

**Enhancing the construction innovation practices using
exploratory project to overcome construction innovation's
obstacle and improve the project performance**

التحقيق في تأثير التخطيط على مدة مشاريع البناء

by

BASSEL AL SHAHER

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of the requirements for the degree of
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Abstract

This research aims to investigate the impact of planning on construction projects duration in Dubai. The primary data has been gathered through a questionnaire which was distributed among the project managers of different construction companies of Dubai (UAE) to investigate their opinions. The secondary data has been presented in the literature review which has been gathered from books, reports, and academic journals. The analysis of the correlation has been provided to understand the relationship among the independent and dependent variables of the research. The conclusion has been drawn at the end, and suitable recommendations have been provided for project managers of construction companies.

Abstract in Arabic

يهدف هذا البحث إلى معرفة تأثير التخطيط على مدة مشاريع البناء في دبي. تم جمع البيانات الأولية من خلال استبيان تم توزيعه على مديري المشاريع في شركات البناء المختلفة في دبي (الإمارات العربية المتحدة) للتحقيق في آرائهم... تم تقديم البيانات الثانوية في مراجعة الأدبيات التي تم جمعها من الكتب والتقارير والمجلات الأكاديمية. تم توفير تحليل الارتباط لفهم العلاقة بين المتغيرات المستقلة والتابعة للبحث. تم التوصل إلى الاستنتاج في النهاية ، وتم تقديم التوصيات المناسبة لمديري مشاريع شركات المقاولات

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Chapter I: Introduction

1.0 Introduction

In construction projects, the path from concept to reality usually brings challenges, and these challenges are difficult to anticipate at first. Construction projects carry their own risks, and if not minimized, can have a negative impact on the success of the project. The construction project plan makes the complex activities of the construction project a realistic and feasible construction plan (Amadi, 2017).

According to Giang and Pheng, (2011), the construction industry is among the most significant industries that can contribute effectively to the national development, and it contributes to the total fixed capital, gross domestic product, and national employment. However, this sector is sensitive to changes and financial turmoil, as the construction environment changes continuously, in addition to the continuous flow of new conditions from the relevant government agencies, and the intensity of competition between companies to win projects, which increases the importance of the need for improvement and development in this sector.

Achieving quality in the construction industry has important economic repercussions that reduce construction costs by eliminating the costs of correcting defects and errors and the costs of re-executing some mismatched work, achieving customer satisfaction, and reducing maintenance costs, which contributes to increasing the economic lifespan of the facilities. The topic of delay in construction projects began to take a large area of attention due to the complexity of the projects in terms of design and implementation methods, and this is what called for many researchers to write on this topic, especially in developing countries because of

the weight this phenomenon places on the development process on the government and private sector. The delay here is the amount of the difference between the time planned for a construction project and the actual time to complete it (Dixit, Mandal, Sawhney and Singh, 2017).

The study of this phenomenon is enough to pay attention to, given the financial and economic consequences this phenomenon imposes on countries in general and on the economic climate for construction projects, in addition to the negative effects on the parties to the construction process represented by the employer, consultants and contractors, such as the additional costs resulting from the indirect cost spent on the projects. Given that the topic of delay has gained this much attention, researchers have covered it with many studies (Mahamid, Bruland and Dmaid, 2012: Marzouk and El-Rasas, 2014: Atout, 2016), most of which focused on diagnosing the size of this phenomenon, and most importantly the delay causes that occur in the construction projects, among which the major ones are as follows:

- Poor planning of the project.
 - Mismanagement. Weakness, lack of use of a specialized team of competence, and lack of experience.
 - The inability to overcome obstacles.
 - Failure to set a timetable for the completed works of the project:
 - Failure to abide by the project controls and the site and country laws,
- which leads to many interrupti

- Fabricating problems with all parties.
- The inconsistency of the work team.
- Lack of financial resources to support the project.
- Not using the appropriate materials for the project and using old, overworked, old shabby mechanisms.

Currently, the Emirate of Dubai is representing a highly successful investment area in the world, where the real estate sector has witnessed a significant growth during the past decade that has a main role in bringing investments from different countries, while the architectural facilities and services that Dubai has provided to investors are described as attractive, there are still opportunities for an increase in the size of real estate investments in Dubai, especially after many successful billions dollars projects that have played a part in the growth of the real estate industry, particularly the infrastructure in Dubai.

Dubai has still been launching quality projects, regardless of the outcomes of the global economic crisis that has significantly impacted its real estate level and urban investments. This is clear evidence of the resurgence observed by the region, confirming its uniqueness regarding the continuity and building and is differentiated by an integrated infrastructure that is beneficial for all industries, with proportional speeds and balanced development. This leads to the strengthening the commercial position of the Emirate of Dubai and providing the elements of commercial work for the investors from Arab, Gulf, and foreign countries.

The parties who are involved in the construction of the project understand that the delay in delivering projects in terms of the timelines decided by the investors is a damaging factor that

eliminates profits, due to the resulted fund losses for the investors and contractors in addition to the negative image of the government organizations promoting the projects. This delay results in putting pressure over the contractors, which leads them to implement the project at lower quality.

The major delay causes in the projects may be the weak engineering and administrative planning of the contracting firms due to their inability of accurately defining their objectives and develop of strategies, plans, policies, and timetables essential for the process of reasonable implementation of the various stages of the project.

The process of project's engineering and administrative planning has its own rules, regulators, and pointers that must be complied with for setting the specific plans for every project as per their circumstances, needs and significance. Through this research, the researcher will show the degree of impact of improper planning on the delay in implementing the construction projects in the Emirate of Dubai in the United Arab Emirates, and he will use it for identifying the factors that cause improper planning that then affects the implementation of the project duration and thus the delay in its implementation.

1.1 Importance of the Research

This research takes a degree of importance because the building and construction industry is considered to be a major economic sector concerning the activity rates, employment absorption, creation of job opportunities and the overlap with other economic sectors. The human need to build is an important requirement that started since their creation and evolved with its evolution with time until it turned into a craft with specialists working constantly to develop it, and choosing the best ways to exercise it within the framework of controlling the costs, time, and quality.

1.2 Research Problem

Due to the close relationship that the researcher had with the construction projects in the UAE, he was able to notice that the effective engineering and administrative planning for the engineering projects have a significant part in the success of the contracting firms regarding the completion of their projects in the decided timeframe. On the other hand, improper planning and inaccurate knowledge of the concept and stages of planning, its significance, and its elements would result in control loss over the elements of the engineering project regarding the implementation time, costs, and quality. The research concentrates on the elements of weak planning responsible in delaying the construction projects.

The level of awareness of the construction contracting firms related to the perception of project planning is represented by the level of willingness and understanding of the contracting firms for the requirements of plan preparation, approval, implementation, and follow-up. The level of awareness of the construction contracting firms related to the significance of project planning is represented by the significance of time, future expectations, proper handling with administrative and technical benefits of planning in the projects.

1.3 Research Objectives

The research aims primarily to introduce the general administrative planning and engineering planning by:

- 1) Identification of factors associated with the management of construction projects and the influence of each factor on the planning process
- 2) Relationship between negligence in planning processes and poor implementation on the construction projects duration

3) Reaching a broader understanding of project planning process and develop methods to adjust it to reduce delays in the implementation of construction projects.

Chapter II: Literature review

2.0 Introduction

In the literature review, the researcher incorporated all the information gathered from books, academic journals, and reports to provide a corroborate the importance of current research through secondary data. The researcher critically evaluates the secondary data to determine the validity of the current research.

2.1 Role of Project Planning in Construction

The findings of the research conducted by Akinradewo and Aigbavboa, (2019), postulates that planning is very crucial and important for any activity to be executed to know beforehand the nature of the task, risk and the resources that will be required in order to attain the objectives of the organization. Planning in the construction industry involves establishing the most efficient sequence of events required to complete the project and allocating resources in such a way as to ensure the efficiency of the construction company.

The aim of this research was to evaluate the impact of construction project planning on Contractor's profit in the Nigerian construction industry. The study examined the content of construction industry planning and the role of planning in the construction industry. The research work covers both qualitative and quantitative research methods. The purpose of the interview is to gather the necessary information from the interviewee, and then use a well-structured questionnaire to verify the information received from the interview. The professionals involved in this research work are mainly surveyors, builders, engineers and architects. According to the survey, the results show that there is a positive correlation between the construction plan and the contractor's profits in a specific construction project. The results of the study also show that

well-planned contracts can reduce waste at construction sites, ensure efficient use of labor, help projects be completed on time, at cost and quality, and ultimately increase contractor profits.

2.2 Importance of Economic Factor in Construction Projects

Due to globalization, a majority of firms have started to opt from running their operation in many regions all over the globe, and many of them prefer countries like Middle East (Al Mousli and El-Sayegh, 2016; Khodeir and Mohamed, 2015). The UAE is considered to be among the wealthiest countries of the world having a successful construction industry. The wealth of this country is majorly attained through its oil industry, yet many other sectors such as tourism, manufacturing, and agriculture have also become major contributors to its economy and 25% of the country's GDP is obtained from non-oil sectors. Almost 24% of the world's construction cranes are currently operating in the UAE. Furthermore, the construction industry of the UAE owns the eighth rank among all construction industries due to its advanced technology and is really close to the US that has the fifth rank. The country even tops Germany that has the 16th rank (Khan, 2014).

Several economic factors have a significant impact on the projects, including interest rates, joint ventures, foreign investments, and currency exchange rates (Forteza *et al.*, 2017; Sbia and Alrousan, 2016). These factors can individually result in increasing competition, decreasing consumption, and change the final sale prices as well as profit margins. The economy of the UAE is considered to be a non-diversifiable economy that is dependent on the oil and construction industry, therefore any change in the prices of oil and construction-related elements results in affecting the country's economy. For instance, the oil prices dropped in June 2014, and in the beginning months of 2017, they were almost 60% decreased with around \$55 per oil barrel. Moreover, the International Monetary Fund has expected the price to be \$50 per barrel in

2019 yet almost \$60 per barrel in 2020, still, this could result in decreasing the overall revenues of the oil sector. This variability in the economy has led to a considerably high rate of inflation as well as price fluctuation, and even though the high inflation could be caused by liquidity growth, it is majorly based on the dependence of the central bank of the UAE on its government and improper oil income management. The liquidity growth and governmental dependence of the central bank are a result of the expansionary monetary policy (Sbia and Alrousan, 2016). An unstable economy, high price fluctuations, high inflation, and lack of budget are a major contributor to high risks for the construction sector of the UAE.

2.3 Importance of Cost Factor in Construction Projects

One of the most important aspects of the life cycle of a project is its cost, which is considered to be a major contributor to the success of the project. Although cost management is highly critical, many projects are observed to fail in achieving their goals despite them staying in the identified budget (Larsen, Shen, Lindhard and Brunoe, 2016). Cost overrun is an extremely common issue in project management and is mostly linked with delaying of projects within the construction sector. This issue is a serious one and requires extensive research for ensuring its complete eradication in the coming years. It has also been seen that cost overruns are equally common among the construction industries of both developed and developing countries (Abdul Rahman, Memon and Abdul Karim, 2013). Although it is more commonly experienced in developing countries and here, the cost overruns even exceed all of the specified project costs. Moreover, materials with lower quality result in increasing the overall cost of the construction as a considerable amount of these materials are lost during construction. This happens because of improper material standards and management systems. Also, the inability for preventing cost

overruns or controlling construction costs could result in the failure of construction firms (Memon, Rahman, Abdullah, and Azis, 2010).

