important procedure that contractor perform during planning process.

➤ **Time Planning**

Time planning includes the processes required to manage the timely completion of the project. It has the most significant influence on the project success measures which

includes cost overrun, schedule overrun, customer satisfaction and technical performances. The results indicated that the participating contractors have been considered that time planning procedure as an important planning procedure as shown above in table 4.22. This result is supported by the results of Zwikael (2009), Zwikael and Globerson (2004) and Zwikael and Globerson (2006) in which the project time planning has been ranked as the most important planning procedure. This group consists of 8 planning procedures. The results indicated that the participating contractors consider activity definition as a highly important planning procedure while long lead item, activity sequencing, activity duration estimating, activity resources estimating, resource levelling, schedule development and schedule controlling are considered as important planning procedures and each of these procedures is discussed in more detail below.

Activity definition has been considered as a highly important procedure by grade 1 and 3 contractors while grade 2 contractors consider it as an important procedure as shown above in table 4.22. It seems that most of these contractors perceive the key benefit of this procedure as it breaks down the work packages into activities which provide a basis for estimating, scheduling, executing, monitoring, and controlling the project. This result supported by the results of Zwikael (2009), Zwikael and Globerson (2006) and Zwikael et al (2005) in which the activity definition has been ranked as one of the most important procedure that contractor perform during planning process. **Long lead item** has been considered as important planning procedure by the participating contractors. In particular, grade 2 contractors consider it as a highly important procedure while grade 1 and 3 contractors consider it as an important procedure as shown above in table 4.22. Long lead items are those construction equipment or materials that need to be procured and whose

procurement lead time which includes design, fabrication and delivery will lead to a delivery date on site that will impact negatively the completion dates of the project. It looks that the contractors in Saudi Arabia are more afraid of long lead item which usually delay the completion of project if it is not well defined during the planning process. **Activity sequencing** is the process of identifying and documenting relationships among the project activities. It has been considered as important planning procedure by the participating contractors. In detail, grade 2 contractors consider it as a highly important procedure while grade 1 and 3 contractors consider it as an important procedure as shown above in table 4.22. It seems that the participating contractors understand the key benefit of this process which is defining the logical sequence of work to obtain the greatest efficiency given all project constraints. This result supported by the results of Zwikael (2009), Zwikael and Globerson (2006) and Zwikael et al (2005) in which the activity sequencing has been ranked as an important procedure that contractor perform during planning process. **Activity resources estimating** is the process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity. It has been considered as an important planning procedure by the entire grade 1, 2 and 3 contractors as shown above in table 4.22. The key benefit of this process is identifying the type, quantity, and characteristics of resources required to complete the activity which allows more accurate cost and duration estimates, and this will contribute positively on the project success and avoid any loss or delay. **Resource levelling** is a technique in which start and finish dates are adjusted based on resource constraints with the goal of balancing demand for resources with the available supply. Resource levelling can be used when shared or critically required resources are

only available at certain times, or in limited quantities, or over-allocated, such as when a resource has been assigned to two or more activities during the same time period .It has been considered as an important planning procedure by the participating contractors as shown above in table 4.22 in Saudi Arabia. It seems that the participating contractors are worry to consider resource levelling step during the planning process due to their function in providing the minimum fluctuation of the resources usage during the project life cycle i.e. keep resource usage at a constant level over the project lifecycle. It has been understood from the results that there is no restrictions or requirements from the clients on the method that used in preparing the resource levelling for their projects.

Resource levelling can often cause the original critical path to change, usually to increase.

Activity duration estimating is the process of estimating the number of work periods needed to complete individual activities with estimated resources. It was noted from the result that the participating contractors has been considered this procedure as important planning step. Precisely, grade 1 and 2 contractors consider it as a highly important planning procedure while grade 3 contractors consider it as an important procedure as shown above in table 4.22.This indicates that the participating contractors pay high attention toward this process because it provides the amount of time each activity will take to complete, which is a major input into the develop schedule process. This will be reflected on the project success like schedule overrun. This result supported by the results of Zwikael (2009), Zwikael and Globerson (2006) and Zwikael et al (2005) in which the activity duration estimating has been ranked as an important procedure that contractor perform during planning process. Finally in regard to time planning steps, **Schedule**

development and schedule controlling have been considered as important planning procedures by the entire grade 1, 2 and 3 contractors as shown above in table 4.22.

Develop schedule is the process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model while control schedule is the process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan. It looks that the participating contractors understand the key benefits of these processes as they are:

- 1) Generate a schedule model with planned dates for completing project activities.
- 2) Provide the means to recognize the deviation from the plan.
- 3) Take corrective and preventive actions and thus minimize risk.

➤ **Cost Planning**

Project cost planning includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget. This group consists of 3 planning procedures. The results indicated that the participating contractors consider cost estimates development, budget determining and cost controlling as an important planning procedures and each of these procedures is discussed in detail below.

Cost estimates development is the process of developing an approximation of the monetary resources needed to complete project activities .It has been considered as an important planning procedure by the participating contractors as shown above in table 4.22. This indicates that the participating contractors understand the benefit of this process as it determines the amount of cost required to complete project work. There are variations in the importance among other authors as Zwikael (2009) has found it to be

important procedure while Zwikael and Globerson (2006) , and Zwikael et al (2005) have found that cost estimating procedure are considered a moderate important procedure.

Budget determining is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline. It has been considered also as an important planning procedure by the entire grade 1, 2 and 3 contractors as shown above in table 4.22. Zwikael (2009) has supported this result and ranked this procedure with important, while, Zwikael and Globerson (2006), and Zwikael et al (2005) have said that the contractors consider this procedure as moderate important planning procedure. The key benefit of this process is that it determines the cost baseline against which project performance can be monitored and controlled. Finally in regard to cost planning steps, the results indicated that the participating contractors have been considered **Cost controlling** as an important planning procedure as shown above in table 4.22. Cost controlling furnish the means to recognize difference from the budgeted in order to take corrective action and minimize risk, to monitor the status of the project and to update the project costs, and managing changes to the cost baseline, which effectively impact on the aspects of project success like cost overrun. Other functions for cost controlling during the planning process are:

- Influencing the factors that create changes to the authorized cost baseline.
- Ensuring that all change requests are acted on in a timely manner.
- Managing the actual changes when and as they occur.
- Ensuring that cost expenditures do not exceed the authorized funding by period, by WBS component, by activity, and in total for the project.

- Monitoring cost performance to isolate and understand variances from the approved cost baseline.
- Monitoring work performance against funds expended;
- Preventing unapproved changes from being included in the reported cost or resource usage;
- Informing appropriate stakeholders of all approved changes and associated cost; and
- Bringing expected cost overruns within acceptable limits

➤ **Quality Planning**

Project quality planning is the process of identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will demonstrate compliance with quality requirements. The results indicated that the participating contractors have been considered it as an important planning procedure. More specifically, it has been considered as an important planning procedure by the grade 1, 2 contractors while grade 3 contractors consider it as a moderately important procedure during the planning process as shown above in table 4.22. Zwikael (2009) has supported this result and ranked this procedure with important, while, Zwikael and Globerson (2004), Zwikael and Globerson (2006) and Zwikael et al (2005) have said that the contractors consider this procedure as moderate important. This indicates that the participating contractors do not compromise on the quality for their product, due to its' impact on the safety issues. Also, it seems that most of these contractors are willing to trade cost and time measures, with higher quality of the final product. Furthermore, they

grasp that the failure to meet the quality requirements can have serious, negative consequences for any or all of the project's stakeholders. For example:

- Matching customer needs by overworking the project team may lead to decrease profits and increase project risks, employee exhaustion, errors, or rework.
- Matching project schedule objectives by rushing planned quality inspections may result in undetected errors, decreased profits, and increased post implementation risks.

➤ **Human Resource Planning**

Human resource planning is the process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan. The results indicated that the participating contractors have been considered human resource planning as an important planning procedure as shown above in table 4.22. This result is supported by the results of Zwikael (2009), Zwikael and Globerson (2004), Zwikael and Globerson (2006) and Zwikael et al (2005) in which the human resource planning has been ranked as an important planning procedure. This procedure will help the contractors to establish project roles and responsibilities, project organization charts, and the staffing management plan including the timetable for staff acquisition and release, identification of training needs, plans for recognition and rewards programs, compliance considerations, safety issues and the impact of the staffing management plan on the organization.