2.4 Importance of Planning Factor in the Construction Projects

Project management is a process that includes the beginning, defining, and planning of a project, along with its executing and terminating. This can be seen in the below Figure below. Project planning includes project structuring regarding the tasks related to project scheduling as well as resource allocation. On the other hand, project scheduling aims at determining the beginning and ending dates of the project activities, and resource allocation aim at ensuring the adequate and timely resource supply for the project execution (Klein 1999). The supply of the resources is mostly not permanent and many key resources required for projects are often insufficient. For construction projects, such resources include money, construction materials, equipment, and labor. The main goal of the construction project planning is the timely provision of insufficient materials and labor to the construction projects. Therefore, a relevant project planning method must be selected for the timely provision of the materials and labor to the construction projects since it is a requirement for effective project planning, which means that the project planning should be as accurate as possible but flexible according to need (Yang and Wei, 2010).

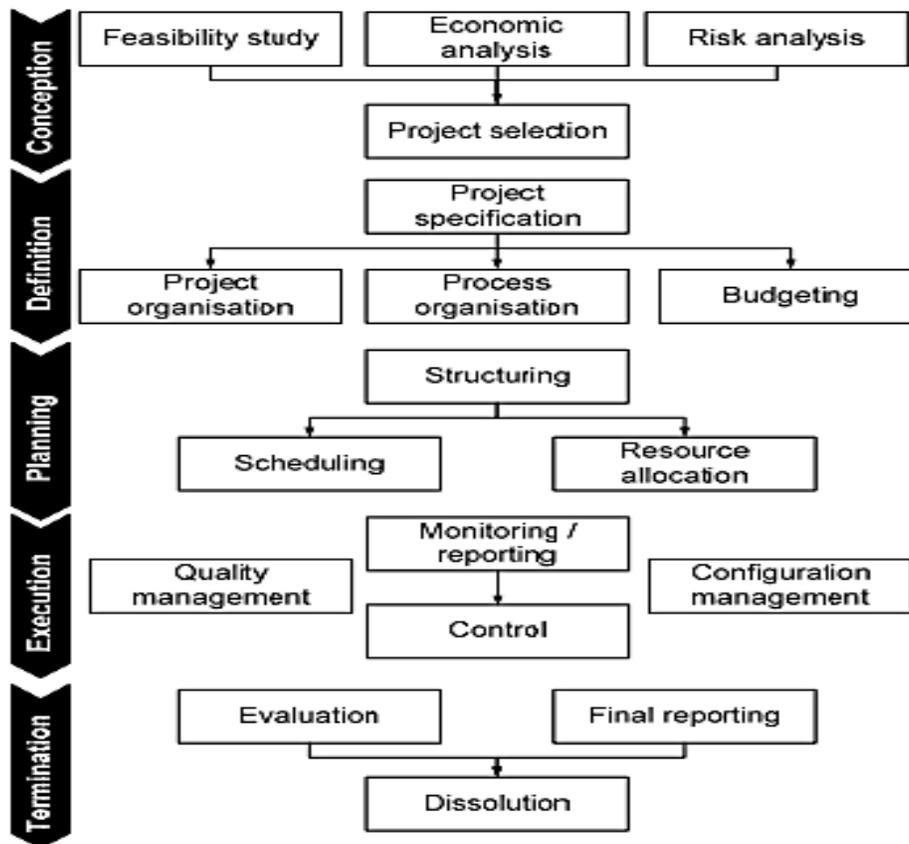


Figure 1: Project Schedule

(Source: Herroelen and Leus 2005)

The project planning leads to the creation of a project schedule that is the classification of a set of the beginning and ending timings of the project activities. The project schedule is an important coordination and communication tool for the processes concerning the external partners within either outbound or inbound supply chain of the company. Moreover, it helps to plan the project activities as well as assign associated resources to every activity based on some performance evaluation and external activities' planning. Therefore, a project schedule is an information source for the advanced reservation of major equipment and labor and refers particularly to a multi-project setting.

Moreover, the planning of external activities is based on a consistent schedule, like delivering data for material obtainment, preventive conservations, or order delivery to external or internal consumers. Concerning the environment of the company, collaboration among the actors within the supply chain involves the timely agreement settlements, capacity for subcontractor work, the agreement on the material delivery, the planning of supporting activities such as supporting personnel and setups, etc., the due dates settlement for the project result delivery, and cash flow projections on the basis of a budgeting schedule (Herroelen and Leus 2005).

2.5 Importance of Project Management and Technology Factor in Construction Industry

Miozzo and Ivory, (2000), conducted a research in the UK using a direct questionnaire with a sample of all the construction process parties including: contractors, consultants, sub-contractors and suppliers. This study aimed to shed light on the administrative components of construction projects and concluded that there is a close correlation between these components. The important facets which were revealed through the research explained that it is important to understand the way of dealing the construction process by the parties. The methods used for inviting tenders and dealing with the stages of project design, supervision and implementation, and the methods of financing each stage. The use of modern technologies in projects that help improve project outcomes (cost, time, quality).

This study recommended the necessity of using modern technology in managing and planning construction projects at all stages, starting with the idea and ending with the delivery of the project and placing it under investment. The researcher has benefited from this study in

enhancing understanding of the components of the construction project and finding ways to ensure balance between all parties to construction projects.

In another study, it has been examined that because of the increasing need for quality improvement in construction projects, it is necessary to reduce and prevent rework by understanding the basis of the work and distinguishing the reasons for it. The research has therefore examined the phenomenon of rework in local projects (Syrian buildings) in terms of their causes and classification. Information was collected to determine the reasons for the rework by a questionnaire for which a number of variables (100 variables) were defined, and these variables were listed under seven main themes: human, coordination and communication, technical and engineering, owner, project management, contract, design.

The study revealed the most important sources that lead to re-employment, including: Under-experienced workers, project implementation after a considerable period of study, short duration set by the owner, poor overall project management, insufficient project study before presenting and separating the design and implementation process. The research eventually recommended the application of quality management policies that could reduce the rework of Syrian construction projects.

Based on our findings in the research, the study suggests that effective and measured measures to reduce reemployment be taken into account, such as: Improve training and supervision of workers, and improve project management, Improve the methods and techniques of communication between the parties to the project, Commit to specifications and develop procedures and work to minimize changes, Work to raise awareness and increase the customer's experience on the project they need, Development of contracting methods and methods of

choosing a contractor, Integrate the work between the designer and the port, and improve coordination within the design process to prevent conflicts.

2.6 Evaluating the Administrative Factors Causing Delays in Construction Projects

Another study was conducted in the State of Qatar (Jarkas and Younes, 2014). It came for the purpose of explaining the importance and influence of the administrative factors on the productivity of construction projects regarding the time accomplished in the flourishing period between 2005 - 2008, by seeking the opinions of a sample of project managers in each of the consulting offices and construction firms. It can be concluded through the study that there is a statistically significant effect of leadership's competence in its dimensions, such as leadership capabilities and skills, human resource selection, time dealing, and awareness of integrative performance elements, on the time set for the construction projects completion. There is a statistically significant effect of administrative efficiency in its dimensions, such as understanding the internal environment of the contractor, team building, external parties dealing, and human relations employees and management, on the time set for the construction project completion. There is a statistically significant effect of scientific and cognitive competence in its dimensions, such as scientific skills, legal skills, current technical environment awareness, current social environment awareness, and human resource management, on the time set for the construction project completion.

It can be recommended on the basis of the study that the necessity of the founders of contracting firms and their director board to investigate and examine the choosing of the human resources that the firm management is assigned to, and that these components have collective management, leadership, experienced and scientific knowledge, as they are not separated from

one another. The salaries paid by contracting firms should not be a hindrance to selecting the human resources that satisfy leadership, administrative, scientific and knowledge requirements. The formation of a union or a syndicate for contractors through which their problems can be presented to the stakeholders, and discussed in order to facilitate dealing with these problems in a way that does not stand in the way of their aspirations and goals. Establishing professional academies for training in order for providing the construction employees with theoretical, scientific, professional, and cognitive experiences. The researcher has benefited from this study in crystallizing the general formula for his study and laying out broad lines for it in line with the proposed research content. The researcher also benefited from this study in formulating and designing the proposed questionnaire to collect data and analyze the study.

2.7 Role of Administrative Performance in the Construction Industry

A study was conducted by Ahcom (2004), in Saudi Arabia; a questionnaire was used to collect the opinion of project managers and engineers in both contracting and consulting companies. The purpose of the study was to build a special model to develop contractors' administrative performance. It also concluded that delay reasons in construction projects are directly related to the increase of the cost. This effect can be reduced through: pre-planning the project, continuous monitoring of the project plan by the project management team, coordination between the contractor and the external parties that are associated with the project, including suppliers, subcontractors and others. The contractor's dedication of timely providing highly skilled teams, trained labor, and quality materials.

The study recommended that the contractor form work teams of different specialties with high expertise and pay attention to effective communication, advance planning and control of planning at all stages of the project. This study has benefited the researcher by relying on many

points as a basis for his study, especially with regard to the planning aspect and its relationship to the time of project implementation.

2.8 Effective Ways to Achieve Technical Teams

The study was conducted by Raidén, Dainty and Neale, (2006), in the UK, and relied on collecting statistical data from project managers at contracting companies; and focused on finding the most effective way to achieve technical teams' and workers' needs in construction companies and how they relate to projects' requirements that they work on. The study pointed out the importance of project management's interacting with human resources and senior management in order to consolidate project's objectives for all workers.

The study recommended that good selection of human resources and taking care of training, participation, support and motivation to enhance motivation at all organizational levels. The researcher profited from this study in formulating the items of the questionnaire, especially with regard to the stage of preparing the plan.

De-motivational Factors Affecting Performance and Productivity

Radosavljevic and Wuyi, (2014) state that the deep analysis of past literature showed a lack of adequate research related to the de-motivational factors that affect the productivity and performance of the managers of site-based construction projects. After it was announced that the hosting rights of the FIFA 2022 World Cup have been given to the State of Qatar, the government has promised to spend almost ten billion dollars on several new construction projects. Thus, this study aims at the identification, exploring, and ranking of the comparative significance of the de-motivational factors that influence the construction management productivity of the state.

The study results show various important de-motivational factors that influence the performance of the construction project managers, including lack of financial incentive schemes, remuneration scale, slow decision-making processes, response delay towards Requests for Information (RFI), skilled labor and material shortage, frequently changing orders during project execution, low quality of drawings, clarity and completeness of technical specifications, and rework. This research identifies the negative facets that contribute in sabotaging the performance and productivity of construction products which help the researcher of current study to emphasize on both positive and negative factors.

2.9 Delay in Public Construction Projects in Jordan

Samarah and Bekr, (2016) claim that the construction industry is one of the major economic sectors of Jordan. This sector has to face many significant issues related to cost and time overrun. This research aimed at the detection of the main factors that caused delays in the public projects of Jordan and finding the impacts that these delays had on project productivity. This objective was achieved by performing a thorough literature review and field study for finding the insight of the main parties that were involved in implementing the construction projects in the country. The questionnaire conducted for this research has been divided into three divisions, i.e., the introductory part, the causes indicated by the literature review (55 causes), and further categorized in four groups, and the impact that these causes have on the project productivity. The questionnaire responses were gathered from 146 respondents that includes the contractors, clients, and consultants.

The data was analyzed by determining the frequency of severity, occurrence, and significance of all individual delay causes. The research helped researcher by presenting the

ranking of the major factors for every group as well as the major factors for the overall survey. Moreover, it also provided the causes of the delay that impacted the project productivity.

2.10 Factor of Time and Cost Overruns Delay Construction Residential Projects in Zimbabwe

Nyoni, (2018) stated that in the construction sector of Zimbabwe can be accounted for over 20% of the annual GDP of the country. The industry was expected to raise in 2012 by almost 1.5% and help in creating new job opportunities for the public. In 2014, it provided around 3% to the national GDP. The growth forecasts show that by 2018, this sector is predicted to grow further to almost 15% of the GDP. Therefore, the construction sector requires proper development that will have a broad influence on the overall economy. Still, its contribution to Zimbabwe is often low due to the occurrence of delays and a major issue faced by this sector is the delay of construction projects and infrastructure that creates hindrances in the expected economic growth.

Constant and long-term delays in construction projects are becoming a common problem in the business operations of the country. The completion of the project within the decided time and budget is considered to be a significant standard of its success by the contractors, clients, consultants, and other stakeholders. The main goal of all residential construction projects is their timely and on-budget completion. Yet these major goals are often not achieved due to the occurrence of delays and they lead to causing major reductions in the profits of these projects. Delays in the construction projects have a significantly major effect on the sponsors, clients, project team members, and participants of the project. These also cause conflicts, disagreements, suspicions, financial problems, and even lawsuits.

Furthermore, it can also be noted that a serious lack of housing is present in Harare, the city of Zimbabwe, which a heavily-populated city and thus, requires more housing projects. Thus, construction project delays are causing harm to construction firms as well as their clients. The study results also show that weak onsite financial control, unproductive budgeting schedule, and unsuccessful site management are major causes of the construction delays. It can also be observed that the additionally required time and costs are among the significant impacts of the delays in the construction projects of the country. Some recommendations for the minimization of the delays in these projects are frequent party meetings, efficient planning, and effective cost estimation of the project.

2.11 Financial Factors Delay Construction Projects in Yemen

Alaghbari, Saadan, Alaswadi, and Sultan, (2018) state that delays in construction project implantations are a major issue in Yemen, particularly in public projects. This research aims at identifying the major factors that result in delays in construction projects in the region. For the achievement of this objective, a questionnaire was developed and provided to structural and architectural engineers working on construction projects. These questionnaires comprised of 32 predefined causes that were further grouped by five factors, i.e., managerial, financial, technical, materials and equipment, and external factors. After the successful collection of the responses, the relative importance index (RII) was calculated and a ranking was done for the causes based on their groups. The results revealed that the financial factor group gained the first ranking between the total groups. The five major factors that caused the delay in construction projects of Sana'a – Yemen were as follows:

- (1) Delay in the receiving of the progress payments by contractors
- (2) Financial challenges faced by clients

(3) Insufficient experience of the contractors or consultants

(4) Improper site management and regulation

(5) Inadequate cash for project implementation

This research helps the researcher by highlighting the significance of the acknowledgment of the major factors and the causes that resulted in causing delays in the construction project in Yemen for successfully implementing the construction projects.

Effect of Poor Management and Planning on the Duration of Construction Projects

Khalid (2019) states that the construction sector plays an important part in the economy of countries and helps in the creation of increased wealth and employment opportunities. Still, there several construction firms have to face issues related time overrun and delay in the completion of the projects, which results in surpassing the time and costs of the project. Although project management has significantly benefited the construction industry and has proved to be an effective strategy for the successful project implementation, the problems still arise because of improper management or planning, leading to delays in project completion, excessive expenditure, and lower quality, all of which results in the dissatisfaction of the client and loss for the project owners. This paper aims at reviewing the effects that poor management and planning have on the construction project duration. The research is based on the descriptive methodology that refers to the researcher reviewing past research and literature to identify the relationship that the poor management and planning of project has with the delay occurring in the construction projects. The literature analysis of the research shows that according to many researchers, poor project management and planning is a major cause of delays occurring in the construction projects. It can be concluded that poor management and planning of the

construction projects could result in causing adverse impacts on the completion and overall costs of the projects. The delays in the construction projects result in causing reduction in the profits provided by the projects. Such issues can be avoided or decreased through proper initial planning and effective project management since these both are essential for the success of the construction projects.

The management and planning of the construction projects aim at the organization, planning, coordination, monitoring, and controlling of the achievement of the project objectives in the best possible manner as proposed by the partners of the project according to their requirements. These include various processes and sub-processes and involves the identification of the project's scope as well as the responsibilities of the workers, cost evaluation, stakeholder management, and effective utilization of the control and arrangement tools and strategies. This requires the understanding of the basics of the project management while considering the main objective for ensuring project success and high profits by managing the estimated time, costs, and quality efficiently. The lack of such understanding would cause improper implementation of the project, having adverse effects on its productivity and results (Assaf and Al-Hejji, 2006).

2.12 Critical Success Factors (CFS) for Project Management in Construction Projects

Alias, Zawawi, Yusof and Aris, (2014) state that in terms of project management, critical success factors (CSFs) can be referred to as the conditions, characteristics, or variables having a major influence on a project's success if it is effectively maintained, managed, and sustained. Various studies identify various CSFs and insufficient harmonious views between the researchers regarding the judging criteria for the success of a project as well as the factors influencing it (Fortune and White, 2006). Moreover, various studies related to the CSFs have

also revealed the influence context based on which, the factors are categorized as significant or which CSFs are associated to the project's success. The management operations in the construction projects of most construction firms could be effectively implemented through the exploration of the critical success factors (CSFs) to ensure the improvement of project productivity.

The CSFs approach was developed almost two decades ago and has been used popularly since then (Chan, *et al.* 2004). However, many studies still concentrate on the traditional “iron triangle” that are cost, quality, and schedule, i.e., the criteria for project success measurement, of conventional construction process instead of the supportable buildings (Walker and Shen, 2002). A majority of the studies have only focused on the essential critical project attributes that are particularly associated with green building projects, including early project team member's involvement (Lapinski *et al.* 2006) and integrated project delivery methods that are often not considered to be major success factors that would improve the project performance regarding cost, time, and quality.

Five variables have been identified in this study, which are Project Management Action, Human Factors, Project Procedures, Project Related Factors, and External Issues for achieving a competitive edge in the construction sector. The study results would help the project management practitioners in achieving certain construction performance levels. They will also help in defining the critical factors that cause the success of a project and offer a forecasting tool for enabling the parties to quickly evaluate the likelihood of the success of the project. The study also explains a conceptual framework to determine the critical success factors within project management practices for project success that are based on five variables considered during the phases of the project management for enhancing the possibility of the success of the project.

After the identification of the project success variables, the researcher can easily determine the critical success factors that are required for successful practices of project management.

Therefore, it can be concluded with the help of this review based on numerous studies and pieces of literature that poor planning and weak management of the construction projects could have multiple adverse impacts on their completion and duration. The delay in the construction projects and issues associated with their duration often cause the failure of the projects and reduce their profits massively. These issues can be avoided by effective initial project planning and proper project management since both of these factors are essential for the successful implantation of construction projects.

Chapter III: Methodology

3.1 Methodology:

This research aims at the examination of the effect of weak planning regarding the time taken by the construction projects in Dubai. Still, the influence that methodology has on the data and the retrieved results are clear. The following chapter explains factors like research design, target population, sample, sampling techniques, data sources, and data collection methods that have been used in the study for data collection.

3.2 Correlational Research Design

Correlational research design is considered to be a non-experimental research design technique that enables the researcher to build an effective relationship among two variables that are closely connected. It uses two variables that are dependent and independent variables (Curtis, Comiskey, and Dempsey, 2016). This technique does not make any assumption during the evaluation of relationships among the variables and the statistical analysis techniques are used for calculating these relationships. For this research, poor planning is taken as the independent variable and the delay in the projects is taken as the dependent variable.

The correlation among the two variables having value ranges between -1 to +1 is determined by a correlation coefficient. In the case of the value of the correlation coefficient being near +1, the relationship among the variables is considered to be positive while closer to -1 indicates a negative relationship (Benesty, Chen, Huang and Cohen, 2009).

3.3 Data collection methods

Data collection methods have two main types, which are primary data and secondary data (Mackey and Gass, 2015).

3.3.1 Primary Data

Primary data is considered to be more accurate as it is originally gathered by the researcher and has not been present prior to the specific research (Thomas, 2015). The collection methods for primary data include focus groups, case studies, interviews, surveys, and questionnaires. The primary data for this research is collected through the questionnaire method. This data will allow the researchers to conduct their research effectively as it is updated and thus, is able to support the research objectives (Rahman, 2017). The selected data collection technique would also enable the researchers to address the objectives set in Chapter 1.

3.3.2. Questionnaire Method

A questionnaire is referred to as a set of written questions that a selected set of participants have to answer. The method is assumed to be one of the most popular and easy methods for quantitative data collection from the targeted population. The questionnaire for this research includes structured questions for increasing the efficacy of the quantitative data that has been collected through it (Rowley, 2014).

Moreover, it has been designed on the basis of the experience in the arena of construction projects and reviews of past literature. It was then provided to the project managers for determining the level of influence that poor planning has on the delay of project completion in Dubai.

3.3.3 Secondary Data

According to Johnston (2017), secondary data is the second-hand information that is collected and organized by previous researchers so that it could be used and referenced in the future. Secondary data saves both the time and costs for the researcher as it does not require the processes of data collection. (Cole and Trinh, 2017). The secondary data for this research's literature is taken from various resources such as books, articles, and journals, etc. and helps to understand the fundamental elements and conceptions of the study.

3.4 Sample Population

The research population can be defined as the group of people from which a small subset is selected for the conduction of logical questioning. Taherdoost (2016) states that the targeted population must comprise all the essential elements that have to be investigated for the research. For this study, the sample population is the managers of various construction projects that are being operated in Dubai.

3.5 Sampling Design

This research uses a random sampling technique. For this technique, the managers of various organizations have chosen randomly for distributing the questionnaire. (Christensen et al., 2011). These managers have been working over various projects for various construction firms across the city of Dubai. A sample of 150 project managers had been chosen for the questionnaire distribution among which, 120 provide proper responses. This was then followed by the collection and SPSS analysis of these survey responses.

3.6 Variables of the Study

The research includes the following variables:

- Poor Planning (The independent variable)
- Duration of Construction Projects (The dependent variable)

Some of the additional variables that have been included or used for constructing the questionnaire are as follows:

I. The Concept of Planning:

Planning refers to the alignment of the requirements and the things that can be practically available. It can be defined as the mobilization, coordination along with the direct resources, manpower, and energy used for achieving the objectives in a specified time period by following the plan at minimal costs.

The development of engineering planning for construction firms is considered to be a major function for the project leader while the firm's engineering management is responsible for its promotion as an essential function that only completes after the objectives have been achieved successfully by the administration that has implemented the engineering plan.

❖ **Plan Preparation:** The plan preparation phase can be further divided into the following:

1. **Understanding the nature of the engineering project:**

Engineering projects are considered to be a particular kind of technological systems that are recognized specifically by particular codes for which the implementation of the projects should be registered engineers or engineering firms that hold a license for conducting projects like the designing and constructing of buildings, factories, industrial installations, and other infrastructure and networks.

The contract signed between the project owner and the construction firms includes the project scope. Therefore, an engineering project can be further divided into the design and construction phases. The outputs provided by the design phases are the calculations, drawings, similar design documents that are required for the implementation of the subsequent construction phase.