➤ **Communications Planning**

Communications planning is the process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements,

and available organizational assets. The results indicated that the participating contractors have been considered it as a moderately important planning procedure. In particular, it has been considered as an important planning procedure by grade 1 and 2 contractors while grade 3 of the participating contractors consider it as a moderately important planning procedure that should be performed during planning process for a project as shown above in table 4.22. This result was confirmed by the results of Zwikael (2009), Zwikael and Globerson (2004), Zwikael et.al (2005) ,Zwikael and Globerson (2005) in which the communication planning has been ranked as the least important planning procedure .This indicates that the major ratio of the participating contractors perform the communication planning in early stages such as during project management plan development. This allows appropriate resources, such as time and budget, to be allocated to communication activities, which means that the information is provided in the right format, at the right time, to the right audience, and with the right impact.

➤ **Risk Management Planning**

Risk management planning is the process of defining how to conduct risk management activities for a project. The results indicated that the participating contractors have been considered as an important planning procedure as shown above in table 4.22. Zwikael (2009) has supported this result and ranked this procedure with important, while, Zwikael and Globerson (2004), Zwikael and Globerson (2006) and Zwikael et al (2005) have said that the contractors consider this procedure as moderate important. This indicates that the participating contractors perceive risk as the effect of uncertainty on projects and organizational objectives. Therefore, they perform the risk management planning step during the planning process to ensure that the degree, type, and visibility of risk

management are commensurate with both the risks and the importance of the project to the organization and to ensure that the risk management process is supported and performed effectively over the project life cycle.

➤ **Procurement Planning**

Procurement planning is the process of documenting project procurement decisions, specifying the approach, identifying and evaluating potential sellers, evaluating the risks involved with each make and reviewing the type of contract planned to be used with respect to avoiding or mitigating risks. It has been considered as an important planning procedure by the entire grade 1, 2 and 3 contractors as shown above in table 4.22. This result was supported by the result of Zwikael (2009) in which the procurement planning procedure was coming after the quality planning procedure in term of importance.

Procurement planning will let the contractors to determine whether to acquire outside support, and if so, what to acquire, how to acquire it, how much is needed, and when to acquire it.

In general, the results indicated that the conceptual planning procedures like risk management, communication and procurement procedures have lower level of importance than the core planning procedures like cost, time, scope and human resource by the participating contractors. This result was confirmed by the result of Zwikael and Globerson (2006). This may refer because of these procedures are not required as inputs for formal tools such as software packages. Another possible reason may be due to the lack of a relatively simple formal template to aid in implementing these procedures.

4.5.5 Planning Evaluation

This section presents the evaluation of the planning procedures which the participating contractors perform, focused on the second objective of the study, i.e. .evaluate the current planning procedures which are followed by contractors in Eastern Province of Saudi Arabia. The results acquired by all the participating contractors and by each grade of contractor are separately analyzed and discussed in detail below.

The results indicated that the participating contractors express many reasons for their satisfaction level on the planning procedures which they perform with different level of agreement. The distribution of the level and the reasons of satisfaction on the planning procedures which the participating contractors perform are presented in table 4.23 below.

Table 4.23 Level and Reasons of satisfaction on planning procedures

Level	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Level of satisfaction	2.46	2.20	2.54	2.80
Note: 1= Extremely Satisfied, 5= Not Satisfied				
Reasons for Satisfaction	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Strong communication between site and head office	1.79	1.67	1.72	2.08
Effective coordination among involved parties	1.79	1.67	2.01	1.71
On time delivery of materials	1.89	1.82	1.78	2.15
Corrective actions are effective	1.96	1.89	2.07	1.94
Projects are executed smoothly	2.14	2.16	1.89	2.42
Problems are identified before they occur	2.29	2.33	2	2.57
Smooth flow of equipment resources	2.32	1.93	2.38	2.92
Stakeholders satisfaction	2.46	2.29	2.61	2.56

Actual projects duration exceed planned duration	2.54	2.50	2.33	2.86
Smooth flow of human resources	2.57	2.42	2.54	2.86
Actual costs exceed budgeted costs	2.75	2.67	2.69	2.96
Note: 1=Strongly agree, 5= Strongly disagree.				

It is very important to refer that the satisfaction level in each grade of the participating contractors was approximately the same. It seems that most of these contractors express convergent satisfaction level due to its' similar impacts on the project success aspects such as schedule overrun, cost overrun, technical performance and customer satisfaction. The satisfaction level of the participating contractors depends on many reasons which effectively impact on the entire project success' aspects like schedule overrun and cost overrun. It should be noted that the participating contractors don't distribute their efforts according to the potential impact that each planning procedure may have on the project success. This finding is confirmed by Zwikael and Globerson (2006).

The results indicated that the grade 1 participating contractors are highly satisfied about the planning procedures which they perform while grade 2 and 3 of the participating contractors are satisfied about the planning procedures which they perform. Also, the results indicated that the participating contractors especially grade 3 contractors have not been strongly disagree that cost and schedule overruns are the main factors for their satisfaction level about the planning procedures they perform. It seems that most of these contractors are more afraid of the technical project performance rather than cost or schedule overruns and they attain their strength from technological innovation and leadership. Also it indicates that the clients of their projects are not very firm in delaying the project's completion and spending over-budget, in some cases it improves the

technical performance. This result is supported by the result of Zwikael et.al (2005), and Zwikael and Globerson (2006). Moreover, the project managers tend to overestimate the importance of some planning procedures and spend too much effort in executing them, while in other critical procedures, they tend to spend too little effort because they tend to execute easier processes more frequently, although they have a lower impact on project success, i.e. project managers tend to spend more time on planning processes of a technical nature, since they are easy to perform. However, some of these procedures do not contribute as much to project success as the ones that require a more conceptual treatment. This exceeding in cost and time than expected or original may derive that the contractors believe that the planning procedures are important and had great impacts on project success but they lack for enough skills, qualifications, nature of the tools, poor control, or over-ambitious commitments to the customer which prevent them to perform these procedures in a proper way. (Zwikael, 2009)

Although the participating contractors in Saudi Arabia are considering the human resources planning and resource levelling as important planning procedures that should be performed during the planning process, the results indicated that the participating contractors in all grades have not been strongly agreed that the smooth flow of human resources and equipment are the main reasons for their expressed satisfaction level about the planning procedures they perform. This shows that the efforts consumed by the human resource planning and resource levelling over the life cycle of the project are not aligned with the relatively poor smooth flow of human resources and equipment, i.e. too much relative energy is consumed by these processes compared to their low impact on project success. This indicates that the project managers and the planning team may not

take into consideration that the amount of resources required for an activity will be changed frequently during execution phase, making the first estimation less valid. Also, it may be referring to the changes and alterations that committed by the customer over the life cycle of the project which making the smooth flow of resources not possible.

The results indicated that the participating contractors have been agreed that the strong communication between site and head office, and effective coordination among involved parties are considered the main reasons for their expressed satisfaction level about the planning procedures they perform. This indicates that they have a very well communication and coordination skills which enable them to contact correctly with different entities over the life cycle of the project and they perceive the impact of these skills on the project success.

The results also indicated that the participating contractors have been agreed that on time delivery of materials is considered as a reason for their expressed satisfaction level about the planning procedures they perform. This shows that the contractors value the procurement planning procedure and pay high attention in regards to long lead items during planning process by determining whether to acquire outside support, and if so, what to acquire, how to acquire it, how much is needed, and when to acquire it.

The results indicated that the participating contractors have been agreed that the effective corrective actions are considered as a reason for their expressed satisfaction level about their planning procedures. This shows that most of these contractors are very well organized and have a good decision making skills that enabling the corrective actions over the life cycle of the project to be effective.

The results indicated that the participating contractors have been agreed that the smoothly executed projects are considered as a reason for their expressed satisfaction level about their planning procedures. This may be referring due to the smooth flow of resources, effective correction actions and the problems are identified before they occurred over the life cycle of the project. Also, it seems that the good communication and coordination skills among the project team help them to execute the projects smoothly and to avoid obstacles and potential problems.

The results indicated that grade 1 and 2 participating contractors have been agreed that the identification of the problems before they occur is considered as a reason for their expressed satisfaction level about the planning procedures they perform while grade 3 participating contractors have been neutral that this factor is considered as a reason for their expressed satisfaction level about their planning procedures .It seems that most of these contractors perceive the importance of risk management planning during planning process by performing plans to response the problems before they occurred or by assigning a contingency reserve to deal with these problems. Also, this indicates that these contractors have sufficient experience and knowledge to predict the potential problems over the life cycle of the project before they occurred.

The results indicated that grade 1 of the participating contractors have been agreed that the stockholders satisfaction is considered as a reason for their expressed satisfaction level about the planning procedures while grade 2 and 3 of the participating contractors have been neutral about this factor. These different levels of agreement about the customer satisfaction to be a reason for contractors' satisfaction about the planning procedures they perform is coming as results from other reasons which impact on the

project success, such as cost and schedule overruns since the customer is the one who is affected by the project duration and project cost.

It is very important to be noted that the participating contractors are mainly agreed on the reasons for their satisfaction level about the planning procedures which they perform except for schedule overrun and cost overrun. It seems that the contractors still differ about the priority of project success, i.e. some contractors prioritize customer satisfaction and project performance on the schedule and cost overruns and vice versa.

4.6 Characteristics of the Planner

This section presents the parameters like qualifications and skills which the participating contractors consider to be found in the planner for construction projects. It also presents how much the participating contractors are satisfied about their planner depending on many reasons.

4.6.1 Planners' parameters

The literature review especially PMI (2013) has addressed many parameters such as skills, inputs and qualifications that should be found in the planner for construction project without any order or prioritization in term of importance. However, the results indicated that the participating contractors (in all grades) consider many qualifications and skills that should be found in the planner with different level of importance. This indicates that the participating contractors differentiate between the importance of these parameters either qualifications or skills depending on their roles in developing the planner' performance and efficiency during the planning phase and over the life cycle of the project.

In this section, importance of different construction planner' parameters like qualifications and skills by all the participating contractors and by each grade of contractor are separately analyzed and discussed. The results acquired for each parameter are discussed in detail below.

✓ **Qualifications**

The results indicated that the participating contractors consider experience in planning and experience in construction work as highly important qualifications that should be found in construction planners while software knowledge, educational degree, training in planning, knowledge in economy and certification are considered as important qualifications that should be found in construction planner and each of these qualifications is discussed in detail below.

Table 4.24 Planner Qualifications

Qualifications	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Experience in planning	1.25	1.14	1.16	1.55
Experience in construction work	1.39	1.32	1.34	1.57
Software Knowledge (Primavera, MS project, etc.)	1.64	1.58	1.67	1.71
Educational degree	1.67	1.83	1.67	2
Training in planning	1.96	1.9	1.78	2.29
Knowledge in Economy	2.11	2.25	2	2
Certification	2.36	2.29	2.12	2.79
Note: 1=High important, 5=Not important.				

Experience in planning and **experience in construction work** have been considered as highly important qualifications by the participating contractors. More specifically, grade 1 and 2 consider them as highly important qualifications while grade 3 contractors

consider them as important qualifications that should be found in the planner as shown above in table 4.24. This shows that the participating contractors value and pay high attention to these qualifications to be found in their planners which mainly improve their performance and efficiency during the planning phase and over the project life cycle. This is may be because of the increment in the planning experience and in the construction work indicate that the planner is aware of the methods, procedures and practices that the organization carries to plan for a project and he has a sufficient experience in different planning stages, like resources levelling and work breakdown structure. This will enable him to apply and perform different scenarios, alternatives and solutions on the project plans and select the best of these alternatives which greatly improve the project success' aspects such as project schedule and project cost. Also, it seems that the participating contractors perceive that the sufficient experience for the planner either in the planning field or in the construction sector indicate that he was exposed for many problems and obstacles in these fields, which enforce him to acquire the solutions for these problems. This situation can, in effect, reduce the changes on the original plans and make the correction actions effective.

The results indicated also that the participating contractors consider **software knowledge, educational degree, training in planning and knowledge in economy** as important qualifications as shown above in table 4.24. This indicates that the contractors in Saudi Arabia understand the key benefits of obtaining these qualifications by their planners because it will enrich them by valuable information to do their jobs in a proper and effective way. For example, by knowing planning softwares like Primavera and MS project which used to facilitate the project plans, the contractors will be able to get their

advanced abilities and features in developing and improving the planning process for a project in many fields like time, cost and human resources planning .This will effect greatly in the project success such as schedule and cost overruns. Also, frequently courses and training in the planning field will help the planners to keep pace with any updated information in the planning aspects which could be used to improve their projects. Moreover, the planner' educational level and knowledge in economy will refer to his academic background and knowledge and any improvement in these factors will enable and qualify him to understand the planning process in a proper and effective way thus ensuring the quality of the process over the project life cycle.

Certification has been considered as important qualification by the participating contractors. In particular, grade 1 and 2 contractors consider it as important qualification while grade 3 contractors consider it as a moderately important qualification that should be found in the planner as shown above in table 4.24. It seems that the contractors in Saudi Arabia don't highly concern to consider the certification as a main qualification that should be found in the construction planner in comparing with other qualifications. This is may be refer to the nature of their projects which don't really need for a highly certified planner.

✓ **Skills**

The results indicated that the participating contractors consider that skills of communication, decision making, coordination, problem solving, analytical, computer, critical thinking, forecasting, influencing, management, leadership, presentation, teamwork and teambuilding, negotiation, research and Investigation as important skills

that should be found in construction planners and each of these skills is discussed in detail below.

Table 4.25 Planner Skills

Skills	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Communication skills	1.59	1.49	1.54	1.83
Decision making skills	1.63	1.58	1.36	1.80
Coordination skills	1.68	1.50	1.56	2.14
Problem solving skills	1.71	1.44	2.18	1.57
Analytical skills	1.71	1.83	1.22	2.14
Computer skills	1.71	1.56	1.91	1.71
Critical thinking skills	1.82	1.80	1.86	1.80
Forecasting skills	1.86	1.92	1.44	2.29
Influencing skills	1.86	1.92	1.56	2.14
Management skills	1.86	1.72	1.83	2.14
Leadership skills	1.93	1.83	1.89	2.14
Technical skills	1.96	1.90	1.90	2.14
Presentation skills	2.04	1.92	1.89	2.43
Teamwork and Teambuilding skills	2.04	1.95	1.96	2.29
Negotiation skills	2.14	1.83	2.22	2.57
Research and Investigation skills	2.18	2.17	1.89	2.57
Note: 1=High important, 5=Not important.				

Communication has been considered as an important skill by the participating contractors. Minutely, grade 1 consider it as highly important skill while grade 2 and 3 contractors consider it as important skill that should be found in the planner as shown

above in table 4.25. This result is supported by the results of Connie & Ethan (1999), and Winch & John (2005) in which the communication skill has been recognized as one of the single biggest reasons for project success or failure. This indicates that the contractors grasp that the effective communication not only in the planner also within the project team and between the project manager, team members, and all external stakeholders is essential. Also, it seems that they know that the openness in communication is a gateway to teamwork and high performance because it improves relationships among project team members and creates mutual trust. To communicate effectively, the planner should be aware of the communication styles of other parties, cultural norms, relationships, personalities, and the overall context of the situation. Awareness of these factors leads to mutual understanding and thus to effective communication. Planners should identify various communication channels, understand what information they need to provide, what information they need to receive, and which interpersonal skills will help them communicate effectively with various project stakeholders. **Decision making** has been considered by the participating contractors as the second important skill that should be found in the planner. More specifically, grade 2 contractors consider it as highly important skill while grade 1 and 3 contractors consider it as important skill that should be found in the planner as shown above in table 4.25. It seems that the contractors in Saudi Arabia perceive the critical role of decision making skills in problem definition and problem solution. Also, decision making skills will help the planning team in evaluating of the planning process and outcomes.

The results also indicated that the participating contractors consider **Coordination** as the third important skill that should be found in the planner as shown above in table 4.25.