2. Defining Objectives:

The efficacy of a project can be measured through three factors, i.e., time, cost, and quality. Usually, the main objective of a project is its implementation by utilizing minimum time and costs, yet yielding maximum quality. But practically, all of these goals cannot be achieved simultaneously, for instance, projects completing in short durations require higher costs. Thus, it is important for managers to use such an approach that balances the attainment of all three goals. These three goals are explained as follows:

- ✓ **Time:** The time required for the completion of the project events or a specific point on the project timeline.

- ✓ **Cost:** The total cost required by the project, including that of the utilized labor, materials, and additional indirect expenses.

✓ **Quality:** The satisfaction of the desired or defined specifications or requirements by the product or service that is delivered as the result of a project.

3.7 Research Hypothesis

- **Main hypothesis 1:**

The poor planning done by construction firms is considered to be one of the major reasons behind the delay caused in their project completion. This perception has been provided by the group of respondents of the questionnaire, which comprised of managers of firms that worked on construction projects. The hypothesis is further divided into three parts:

- H1: First sub-hypothesis:

The reason for the delay caused in the project completion is because of the poor understanding of the engineering and administrative planning done by the construction firms.

- H2: Second sub-hypothesis:

The reason for the delay caused in the project completion is because of the inadequate awareness of the significance of the engineering and administrative planning done by the construction firms.

- H3: Third sub-hypothesis:

The reason for the delay caused in the project completion is because of the inability of the construction firms to depend on the factors of efficient engineering and administrative planning as the foundation of the successful achievement of their objectives.

- **Main Hypothesis 2:**

- H1: Cost is an important factor for the construction projects
- H2: Cost is not an important factor for the construction projects

- **Main Hypothesis 3:**

- H1: Planning is an important factor for the construction projects
- H2: Planning is not an important factor for the construction projects

- **Main Hypothesis 4:**

- H1: Economic Factors are important for the construction projects
- H2: Economic factors are not important for the construction projects

3.8 Data Analysis Technique

The respondents of the questionnaire provided the best possible responses to the inquired questions. Following the phase of data collection, SPSS was the tool that was used for the attainment of the percentage and frequency of the close-ended responses. SPSS refers to a statistical tool that helps in the statistical data analysis and then the usage of that data for the primary data.

3.9 Ethical consideration

No part of the research study has been plagiarized and all of its content is accurate. The data taken from other resources have been cited using the Harvard referencing. The information provided by the questionnaire participants have been protected and will not be shared with any third-party (Fellows and Liu, 2015).

They were also clearly told about the purpose of the questionnaire and the related research, including the risks and benefits that the research could have. They were also not forced to provide any kind of information, such as the research-related data and personal information, in their response. Moreover, the participants have the chance and right to not provide any kind of response, or not answer any or all questions.

Chapter IV: Data Analysis

4.0 Demographic Variables

The below-mentioned figure 2 shows that there were a total of 120 respondents out of which 15.8% respondents were between 20 and 25 years, 21.67% respondents were between 26 and 30 years, 18.3% respondents were between 31 and 35 years, 19.2% respondents were between 36 and 40 years and 25% respondents were above 40 years. The result of this pie chart shows that most of the respondents are middle-aged.

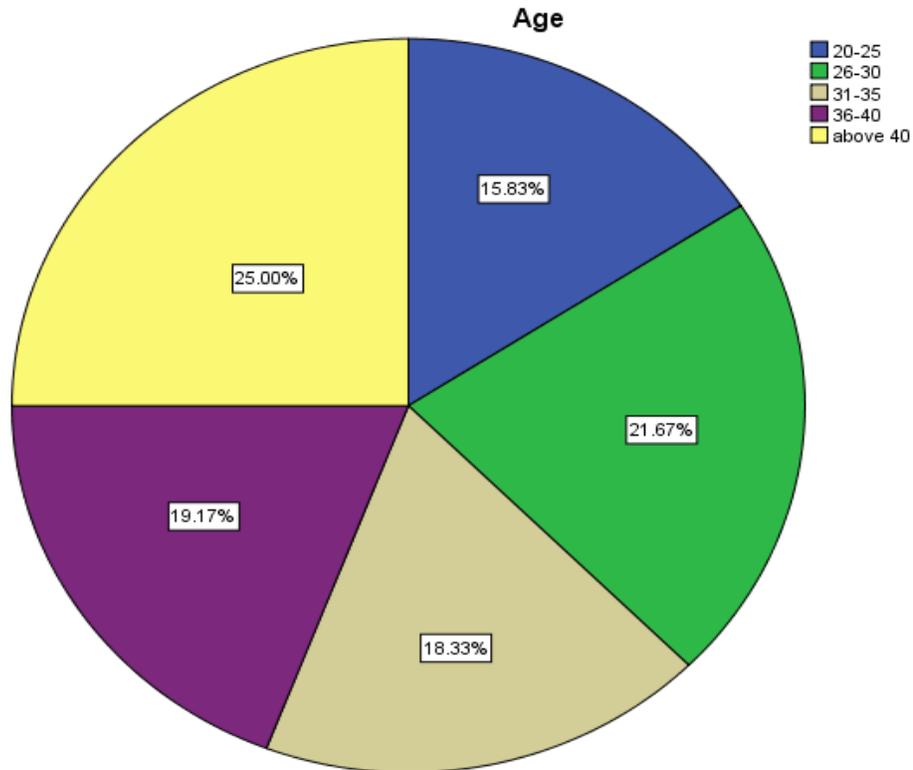


Figure 2: Age of Participants

The below-mentioned figure 3 shows that there were a total of 120 respondents out of which 22.5% of respondents have 1-year experience, 13.3% of respondents have 2 years' experience, 20% of respondents have 3 years' experience, 20% of respondents have 4 years' experience and 24.2% respondents have above 4 years' experience. The result of this pie chart shows that the majority of the respondents are experienced workers.

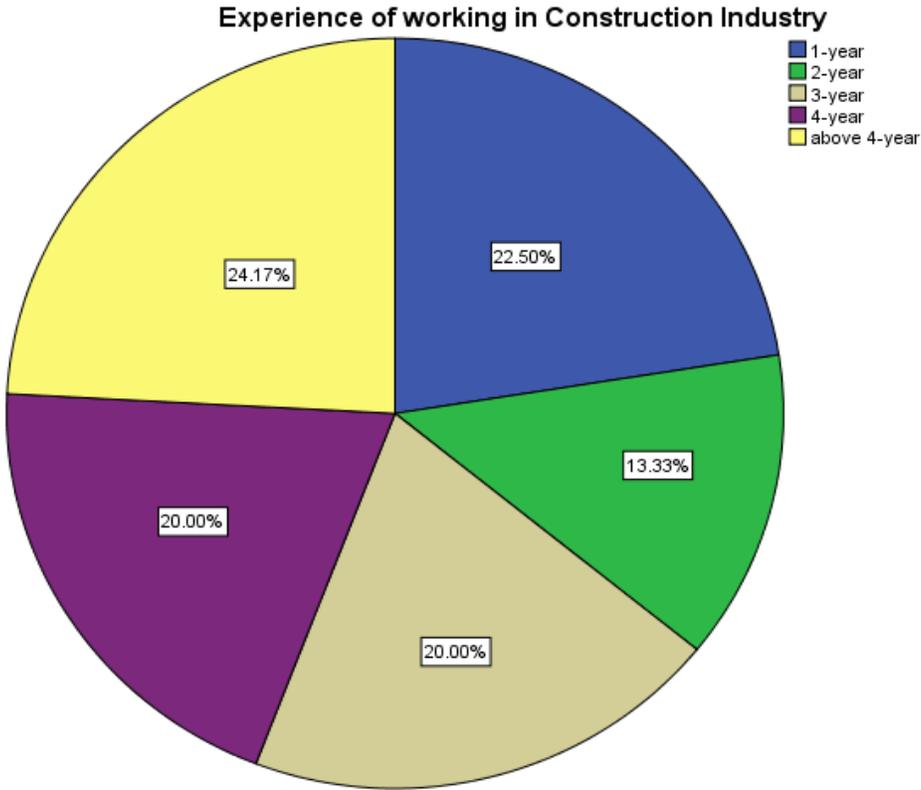


Figure 3: Working Experience of Participants

The below-mentioned figure 4 shows that out of the total 120 respondents, 45% of respondents are female and 55% of respondents are male. The result of this pie chart shows that the majority of the workers working in the construction industry are male.

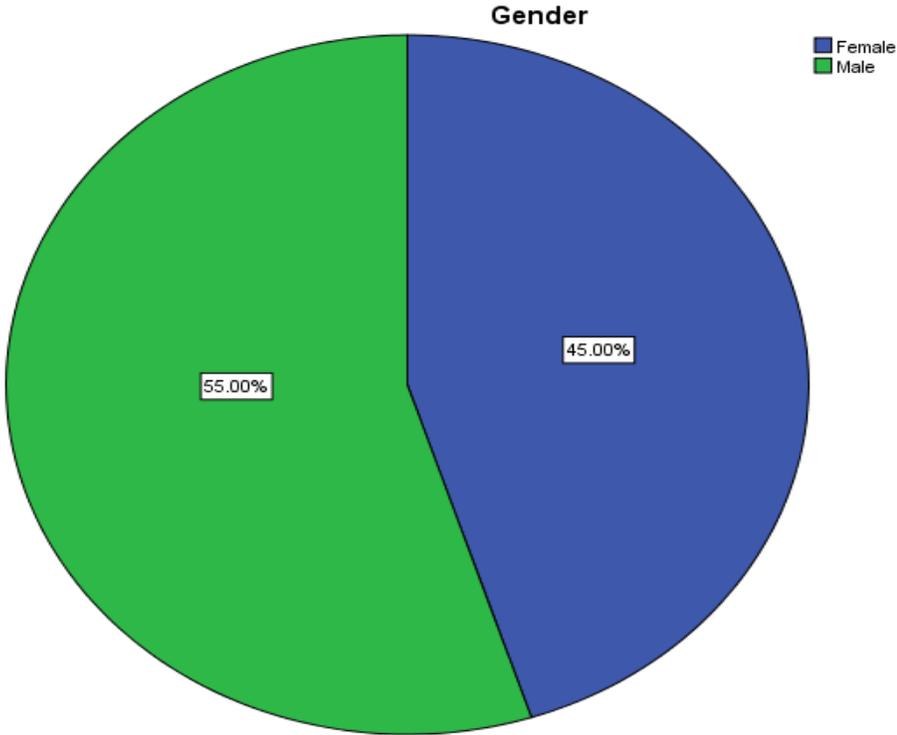


Figure 4: Gender of Participants

4.1 Descriptive Variables

Figure 4: Correlation Analysis

The below-mentioned table shows that the correlation between dependent and independent variables. Here the independent variable was poor planning and the dependent variable was the duration of construction projects. As per our findings of correlational analysis, it is seen that both of these variables are positively correlated with each other which means if there is poor planning then construction project will be delayed and vice versa.

Correlations of Independent and Dependent Variable

		Poor Planning	Duration of Construction Project
Poor Planning	Pearson	1	.236**
	Correlation		
	Sig. (2-tailed)		.009
	N	120	120
Duration of Construction Projects	Pearson	.236**	1
	Correlation		
	Sig. (2-tailed)	.009	
	N	120	120

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

The below-mentioned figure 6 shows that there are a total of 120 respondents, out of which 13.3% strongly disagreed that time is an important factor during the planning phase of the construction project, 13.3% disagreed, 20.8% were neutral, 33.3% agreed, and 19.2% strongly agreed. The result of this graph shows that most workers agreed that there is a significant factor during the planning phase of the construction project.