This shows that the contractors in Saudi Arabia value the coordination skills to be found in their planner due its' role in improving the relationships among the planning team members and different project' stockholders which will be reflected positively on the project success. **Problem solving, analytical and computer** have been considered as important skills that should be found in the planner by the entire grade 1, 2 and 3 participating contractors. These skills have been ranked as the forth important skills as shown above in table 4.25 by the participating contractors. This is may be due to the importance of these skills which enables the planner to:

- Understanding and articulating the rationale of planning.
- Ability to follow a thin thread to collect data and information.
- Clear and liner thinking.
- Ability to conduct primary data collection.
- Ability to perform quantitative and qualitative reasoning.
- Understanding of law, legal institutions, codes, ordinance, etc.
- Competency in basic computer programs (data base, spread sheets, etc.)
- Familiarity with the interaction of planning, implementation and markets.
- Anticipate problems before they occur.
- Recognize if a problem needs to be addressed.
- Define the problem and identify possible causes.
- Facilitates group members in identifying and evaluating possible solutions.
- Identify range of solutions and select most appropriate ones.
- Develops plans to implement solutions.

This result is supported by the result of Connie and Ethan (1999). **Critical thinking** has been considered as the fifth important skill that should be found in the planner by the entire grade 1, 2 and 3 participating contractors as shown above in table 4.25. It seems that the participating contractors pay high attention to this skill because it leads the planner to select the best choice for project plans. **Forecasting, influencing and management** have been considered as important skills that should be found in the planner by the entire grade 1, 2 and 3 participating contractors. These skills have been ranked as the sixth important skills as shown above in table 4.25 by the participating contractors. This shows that the participating contractors perceive the effective role and the great impact of these skills on the planner and, in effect, on the project plan.

Influencing skill will enable the planner to share his power and to rely on interpersonal skills to get others to cooperate towards common goals. By using this skill the planner can influence team members in many aspects by:

- Lead by example, and follow through with commitments.
- Clarify how a decision will be made.
- Use a flexible interpersonal style and adjust the style to the audience.
- Apply his power skill fully and cautiously. Think of long-term collaboration.

Management skills will aid the planner to complete a qualified work on time and within the budget. Also, it will help him in understanding the planning process, i.e. who's involved and timing and dynamics of involvement. Moreover, Management skills enable the planner to solve and deal with conflict which is inevitable in a project environment thus minimizing potential negative impacts. The project team is then able to deliver better solutions and increase the probability of project success. **Leadership** has been considered

as the seventh important skill that should be found in the planner by the participating contractors as shown above in table 4.25. In general terms, leadership is the ability to get things done through others. It seems that the contractors believed that the leadership skills is critical especially in the initial phases of a project when the emphasis is on communicating the vision, motivating and inspiring project' participants to achieve high performance. Also, **Technical** has been considered as the eighth important skill that should be found in the planner by the entire grade 1, 2 and 3 participating contractors as shown above in table 4.25. This shows that the contractors are concerned to ensure that their planners are having very well technical skills which enable them to improve and develop the project plans by employing this skill in a proper way.

The results indicated also that the participating contractors consider **Presentation, teamwork and teambuilding** as the ninth important skills that should be found in the planner by the entire grade 1, 2 and 3 participating contractors as shown above in table 4.25. This shows that the participating contractors perceive the effective role and the great impact of these skills on the planner and, in effect, on the project plan. Team building is the process of helping a group of individuals, bound by a common purpose, to work with each other, the leader, external stakeholders, and the organization. The result of good leadership and good team building is teamwork. Teamwork and teambuilding help the planner to manage the inevitable changes in the project environment effectively. Also, a continued or renewed teambuilding effort will lead to mutual trust, high quality of information exchange, better decision making and effective project management.

Negotiation has been considered as the tenth important skill that should be found in the planner. In detail, grade 1 and 2 consider it as important skill while grade 3 contractors

consider it as a moderately important skill as shown above in table 4.25. Negotiation is a strategy of conferring with parties of shared or opposed interests with a view toward compromise or reaching an agreement .This shows that the contractors know the function of the negotiation skills in increasing the probability of project success because it considers as an integral part of project management.

Finally in regards to the planner' skills, the results indicated that the participating contractors consider **Research and investigation** as the eleventh important skill that should be found in the planner. Precisely, grade 1 and 2 consider it as important skill while grade 3 contractors consider it as a moderately important skill as shown above in table 4.25. This skill will help the planner to identify the problems and customer needs and identify appropriate information sources for problem solving during the planning phase.

Finally, it is very important to refer that there was very slight differences in the importance level of the planner' parameters either skills or qualifications among the participating contractors. It seems that most of these contractors are seeking about similar parameters for their planners which enabling them to improve and develop the planning process for their projects.

4.6.2 Planners evaluation

This section presents the evaluation of the planner who's employed in the participating contractors' organization. The results acquired by all the participating contractors and by each grade of contractor are separately analyzed and discussed in detail below.

The results indicated that the participating contractors express many reasons for their satisfaction level about their planner with different level of agreement. The distribution of levels and reasons of satisfaction about the planner are presented in table 4.26 below.

Table 4.26 Level and Reasons of satisfaction about contractors' planner

Level	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Level of satisfaction	2.36	2.33	2.36	2.41
Note: 1= Extremely Satisfied, 5= Not Satisfied				
Reasons for Satisfaction	All Contractors Mean	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean
Excellent communication skills	1.86	1.75	1.79	2.14
Excellent analytical skills	1.89	1.86	1.56	2.36
Excellent forecasting skills	1.96	1.89	2.00	2.02
Excellent coordination skills	2.00	1.93	1.98	2.14
Excellent decision making skills	2.00	1.93	1.89	2.25
Excellent Teamwork and Teambuilding skills	2.07	2.25	1.89	2.00
Excellent Technical skills	2.11	2.13	2.06	2.14
Excellent Management skills	2.11	2.00	2.11	2.29
Preparing excellent procedures and guidelines for project planning	2.11	2.09	2.11	2.14
Excellent influencing skills	2.11	2.08	1.89	2.43
Excellent presentation skills	2.11	1.99	2.01	2.43
Excellent computer skills	2.18	2.16	2.19	2.20
Supporting project team efforts toward the development of the project plan	2.18	2.19	2.11	2.21
Excellent problem solving skills	2.21	1.86	2.84	2.00
Excellent Critical thinking skills	2.32	2.34	2.17	2.47
Excellent leadership skills	2.32	2.26	2.26	2.5

Excellent negotiation skills	2.36	2.29	2.33	2.52
Excellent research and investigation skills	2.54	2.51	2.22	2.99
Note: 1=Strongly agree, 5= Strongly disagree.				

It is very important to refer that the satisfaction level in each grade of the participating contractors was approximately the same. It seems that most of these contractors express this satisfaction level about their planner due to their similar parameters like qualifications and skills which enable them to have the similar effects in the planning phase and ,as well as in accomplishing the project goals.

The results indicated that the entire grade 1, 2 and 3 participating contractors are moderately satisfied about their planner as shown above in table 4.26. It seems that top management believes that their planners produce weak plans for projects. Also, it is indicated that the entire grade 1, 2 and 3 participating contractors have been agreed that the excellent communication, forecasting, coordination, decision making and analytical skills are considered as the primary and main reasons for their expressed satisfaction level about their planner. This shows that the planners for the participating contractors have been used their communication, forecasting, coordination, decision making and analytical skills in effective and a proper way during the planning phase and over the project life cycle which in turn enable the contractors to achieve their goals and objectives by performing effective planning process. This situation can, in effect, make the contractors to be highly satisfied about their planners due to their excellent aforementioned skills.

The results indicated that entire grade 1, 2 and 3 participating contractors have been agreed that the excellent teamwork and teambuilding, technical, management,

influencing, analytical, presentation and computer skills are considered as the secondary reasons for their expressed satisfaction level about their planner. It seems that these reasons have an impact on the satisfaction level of the participating contractors but not like aforementioned reasons such as excellent communication skills. This is may be due to their medium effects on the project success.

Finally, the results indicated that grade 1 and 2 of the participating contractors have been agreed that the excellent negotiation, research and investigation skills are considered as the least impact reasons on their expressed satisfaction level about their planner while grade 3 contractors have been neutral about these reasons .It seems that these reasons have the lowest impact on the contractors' satisfaction level about their planners in comparing with aforementioned reasons like excellent communication and coordination skills. This indicates that the planner have good negotiation, research and investigation skills but it still not excellent to able the planner to do his job during the planning process in effective and proper way .This situation making the contractors to be not highly satisfied about their planners due to these skills.

Chapter 5: Summary of the Study, Conclusion and Recommendations

This chapter presents the summary of the study, focused on a general overview to the study with its' objectives, and the approach that was used for collecting the required data. Also it presents the findings of the study based on the collected data. Furthermore, it shows the conclusion of the whole study followed by recommendations and future recommendations to construction contractors in Saudi Arabia.

5.1 Summary of the study

Construction project planning is considered as an important element and critical stage in the management and in the implementation of construction projects. It specifies a set of decisions related to the ways that things should be done in the future, in order to execute the design for a desired product or service.

Project planning generally described as the processes that define and refine project goals and select the best of the alternative courses of action to acquire the objectives that the project was undertaken to address. Planning is of major importance to a project because the project involves doing something that has not been done before. Also, it improves all four dimensions of project success: cost overrun, schedule overrun, technical performance and customer satisfaction. (Zwikael & Sadeh, 2007). Planning aims to eliminate uncertainty, improve efficiency of the operation, obtain a better understanding of project objectives and provide a basis for monitoring and controlling work .(Kerzner, 2006).

The objectives of this study were to:

- 1) Identify the procedures which are followed by contractors in the Eastern Province of Saudi Arabia to plan for a project.
- 2) Evaluate the current planning procedures which are followed by contractors in the Eastern Province of Saudi Arabia to plan for a project.
- 3) Identify the parameters which qualify an individual to be a planner for construction projects.

The aforementioned objectives were achieved by collecting the required data from grade1, grade2 and grade3 contractors, who are located in the Eastern Province of Saudi Arabia. Two sets of structured questionnaires were used to collect the required data. One questionnaire was directed to the planning department in the organization or any related department, and the other one was directed to the top management in the organization. Out of the 86 (grade 1, 2, and 3) contractors in the Eastern Province of Saudi Arabia, a total of 35 contractors who are located in the Eastern Province of Saudi Arabia responded to the questionnaire that directed to the planning department or any related department and 32 contractors responded to the questionnaire that directed to the top management. In order to increase the reliability of the data collected, only questionnaires that had at least 80 percent completed data were considered in the final analysis. Using this criterion, 28 of both questionnaires remained for the final analysis.

5.2 Findings

Based on the field questionnaires conducted and the results presented in chapter four, the following findings can be concluded:

- Grade1, 2 and few of grade 3 contractors have planning departments , which were established 15 years ago to do certain functions like strategic planning, project

planning, project controlling and monitoring. The planning department is staffed with more than 20 employees.

- Grade 3 contractors established their planning departments less than 5 years ago and they employ less than 10 personnel in these departments.
- All contractors perform project planning task through their planning departments.
- More than half of grade 1 and 2 contractors perform organization strategic planning, project controlling and project monitoring tasks through their planning departments.
- Few contractors perform project costing task through their planning departments.
- All contractors apply planning engineer position in their planning departments.
- More than half of grade 1 and 2 contractors apply scheduler, surveyor and cost estimator positions in their planning departments.
- Few of grade 3 contractors apply scheduler, surveyor and cost estimator positions in their planning departments.
- Most of grade 1, 2 and few of grade 3 contractors are using Primavera software during the planning process of their projects.
- Grade 1, 2 and few of grade 3 contractors do planning for all project awarded, regardless of the time and the cost limits.
- Majority of contractors start planning phase for a project at the same time they decide to bid for that project.
- More than half of grade 1, 2 and few of grade 3 contractors involve the potential project manager, scheduler and planner in the planning process of their projects.

- Grade 1 contractors consider that the contract documents, available resources and construction methods are the most three important inputs that should be considered during planning process.
- Grade 2 contractors consider that the contract documents, project variables and available resources are the most three important inputs that should be considered during planning process.
- Grade 3 contractors consider that the contract documents, technical requirements and available resources are the most three important inputs that should be considered during planning process.
- All contractors consider that value engineering and weather data are the least two important inputs that should be considered during planning process.
- All contractors consider that procedures of time, scope, human resources and cost are the most important procedures that should be performed during planning process.
- All contractors consider that procedures of procurement and communications are the least important procedures that should be performed during planning process.
- Schedule controlling, activity resources estimating and resource levelling are considered as the least important steps that should be performed during time planning phase by all contractors.
- Budget determining is considered as the least important step that should be performed during cost planning phase by all contractors.
- Grade 1 contractors are highly satisfied about their current planning procedures.
- Grade 1 contractors consider that strong communication between site and head office, effective coordination among involved parties and on time delivery of materials as the

- most important reasons for their expressed satisfaction level about the current planning procedures.
- Grade 2 and 3 contractors are moderately satisfied about their current planning procedures.
 - Grade 2 contractors consider that strong communication between site and head office, on time delivery of materials and projects are executed smoothly as the most important reasons for their expressed satisfaction level about the current planning procedures.
 - Grade 3 contractors consider that strong communication between site and head office, effective coordination among involved parties and corrective actions are effective as the most important reasons for their expressed satisfaction level about the current planning procedures.
 - All contractors consider that actual projects duration exceed planned duration, smooth flow of human resources and actual costs exceed budgeted costs as the least important reasons for their expressed satisfaction level about the current planning procedures.
 - All contractors consider that experience in planning and experience in the construction work as the most important qualifications that should be found in the planner for construction projects.
 - Grade 1, 2 contractors consider that knowledge in economy and certification as the least important qualifications that should be found in the planner for construction projects.
 - Grade 3 contractors consider that training in planning and certification as the least important qualifications that should be found in the planner for construction projects.

- Grade 1 contractors consider that communication skills, coordination skills and problem solving skills as the most important skills that should be found in the planner for construction projects.
- Grade 2 contractors consider that communication skills, decision making skills and analytical skills as the most important skills that should be found in the planner for construction projects.
- Grade 3 contractors consider that computer skills, critical thinking skills and problem solving skills as the most important skills that should be found in the planner for construction projects.
- Contractors consider that skills of teamwork and teambuilding, negotiation, and research and investigation as the least important skills that should be found in the planner for construction projects.
- All contractors are highly satisfied about their current planner.
- All contractors consider that excellent communication, coordination, decision making, analytical and forecasting skills as the most important reasons for their expressed satisfaction level about their planner.
- All contractors consider that excellent problem solving, critical thinking, leadership, negotiation, and research and investigation skills as the least important reasons for their expressed satisfaction level about their planner.
- Grade1, majority of grade 2 and few of grade 3 contractors have established their organization more than 10 years ago.
- Grade 1 and 2 contractors employ more than 500 personnel in their organization.

- Grade 1 contractors have performed projects that have more than 100 million SR value with annual revenue exceeded 40 million SR.
- Grade 3 contractors have performed projects that have less than 40 million SR value with annual revenue less than 20 million SR.

5.3 Conclusion

The importance of project planning in the construction sector has been rapidly increased in the last few decades. As a result, project managers, estimators, and planners strive to continuously improve their project planning capabilities.

Upon comparing 28 construction organizations across construction industry sector. This study has found that the construction organizations achieve high scores in the project planning, and to some extent in the project success. This study has also recognized that the contractors in Saudi Arabia do planning for their projects, regardless of the project duration and the project cost limits. They have designated planning department to do certain functions like strategic organization planning, project planning, project costing, project controlling and project monitoring. Also, they applied many positions in the planning department to perform these functions such as planning engineer, cost estimator, scheduler and surveyor.

It can be concluded also that the contractors depend on many requirements and inputs during the planning phase which effectively impact on the project schedule and project cost such as contract document, project variables, available resources, construction methods and weather data. After collecting these requirements, contractors start to perform many planning procedures with all their steps to complete the planning process, starting by scope planning procedure which include goal definition, phase definition,

scope definition and create work breakdown structure; and passing through time, cost, quality, communication, risk management and procurement planning procedures. This study has also recognized that the contractors are seeking about the one who have enough experience in the project management; especially in the project planning with excellent communication, coordination, decision making skills to do effective plans for their projects.