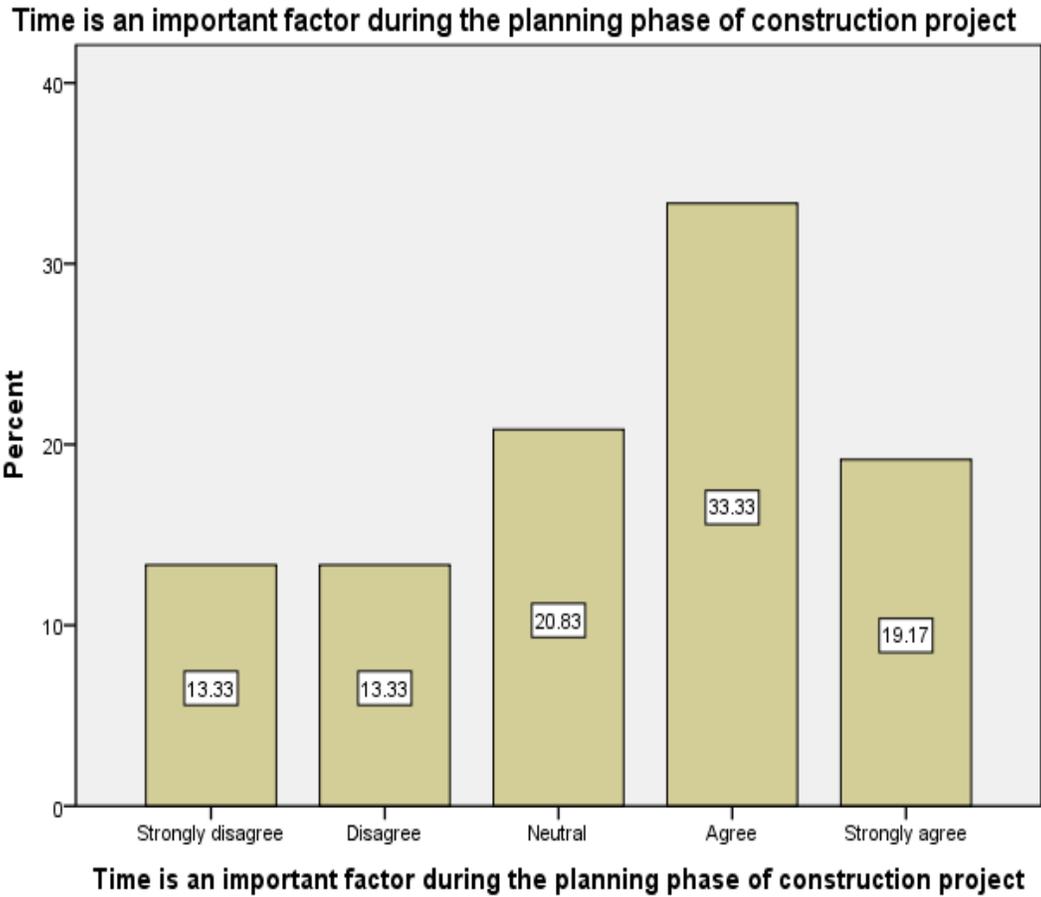


Figure 6: Importance of Time in Planning Phase

Out of the 120 respondents, 26.7% strongly agreed that cost influence the planning phase of a construction project, 19.2% agreed, 20.8% responded neutrally, 18.3% strongly disagreed, and 15% disagreed. The result of this graph shows that the majority of the workers strongly agreed that cost influences on the planning phase of the construction project. In the literature, it has been explained that cost overrun is an extremely common issue in project management and is mostly linked with delaying of projects within the construction sector. This issue is a serious one and requires extensive research for ensuring its complete eradication in the coming years (Abdul Rahman, Memon and Abdul Karim, 2013).

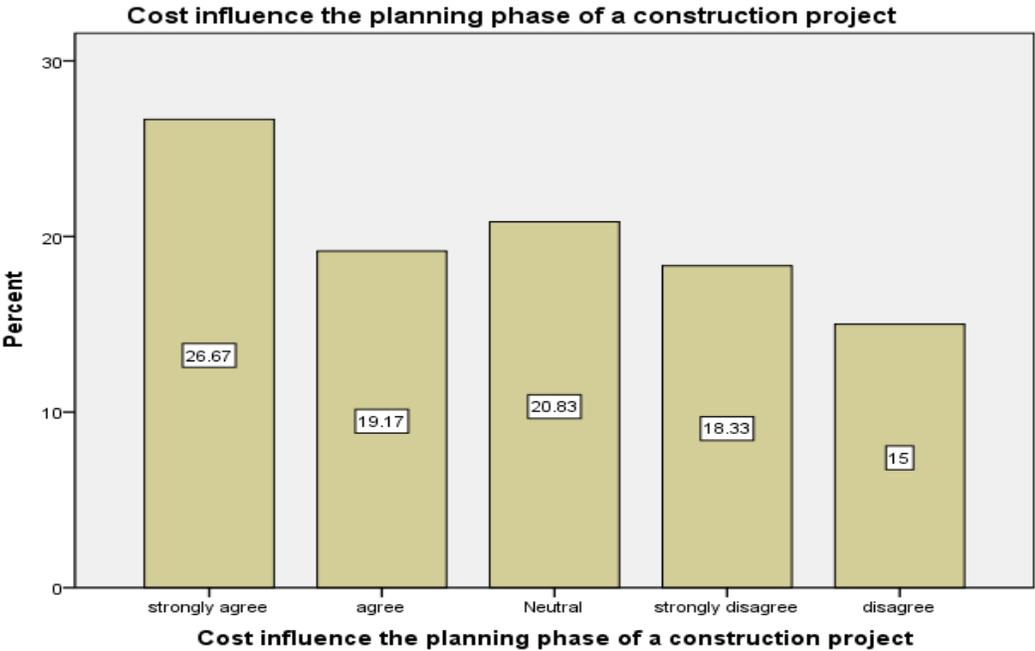


Figure 7: Influence of Cost on the Planning Phase

The below-mentioned figure 8 shows that there were a total of 120 respondents, out of which 7.5% of strongly disagreed that quality factor is significant for a construction project, 8.3% disagreed, 17.5% were neutral, 31.67% agreed, and 35% strongly agreed. The result of the graph shows that the most of the participants strongly agreed that quality is a significant aspect in the construction projects.

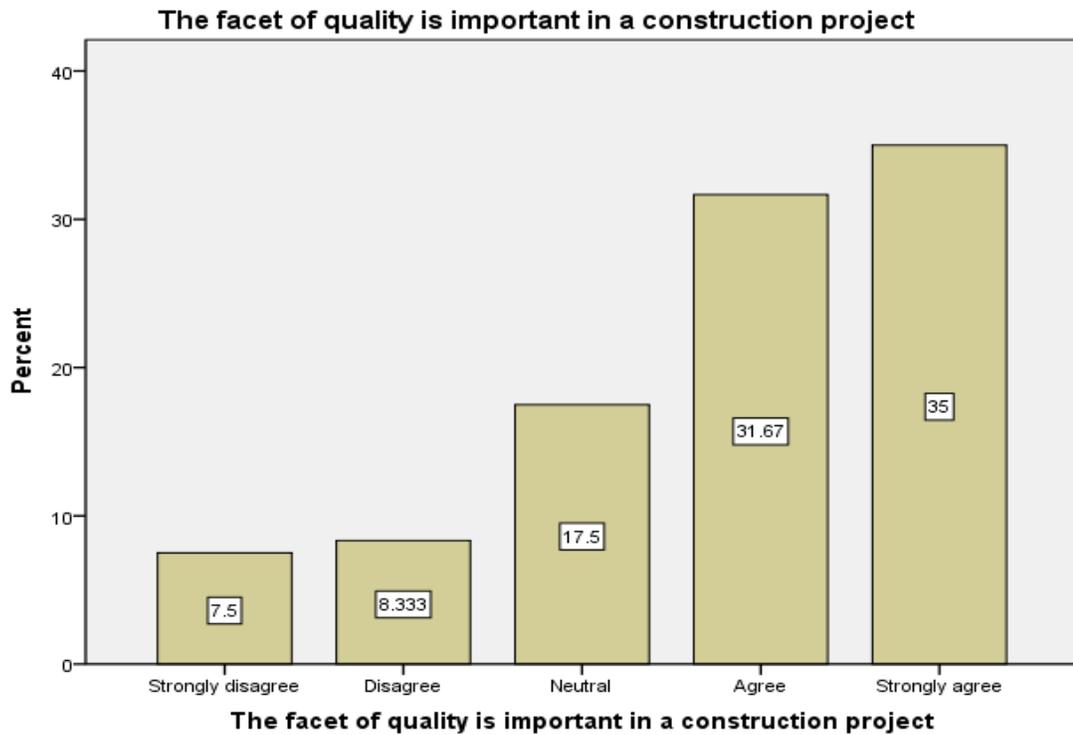


Figure 8: Importance of Quality in a Construction Project

The above-mentioned figure 9 shows that out of the total 120 respondents, 35% strongly agreed that for a construction project, project scheduling is significant, 30.83% agreed with this view, 19.17% remained neutral, 9.167% strongly disagreed, and 5.8% disagreed. The result of the graph shows that most respondents believed that project scheduling is significant for the planning phase of a construction project. In the literature, the research of Yang and Wei, (2010), reveal that a relevant project planning method must be selected for the timely provision of the materials and labor to the construction projects since it is a requirement for effective project planning, which means that the project planning should be as accurate as possible but flexible according to need.

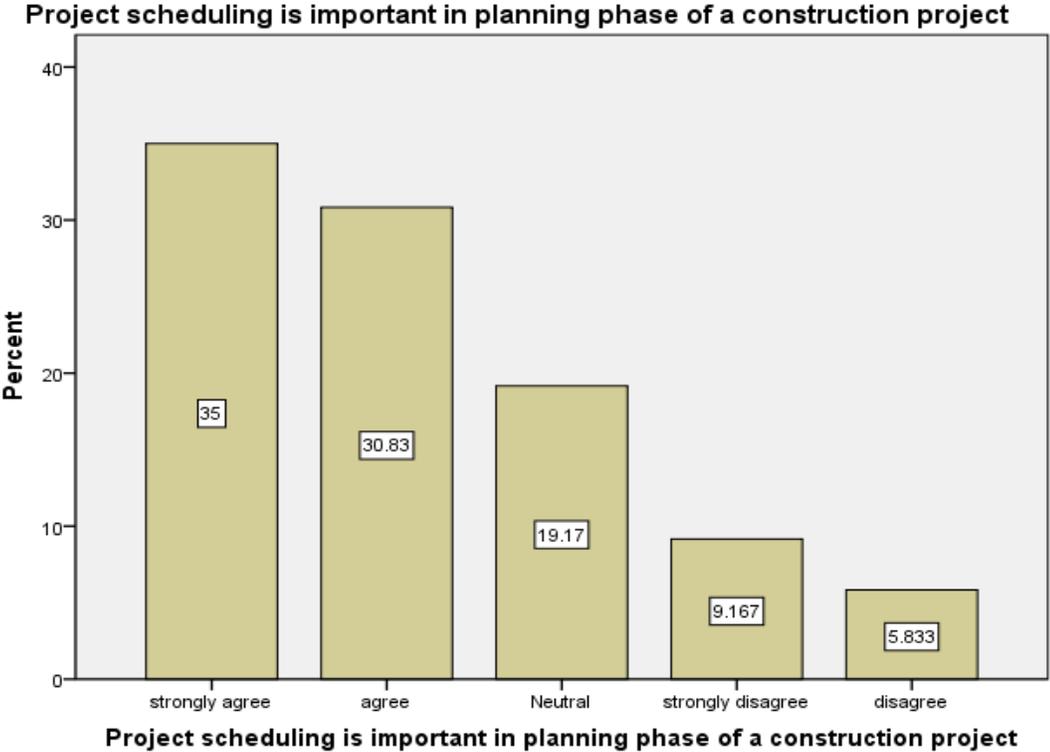


Figure 9: Importance of Project Scheduling in Planning Phase

The below-mentioned figure 10 shows that there were a total of 120 respondents, out of which 10.8% strongly disagreed that planning of a construction project helps in to saving time, 20% disagreed, 18.3% remained neutral, 24.2% agreed and 26.7% strongly agreed. The graph result shows that the most of the participants strongly agreed that planning plays an important role in saving time.