In summary, although the importance of project planning is identified in the construction industry, both the quality of project planning and project success results are not very high. This study contributes to the project management knowledge by identifying most important planning procedures in the construction industry and makes specific recommendations to the project planning improvement for construction project managers, planners. This gives more practical tools to construction project managers. The critical planning procedures introduced in this study could be implemented by project managers, planners, and estimators during tenders and planning phase.

5.4 Recommendations

Based on the findings of this study that discussed in the previous sections with main conclusion listed above and the referring to findings of previous studies discussed in the literature review, the following recommendation are made:

- ❖ Grade 3 contractors are advised to designate a separate planning department which will enable them to perform the planning process in a proper way.
- ❖ All contractors are advised to consider the project costing task as one of the planning department' function.

- ❖ Grade 3 contractors are advised to apply more scheduler, surveyor and cost estimator positions in their planning department due to their effective roles during planning phase.
- ❖ Grade 3 contractors are advised to pay more attention in regards to the planning softwares to be used during planning process due to their advances features, abilities and accurate estimation.
- ❖ Grade 3 contractors are advised to involve the cost estimator, scheduler and the planner in the planning process for their projects.
- ❖ All contractors are advised to pay more attention to the value engineering and weather data to be considered as highly important inputs during planning process.
- ❖ Grade 2 and 3 contractors are advised to pay more attention to the type of the construction methods when they do planning for their projects, due to the great impact of this parameter in the planning process.
- ❖ All contractors are advised to pay more attention to the procurement and communications when they do planning for their projects.
- ❖ All contractors are advised to pay more attention to the schedule controlling, activity resources estimating and resource levelling steps when they do time planning for their projects.
- ❖ All contractors are advised to pay more attention to the budget determining step when they do cost planning for their projects.
- ❖ All contractors are advised to spend more efforts which improve their projects' schedule, cost and human resources flow.

- ❖ All contractors are advised to spend more efforts which improve their planner' skills and qualifications.

5.5 Recommendations for further studies

- ❖ It is recommended that a study could be carried out in future to determine the barriers which prevent the contractors in implementing planning practices in their business operation in Saudi Arabian construction industry.
- ❖ Since this study addresses the subject for construction projects, it would be interesting to study the subject of project planning processes between construction organizations and other industrial sectors like services, software and communications, production and maintenance and compare the results.
- ❖ The study figure out the most important planning procedures that used during planning phase without considering their direct impact on the project success separately. It is recommended that in the future studies to see the impact of each planning procedure on the project success like cost, schedule, and customer satisfaction. Hence, the most critical planning processes, which have the highest influence on the project success in the construction sector will be identified.

References

- [1] Al-Dubaisi,A.H. (2000), Change Orders In Construction Projects In Saudi Arabia, MS Thesis, King Fahd University of Petroleum &Minerals, Dhahran, Saudi Arabia.

- [2] American Association of costing engineers (AACE) , (2008) , Planning and Scheduling Professional (PSP) Certification Study Guide, 1st Ed.

- [3] American Association of costing engineers (AACE) , (2011) , Project Planning: as Applied in engineering and Construction for Capital Projects, International Recommended Practice No. 39R-06.

- [4] American Association of costing engineers (AACE), (2006) , Responsibility and Required Skills for Project Planning and Scheduling, International Recommended Practice No. 14R-90.

- [5] Bryman, A, (2008) , Social research methods, 4th edition, Oxford University Press, Oxford.

- [6] Christiansen, F. (2012) , The Planning Process at a Construction Site, Thesis for the Degree of Licentiate of Engineering, Chalmers University of Technology.

- [7] Cindy, L. M., Awad, S. H, and Jeffrey, S. R..(2005) , Effect of Pre-construction Planning on Project Outcomes. Journal of Construction Engineering and Management, 76 (183), 1-10.
- [8] Collis, J. and Hussey, R. (2009) , A practical guide for undergraduate and postgraduate students., 3rd edition, Great Britain by The Cromwell press, Trowbridge, Wiltshire.
- [9] Connie, P. O and Ethan, P. S. (1999) , Taking Our Bearings: Mapping a Relationship Among Planning Practice, Theory, and Education, Journal of Planning Education and Research, ,18 (3), 257-266.
- [10]
- <http://www.careereducation.columbia.edu/sites/cce/files/Getting%20Started%20TRANSFERABLE%20SKILLS%20exercise.pdf>
- [11] http://contractors.momra.gov.sa/Classifications_By_Region.aspx
- [12] <http://www.greatsamplersumme.com/Job-Responsibilities/Planning-Engineer-Responsibilities.html>.
- [13] <http://www.umsl.edu/~lindquists/sample.html>.

- [14] Kerzner,H. (2006), Project Management: A systems approach to planning, scheduling, and controlling. Tenth edition, Van Nostrand Reinhold, New York.
- [15] Kwak, Y. and Ibbs , C. (2002) , Project Management Process Maturity (PM)2 Model, Journal of Management in Engineering ,18(3) ,150-155.
- [16] Laufer, A. (1990) , Essentials of Project Planning; Owners' prespective, Journal of Construction Engineering and Management, ASCE, 22(6),162-167.
- [17] Laufer, A., Aviad, S., Dora, C.Z., and Gregory, A. H. (1993), Prebid and preconstruction planning process, Journal of construction engineering and management, 119(3), 426-444.
- [18] Meredith, J.R. and Mantel ,S.J. (2003) , Project Management: A Managerial Approach, sixth Edition, John Wiley & Sons, New York.
- [19] Pennypacke, J. S and. Grant, .K. P. (2003). Project management maturity: An industry benchmark, International Journal of Project Management, 34(1), 4-11.
- [20] Project Management Institute. (2013) , A Guide to the Project Management Body of Knowledge (PMBOK Guide), fifth edition, Newtown Square, Pennsylvania.

- [21] Remenyi, D., Williams, B., Money, A. and Swartz, E. (2003) , An introduction to process and method.", SAGE Publications
- [23] Russell,S and Taylor,3d .W. (2003). Operations Management :Quality and Competitiveness in a Global Environment , fifth Edition, John Wiley & Sons, New York.
- [24] Saunders, M., Lewis, P, and Thornhill, A. (2009) , A research methods for business students, 5th edition, Library of Congress Cataloguing.
- [25] Stuart ,D. A, Shekhar, S. P, Edward, G. J, and George, R. S. (2004) , Owner–Contractor Work Structures: Process Approach, Journal of Construction Engineering and Management, 130(5), 680-690.
- [26] Wedawatta, G., Ingirige, B., and Amaratunga, D. (2011) , Case study as a research strategy: Investigating extreme weather resilience of construction SMEs in the UK, University of Salford,UK.
- [27] Winch, G. M ,and John, K. (2005) , What do construction project planners do?’, International Journal of Project Management, 23(2), 141-149.

- [28] Zwikael, O ,and Globerson, S. (2004) , Evaluating the quality of project planning: a model and field results, *International Journal of Production Research*, 42(8),1 545-1556.
- [29] Zwikael, O ,and Globerson, S. (2006) , From Critical Success Factors to Critical Success Processes, *International Journal of Production Research*, 44(17), 3433-3449.
- [30] Zwikael, O ,and Sadeh ,A. (2007) , Planning effort as an effective risk management tool, *Journal of Operations Management*, 25(4),755-767.
- [31] Zwikael, O, Shimizu, K., and ,Globerson,S. (2005) , Cultural differences in project management capabilities: a field study, *International Journal of Project Management*, 23 (6), 454-462.
- [32] Zwikael, O. (2009) , Critical planning processes in construction projects, *Construction Innovation: Information, Process, Management*, 9(4), 372-387.
- [33] Zwikael, O. (2008) , Top management involvement in project management: exclusive support practices for different project scenarios, *International Journal of Managing Projects in Business*, 1(3), 387-403.