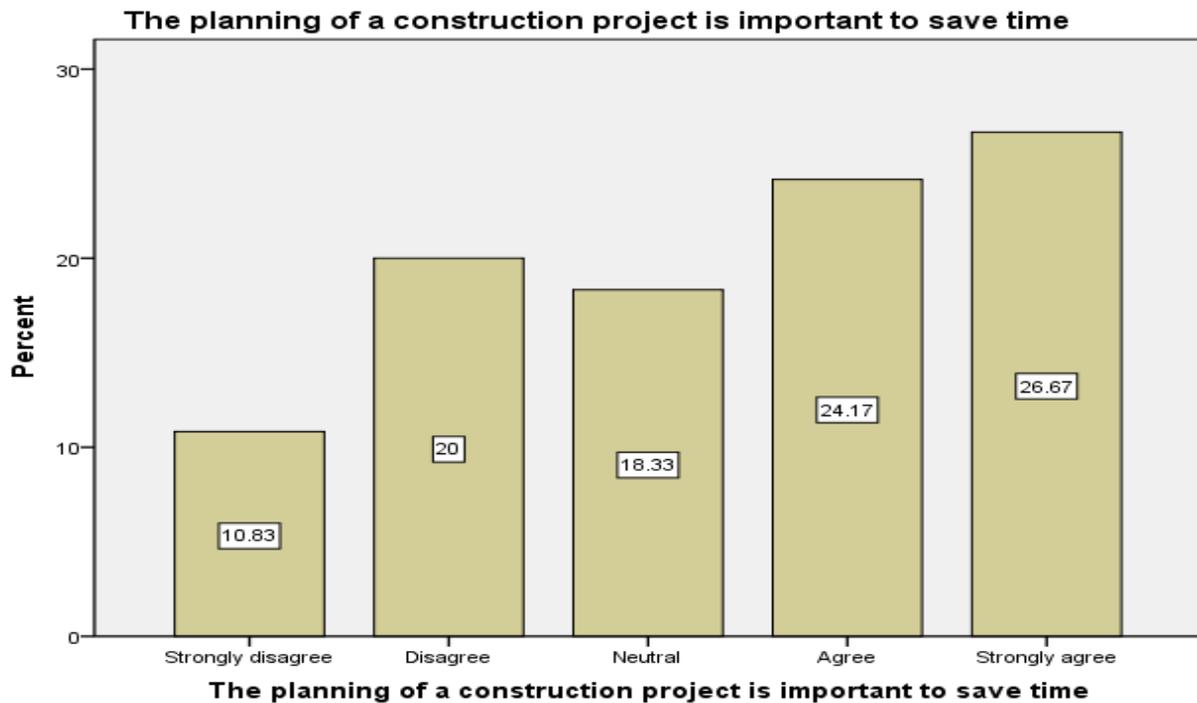


Figure 10: Planning of a Construction Project is Important to Save Time

The below-mentioned figure 11 shows that there are a total of 120 respondents, out of which 17.5% strongly disagreed that the poor administrative and engineering planning of construction companies is a main reason for the delay in the completion of their projects, 14.2% disagreed, 14.2% were neutral, 32.5% agreed, and 21.7% strongly agreed. The graph result reveals that most respondents agreed that main reason for the delay in the construction projects completion are poor engineering and administrative planning of construction firms.

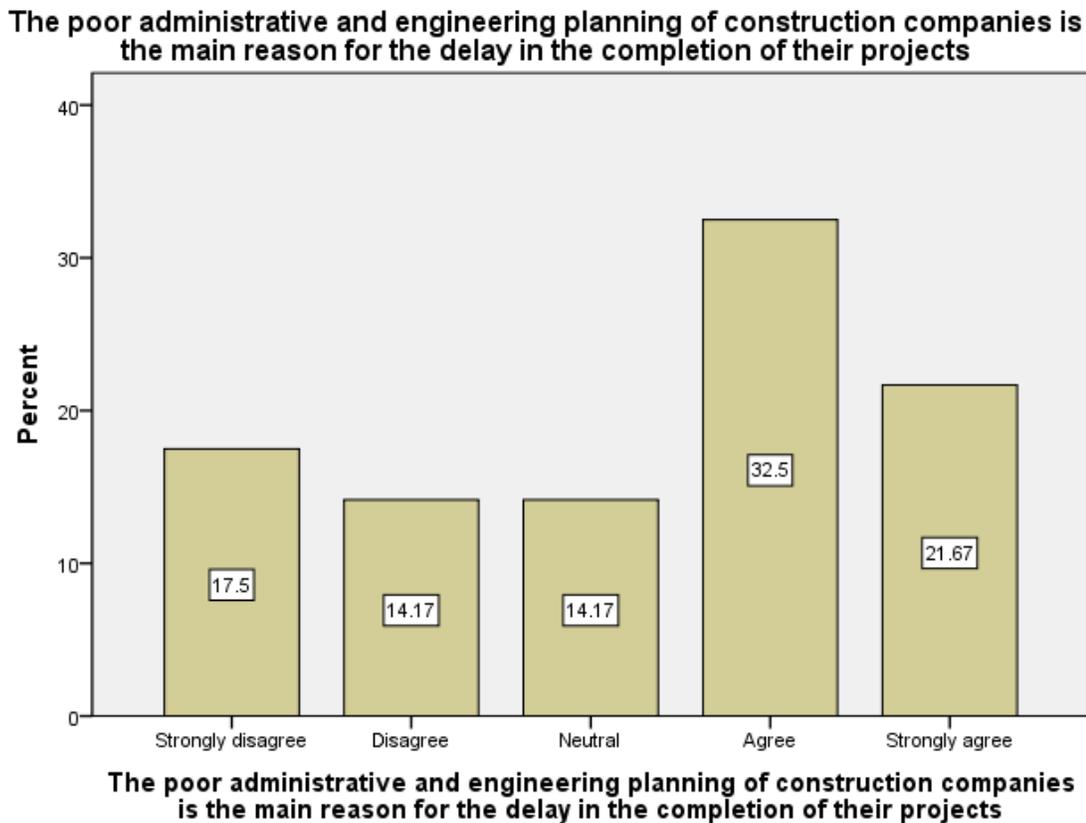


Figure 11: Poor Administrative and Engineering Planning Delays the Construction Project

The below-mentioned figure 12 shows that out of the total of 120 respondents, 25.83% agreed, 17.5% remained neutral, 26.67% strongly agreed, 15.83% s disagreed, and 14.17% s strongly disagreed. The graph result also shows that the most of the participants strongly agreed that delay in the completion of engineering projects is due to the insufficient realization of the importance of administrative and engineering planning in the construction companies.

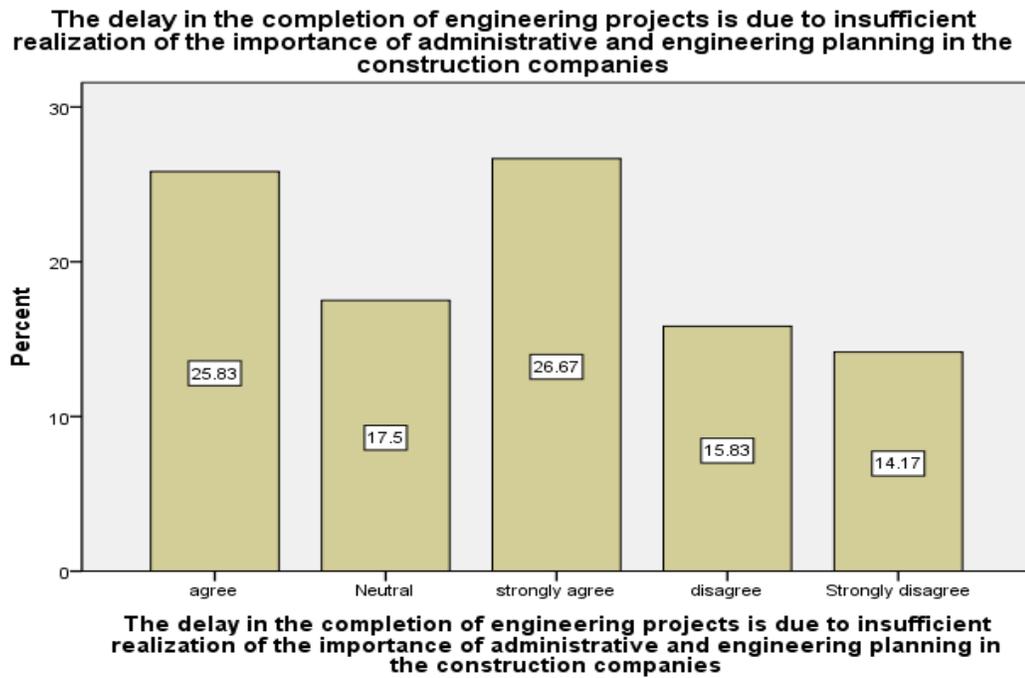


Figure 12: Importance of Administrative and Engineering is Ignored in Construction Projects

The below-mentioned figure 13 shows that when the respondents were asked if the delay in the engineering project completion is due to unclear understanding of the concept of engineering and administrative planning of construction companies, 21.67% of them agreed, 23.33% were neutral, 25.83% strongly agreed, 14.17% disagreed, and 15% strongly disagreed. The result of the graph reveals that most respondents strongly agreed that unclear understanding of the concept of administrative and engineering planning of construction companies resulted in the delay of the engineering project completion.