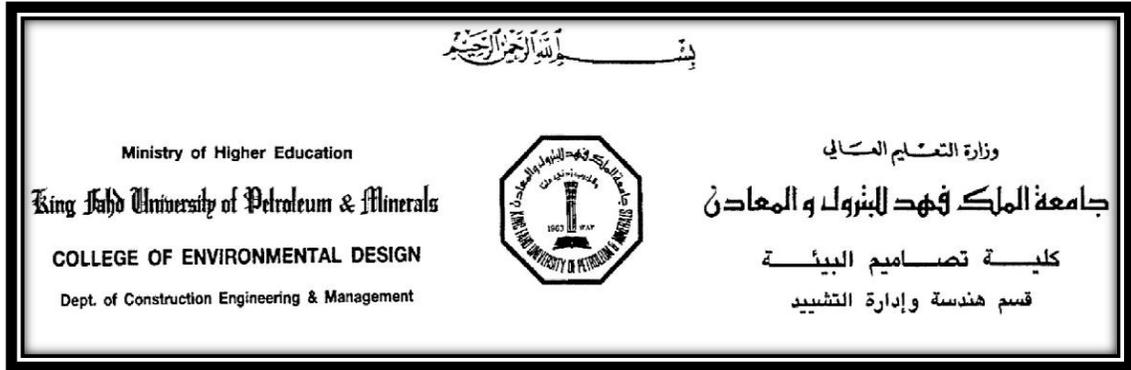
APPENDICES

Appendix A QUESTIONNAIRE #1

Project Planning In Construction Industry
In Saudi Arabia: a Contractors' Perspective
((Planning Procedures))

QUESTIONNAIRE #1

This questionnaire is directed to the planning department in the organization or any related department, so it is highly appreciated if this questionnaire is completed by an individual who is contributed in the planning procedures for the organization to ensure the reliability of the information on the subject of this study.



Dear Participant,

My name is Mohammad Atmeza and I am a graduate student at King Fahd University of Petroleum and Minerals, Dhahran, KSA, studying for Master Degree in Construction Engineering and Management. I am conducting my thesis research on Project Planning in the Construction Industry in Eastern province of Saudi Arabia: a Contractors perspective.

This research has been formally approved with objectives, to define and evaluate the planning procedures, which contractors in the Eastern province of Saudi Arabia follow; and to define the parameters, which qualify an individual for being planner. Because you are familiar and involved in the planning procedures in your organization, I am approaching you to participate in this research study by completing the attached below enclosed questionnaire.

The attached questionnaire will take some of your valuable time but your participation is critical and will have a major contribution to the subject of research.

I assure you that all information will be treated with strict confidentiality and will be used only for academic purposes and will be reported in aggregate format.

I would like to express my deepest appreciation for participating in this research. Please, complete and return the questionnaire to the address below.

Thank you and if you need further information please advise.

Sincerely,

Mohammed Atmeza,

Graduate Student,

CEM Department, K.F.U.P.M ,

Dhahran 31261 , Dhahran 31261,

Mob # 0593114263

E-mail: mohammadtomizey@hotmail.com

Part 1: Organization

This part contains questions seeking information about your organization. You are kindly requested to provide the needed information by placing a tic (√) in the box next to the appropriate answer or by writing in the space next to the question.

Q1) Name of the organization

:(*Optional*).....

Q2). Number of employees:

- Less than 100 100-to less than 500 500- to less than 1000
- 1000-to less than 1500 1500 or more.

Q3).What is the classification of your organization?

- grade 1 grade 2 grade 3 Others, please
- specify.....

Q4). How many years since your organization was founded?

- Less than 5 5-to less than 10 10-to less than 15 15-to less than 20
- 20 or more.

Q5). What is the average size, in terms of Saudi Riyals of projects which your organization performs?

- Less than 20 million 20-to less than 40 million 40-to less than 60 million 60-
- to less than 100 million 100 million or more.

Q6).What are the type(s) of projects which your organization performs(*please select all that apply*)?

Building Industrial Infrastructure Highway Utilities

Others, please specify.....

Q7).What are the type(s) of projects delivery which your organization performs (*please select all that apply*)?

Design-Bid-Build (DBB) Design -Build (DB) Professional CM.

Build-Operate-Transfer (BOT). Others, please specify.....

Q8). What is your organization annual revenue in Saudi Riyals?

Less than 10 million 10-to less than 20 million 20-to less than 30 million

30-less than 40 million 40 million or more

Q9). Who are your organization's owners? (Please select all that apply)?

Private Governmental Others, please specify.....

End of part 1

Part 2: Respondent

This part contains questions seeking information about the respondent to this questionnaire. You are kindly requested to provide the needed information by placing a tick (√) in the box next to the appropriate answer or by writing in the space next to the question.

Q1).Name (optional):

Q2).Age (optional): Years.

Q3).Your education level:

Q4).Your position in the organization:

Q5).Years of experience in the organization:..... Years

Q6).Total Years of experience in construction industry:..... Years

Q7). Other qualifications (please specify):

1.....

2.....

3.....

4.....

5.....

End of part 2

Part 3: Planning procedure in the organization

This part of the questionnaire involves questions exploring information about planning procedures in your organization. You are kindly request to provide the needed information by either placing a tic (√) in the box next to the appropriate answer or by writing in the space next to the question.

Q1). Who is responsible for performing projects planning in your organization?

- Project Manager Project engineer Scheduler

Planning department (*If selected, please continue if not selected please go to question 9*)

- Others, please specify

Q2). When was the planning department established?

- Less than 5 years 5 – to less than 10 years 10– to less than 15 years 15 years

or more

Q3). What is the name of the planning department?

.....

Q4). What is the function of the planning department? (*Please select all that apply*)

- Organization Strategic Planning Project Planning Project Monitoring

Project Control.

- Others, please specify

Q5). How many employees are in the planning department?

- Less than 5 5- to less than 10 10- to less than 15 15- to less than 20 20 or

more

Q6). What is the title of the head of the planning department?

.....

Q7). To whom does this department report to?

General Manager Operation Manager Others, please specify

.....

Q8). What are the job titles of the employees in the planning department? (*Please select all that apply*)

Planning Engineer Scheduler Cost Controller Surveyors

Others, please specify

Q9). When do the planning activities start? (*Please select all that apply*)

At the decision to bid At the award of a contract

Others, please specify

Q10). Who is usually involved in the planning of projects? (*Please select all that apply*)

The planner The potential project manager The cost estimator

The Scheduler The Material manager Others, please specify

Q11). What is the name of the software that your organization uses for projects

planning?(Please select all that apply)

Primavera Ms Project Others, please specify

Q12). For which project(s) does your organization perform planning?

All projects Projects with costs exceeding certain threshold value

Projects with duration exceeding certain threshold value

Others, please specify

Q13). How does your organization prepare work breakdown structures?

- Established templates According to CSI structure
- Others, please specify

Q14). How does your organization level resources?

- Work sheet method Minimum Moment method Time- scaled network
- Others, please specify

End of part 3

Part 4: Planning inputs

The following are potential inputs which planners may consider when they plan projects.

You are kindly requested to evaluate the level of importance of each input based on your experience by placing a tick (√)in the appropriate box next to eachinput by considering the following employed ranking system:

1 = Highly Important, 2= Important, 3= Moderately Important, 4= Little Important, 5=Not important

<i>NO</i>	<i>Planning (inputs)</i>	<i>Level of Importance</i>				
		1	2	3	4	5
1	Type of contracts					
2	Contract documents					
3	Type of stakeholders					
4	Construction methods					

5	Value engineering					
6	Government requirements					
7	Project variables (size, type, location, duration...etc.)					
8	Delivery methods					
9	Weather data					
10	Productivity data					
11	Available resources (materials, human resources, equipment...etc.)					
12	Technical requirements					
13	Others, please specify and rank :` 1..... 2..... 3..... 4.....					

End of part 4

Part 5: Planning procedures

The following are potential planning processes which planners may implement when they plan projects. You are kindly requested to evaluate the level of importance of each process based on your experience by placing a tick (✓) in the appropriate box next to each input by considering the following employed ranking system:

1 = Highly Important, 2= Important, 3= Moderately Important, 4= Little Important, 5=Not important

<i>NO</i>	<i>Planning (process)</i>	<i>Level of Importance</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1	Scope of work definition					
2	Project goals definition					
3	Project plan definition					
4	Phase definition					
5	Work breakdown structure (WBS)					
6	Activities definition					
7	Activities sequencing					
8	Activities resources estimating					
9	Long lead items					
10	Resource Levelling					

11	Activities duration estimating					
12	Schedule development					
13	Schedule controlling					
14	Cost estimates development					
15	Budget determining					
16	Cost controlling					
17	Quality planning					
18	Human resources planning					
19	Communications planning					
20	Risk management planning					
21	Procurement planning					
23	Others, please specify and rank : 1..... 2..... 3.....					