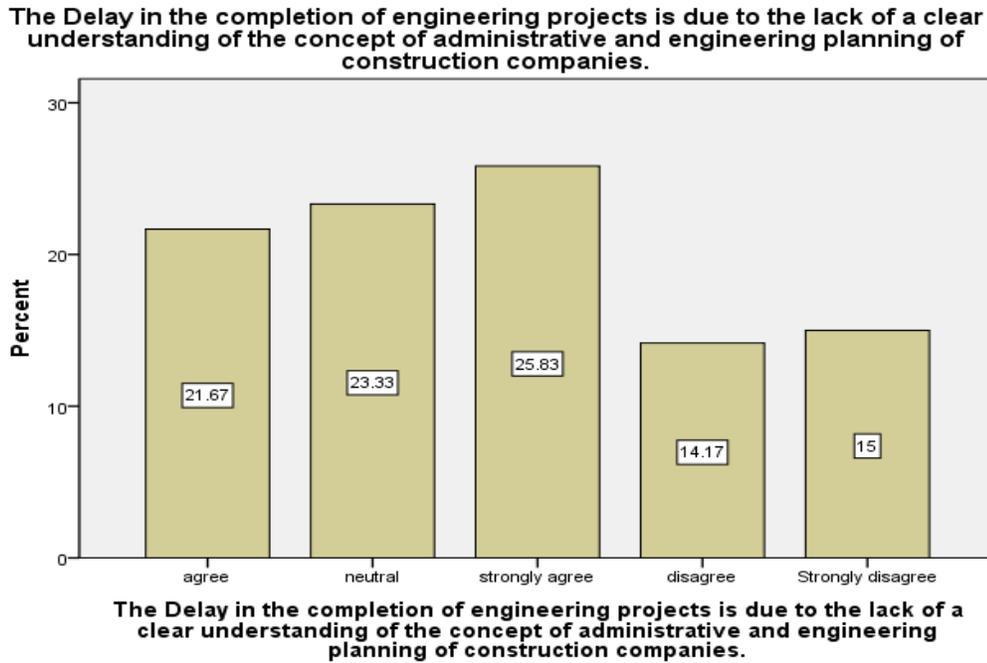


Figure 13: Lack of Clear Understanding Delays a Construction Project

The below-mentioned figure 14 shows that there was a total of 120 respondents, out of which 20% strongly agreed, 30.83% agreed, 13.33% were neutral, 16.67% strongly disagreed, and 19.17% disagreed. The result of the graph reveals that most respondents agreed that delay in the completion of engineering projects is due to the failure of the contracting companies to rely on the elements of effective administration and engineering planning as the basis for the success of their plans.

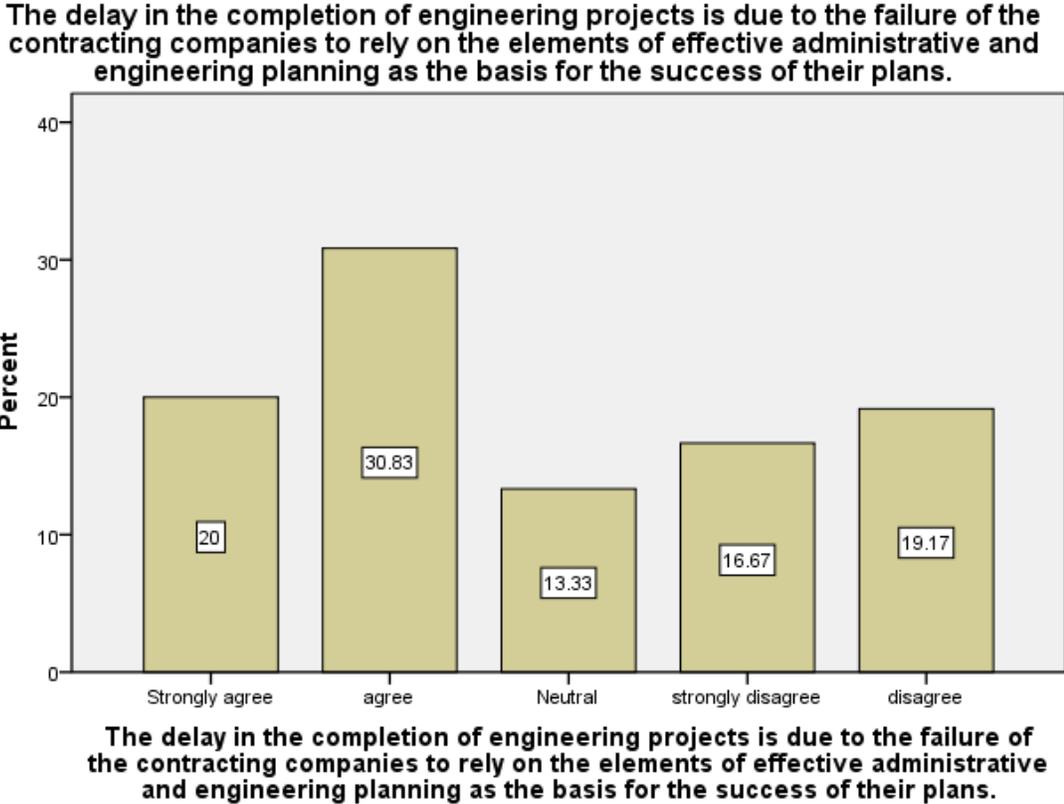


Figure 14: Failure of Contracting Companies in Meeting Effective Administration and Engineering of Projects

The below-mentioned figure 15 shows that when the respondents were asked if the quality of a construction project is associated with compliance of the product with the required specifications, and following specific requirements in the product or service provided to the customer, 19.17% of them strongly disagreed, 10.83% disagreed, 17.5 were neutral, 22.5% agreed, and 30% were strongly agreed. The graph result shows that the most of the participants strongly agreed that in any construction project quality is associated with compliance of the product with the required specifications and following specific requirements in the product or service provided to the customer.

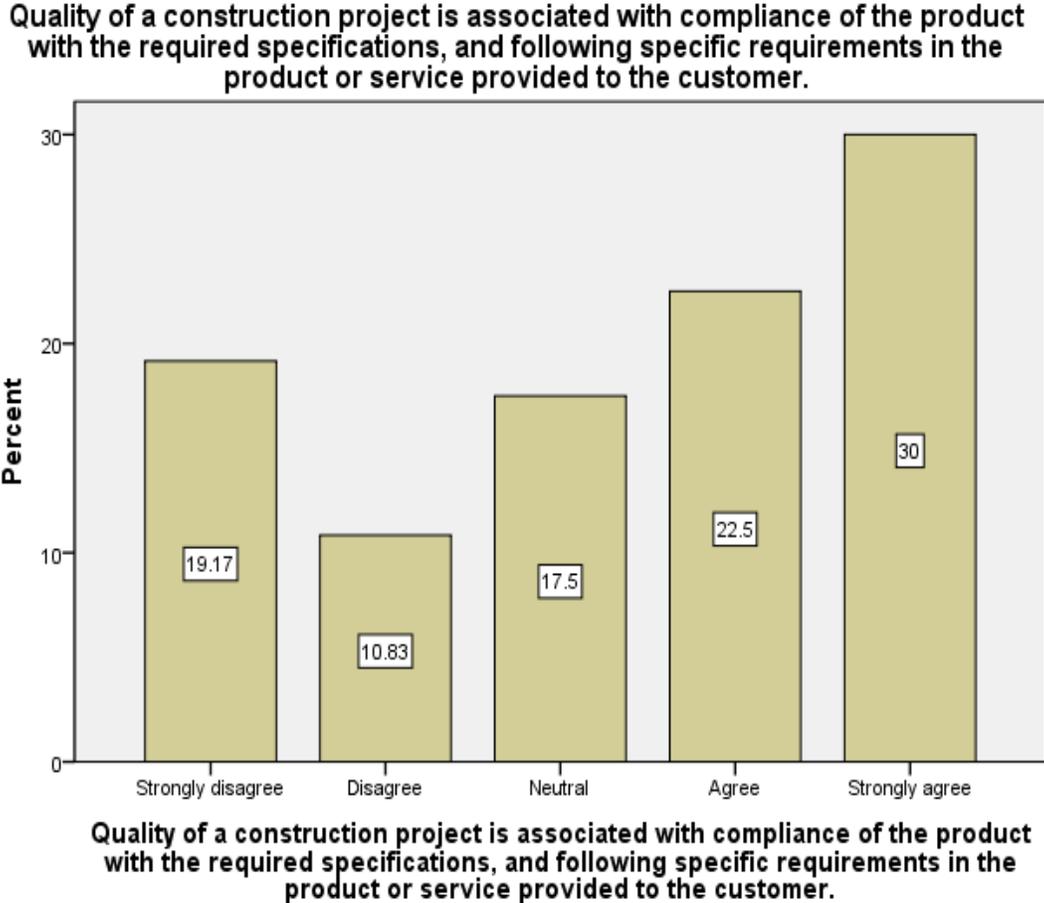


Figure 15: Quality of Construction Project with Compliance of the Product

The above-mentioned figure 16 shows that there was a total of 120 respondents, out of which 30% strongly agreed that the project completion within shorter time requires greater investment, 20% agreed with the statement, 18.33% were neutral, 14.17% disagreed, and 17.5% strongly disagreed. The graph result reveals that most respondents strongly agreed that in most circumstances the completion of the project in a shorter time requires greater investment.

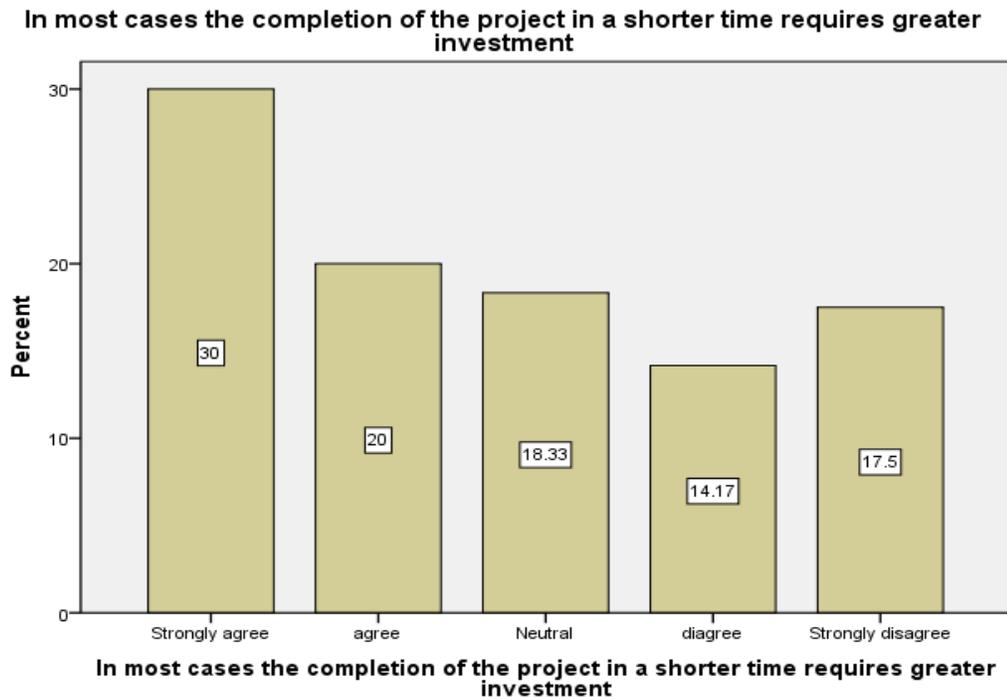


Figure 16: Shorter Time Increases Investment in Construction Projects

The findings of the below-mentioned table show that 9% of the respondents strongly disagreed to the statement, 11% disagree, 14% were neutral, 41% agreed, and 23% strongly agreed. This clearly shows that planning is an important factor for the construction projects. In the literature review, the research of Herroelen and Leus (2005), stated that the main goal of the construction project planning is the timely provision of insufficient materials and labor to the construction projects. Therefore, a relevant project planning method must be selected for the timely provision of the materials and labor to the construction projects since it is a requirement for effective project planning, which means that the project planning should be as accurate as possible but flexible according to need.