End of part 5

Part 6: Evaluation of planning procedure

This part of the questionnaire contains questions seeking information about the level of satisfaction of the current planning procedures in the organization; please write your answer in the specified box next to each question.

Q1). What is your level of satisfaction of the current projects planning in your organization?

- Extreme Satisfaction High Satisfaction Moderately Satisfied
 Low Satisfaction No Satisfaction

Q2)The following is a list of potential reasons for the level of satisfaction you have expressed in the previous question. You are kindly requested to express your level of agreement by placing a tick (✓)in the appropriate box next to each reasonby considering the following employed ranking system:

1 = Strongly Agree, 2= Agree, 3= Neutral, 4 = Disagree, 5= Strongly Disagree

<i>NO</i>	<i>Reasons</i>	<i>Level of Agreement</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1	Projects are executed smoothly					
2	Problems are identified before they occur					
3	Corrective actions are effective					
4	Smooth flow of human resources					
5	Smooth flow of equipment resources					
6	On time delivery of materials					
7	Strong communication between sites and the head office					
8	Effective coordination among involved parties					

9	Actual Costs exceed Budgeted Costs					
10	Actual Projects Duration exceed the Planned Duration					
11	Stakeholders satisfaction					
12	Others, please specify and rank : 1..... 2..... 3..... 4..... 5.....					

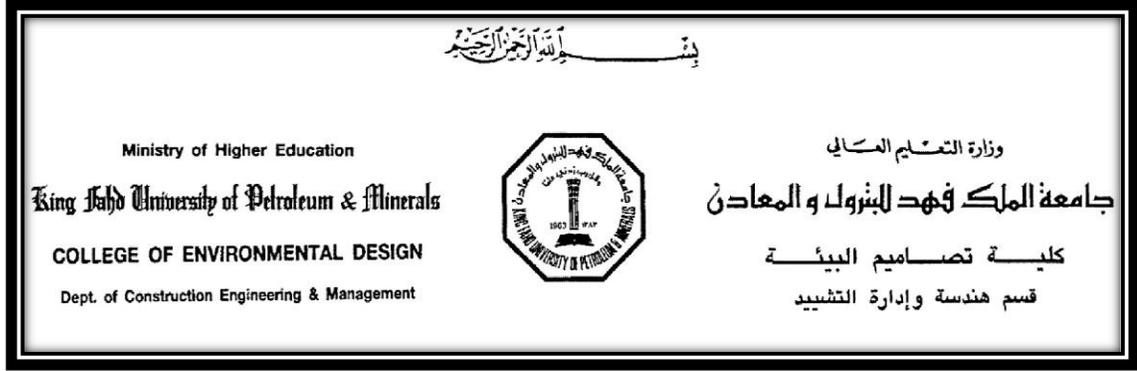
End of the Questionnaire

Appendix B QUESTIONNAIRE #2

Project Planning In Construction Industry
In Saudi Arabia: a Contractors' Perspective
((Planners))

QUESTIONNAIRE #2

This questionnaire is directed to the top management in the organization, so it is highly appreciated if this questionnaire is completed by the one who related to the top management to ensure the reliability of the information on the subject of this study.



Dear Participant,

My name is Mohammad Atmeza and I am a graduate student at King Fahd University of Petroleum and Minerals, Dhahran, KSA, studying for Master Degree in Construction Engineering and Management. I am conducting my thesis research on Project Planning in the Construction Industry in Eastern province of Saudi Arabia: a Contractors perspective.

This research has been formally approved with objectives, to define and evaluate the planning procedures, which contractors in the Eastern province of Saudi Arabia follow; and to define the parameters, which qualify an individual for being planner. Because you are familiar and involved in the planning procedures in your organization, I am approaching you to participate in this research study by completing the attached below enclosed questionnaires.

The attached questionnaire will take some of your valuable time but your participation is critical and will have a major contribution to the subject of research.

I assure you that all information will be treated with strict confidentiality and will be used only for academic purposes and will be reported in aggregate format.

I would like to express my deepest appreciation for participating in this research. Please complete and return the questionnaire to the address below.

Thank you and if you need further information please advise.

Sincerely,

Mohammed Atmeza,

Graduate Student,

CEM Department, K.F.U.P.M ,

Dhahran 31261 , Dhahran 31261,

Mob # 0593114263

E-mail: mohammadtomizey@hotmail.com

Part 1: Respondent

This part contains questions seeking information about the respondent to this questionnaire. You are kindly requested to provide the needed information by placing a tick (√) in the box next to the appropriate answer or by writing in the space next to the question.

Q1).Name (optional):

Q2).Age (optional): Years.

Q3).Your education level:

Q4).Your position in the organization:

Q5).Years of experience in the organization:..... Years

Q6).Total Years of experience in construction industry:..... Years

Q7). Other qualifications (please specify):

1.....

2.....

3.....

4.....

5.....

End of part 1

Part 2: Planners’ parameters

The following are potential parameters which qualify an individual of being the lead planning engineer for construction contractors. You are kindly requested to evaluate the level of importance of each parameter based on your experience by putting a tick (√) in the appropriate box next to each parameter by considering the following employed ranking system:

1 = Highly Important, 2= Important, 3= Moderately Important, 4= Little Important, 5=Not important

<i>NO</i>	<i>Planner Characteristics</i>	<i>Level of Importance</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Qualifications</i>						
1	Educational degree					
2	Experience in construction work					
3	Experience in planning					
4	Knowledge in Economy					
5	Certification					
6	Training in planning					
7	Software Knowledge (Primavera, MS project, etc.)					
8	Others, please specify and rank : 1..... 2.....					

	3.....					
<i>Skills</i>						
1	Communication skills					
2	Forecasting skills					
3	Analytical skills					
4	Coordination skills					
5	Influencing skills					
6	Decision making skills					
7	Presentation skills					
8	Negotiation skills					
9	Leadership skills					
10	Management skills					
11	Research and Investigation skills					
12	Teamwork and Teambuilding skills					
13	Critical thinking skills					
14	Problem solving skills					
15	Technical skills					
16	Computer skills					
17	Others, please specify and rank : 1..... 2..... 3.....					

End of part 2

Part 3: Evaluation of planner

This part of the questionnaire contains questions seeking information about the level of satisfaction of the current planning lead engineer in the organization; please write your answer in the specified box next to each question.

Q1) What is your level of satisfaction of the current planning lead engineer in your organization?

- Extreme Satisfaction High Satisfaction Moderately Satisfied
 Low Satisfaction No Satisfaction

Q2) The following is a list of potential reasons for the level of satisfaction you have expressed in the previous question. You are kindly requested to express your level of agreement by placing a tick (✓) in the appropriate box next to each reason by considering the following employed ranking system:

1 = Strongly Agree, 2= Agree, 3= Neutral, 4 = Disagree, 5= Strongly Disagree

<i>NO</i>	<i>Planner Evaluation</i>	<i>rank</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1	Excellent Communication skills					
2	Excellent Forecasting skills					
3	Excellent Analytical skills					

4	Excellent Coordination skills					
5	Excellent Influencing skills					
6	Excellent Decision making skills					
7	Excellent Presentation skills					
8	Excellent Negotiation skills					
9	Excellent Leadership skills					
10	Excellent Management skills					
11	Excellent Research and Investigation skills					
12	Excellent Teamwork and Teambuilding skills					
13	Excellent Critical thinking skills					
14	Excellent Problem solving skills					
15	Excellent Technical skills					
16	Excellent Computer skills					
17	Preparing Excellent procedures and guidelines for project planning					
18	Supporting project team efforts toward the development of the project plan					
	Others, please specify and rank :					
19	1..... 2.....					

	3.....					
--	--------	--	--	--	--	--

End of the Questionnaire

Vitae

Name Mohammad Ibrahim Deyab Atmeza

Nationality Palestinian

Date of Birth 14/2/1989

Email mohammadtomizey@hotmail.com

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Academic Background

Sept 2008 -- Feb 2012. Palestine Polytechnic University, Hebron, Palestine. Bachelor of Engineering (B.E.), Civil Engineering .GPA: 85.5% .