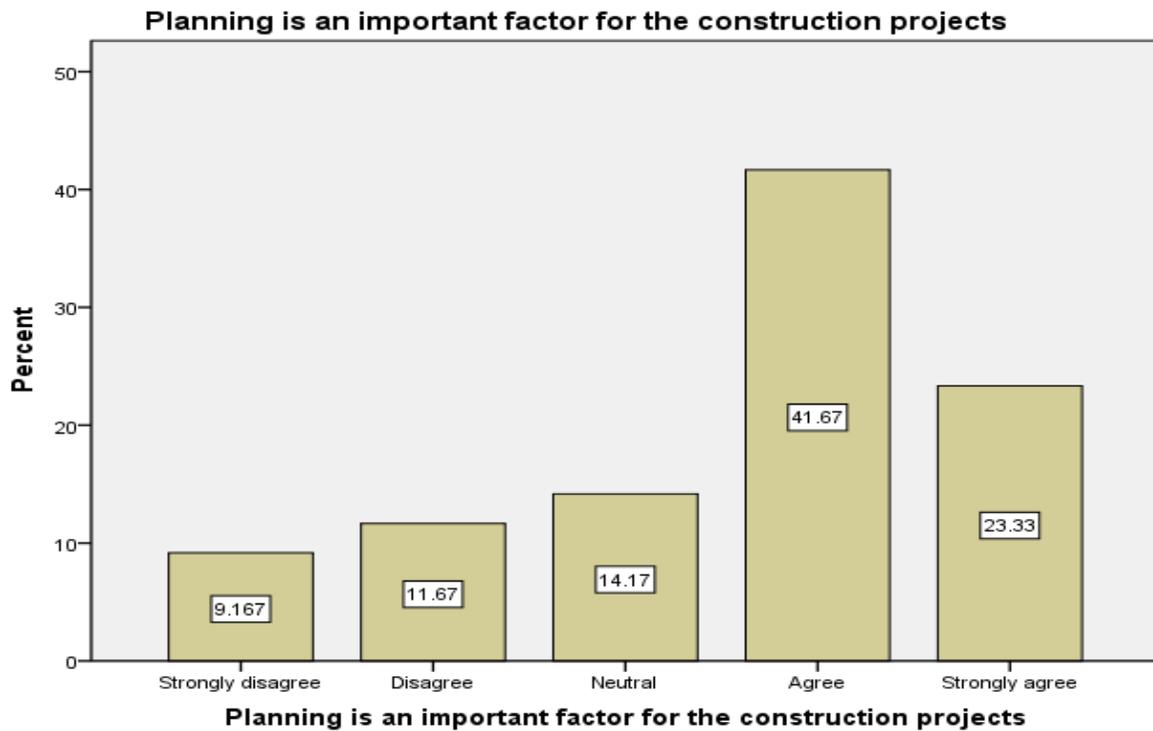


Figure 17: Planning is Important in Construction Projects

The findings of the below-mentioned table show that 30% of the respondents strongly agreed to the statement, 27% agreed, 16% were neutral, 15% strongly agreed, and 10% disagreed. This explicitly depicts that cost is an important factor for the construction projects. In the literature review, the research of Memon, Rahman, Abdullah, and Azis, (2010), also validates that One of the most important aspects of the life cycle of a project is its cost, which is considered to be a major contributor to the success of the project. Although cost management is highly critical, many projects are observed to fail in achieving their goals despite them staying in the identified budget.

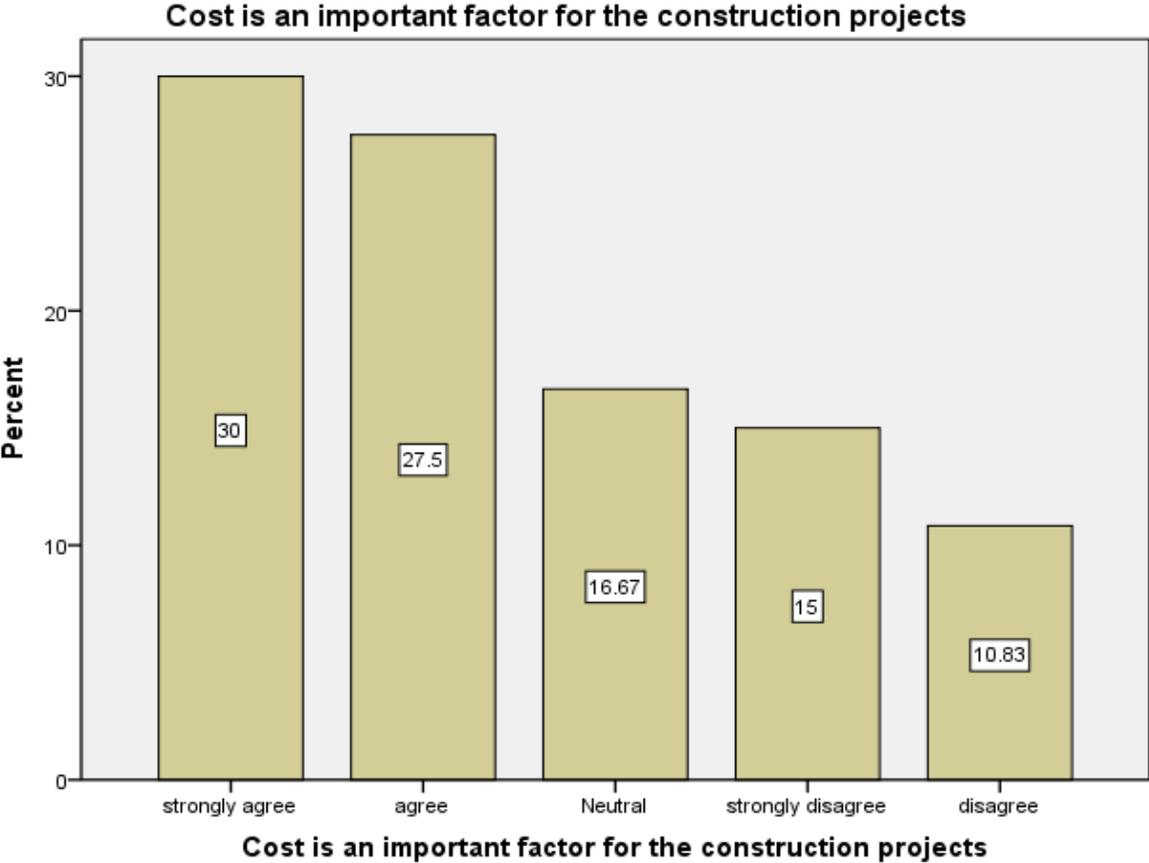


Figure 18: Cost is Important in Construction Projects

The below-mentioned table shows that 31% respondents strongly agreed to the statement, whereas 23% agreed, 17% were neutral, 11% disagreed, and 15% strongly disagreed. The responses of the questionnaire reveal that economic factors play a vital role in the construction projects. In the literature review, the research of Forteza *et al.*, (2017); Sbia and Alrousan, (2016), also corroborated that several economic factors have a significant impact on the projects, including interest rates, joint ventures, foreign investments, and currency exchange rates.

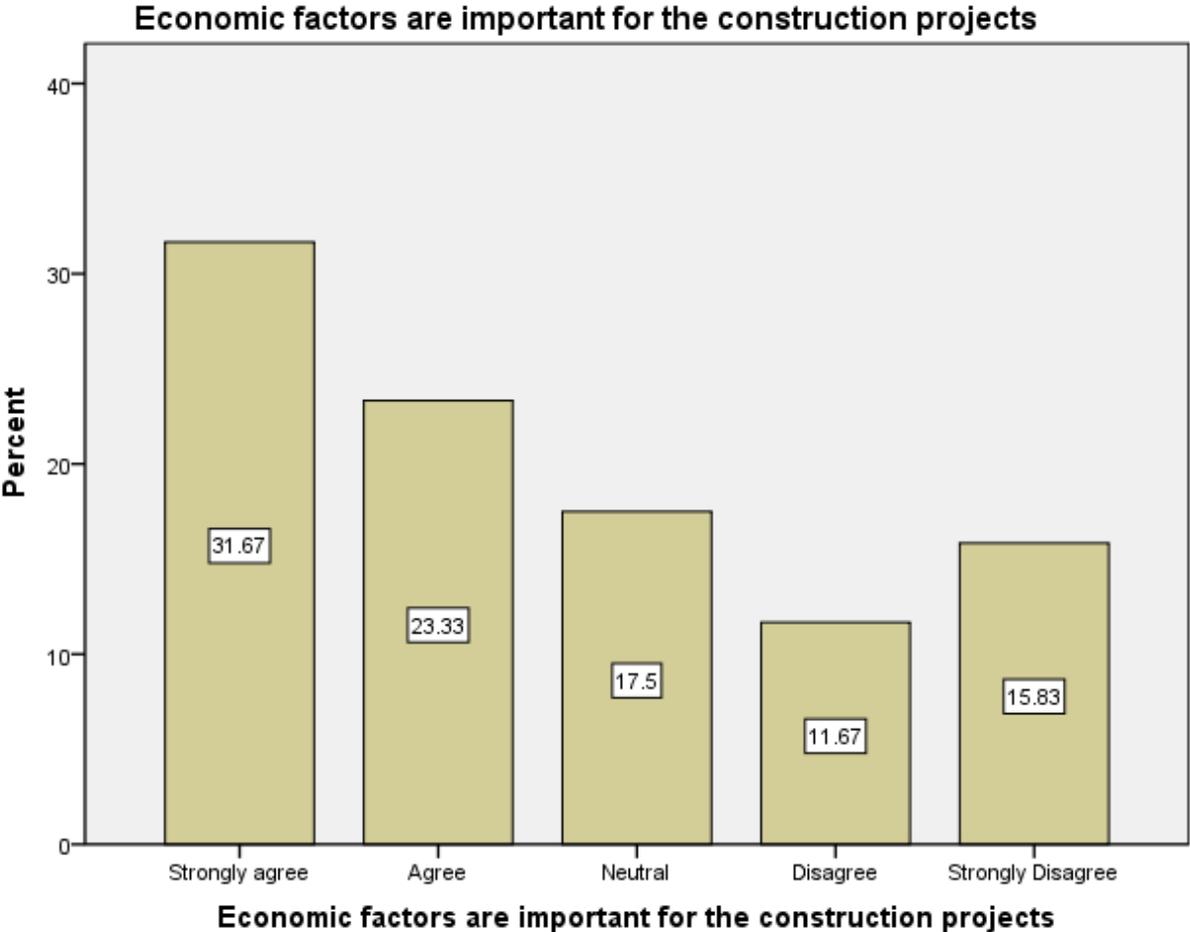


Figure 19: Importance of Economic Factors in Construction Projects

4.2 Analysis of Primary Data:

The analysis of the primary data revealed that poor planning significantly influences the duration of construction projects, although there are other factors too that impact the proficiency of construction products. The findings of figure 5 and 15 revealed that the role of time is considered in the planning of a construction project. In the literature review the research of Nyoni, (2018), stated that constant and long-term delays in construction projects are becoming a common problem in the business operations of the country. The completion of the project within the decided time and budget is considered to be a significant standard of its success by the contractors, clients, consultants, and other stakeholders. The results of figure 6, 17, and 18 presented that the majority of the workers strongly agreed that cost influences on the planning phase of the construction project. In the secondary data research of Samarah and Bekr, (2016), claim that the construction industry is one of the major economic sectors of Jordan. This sector has to face many significant issues related to cost and time overrun. Alaghbari, Saadan, Alaswadi, and Sultan, (2018), also corroborate the findings of this figure 6 in which researchers stated that financial challenges faced by clients, and inadequate cash for project implementation are the major factors that resulted in causing delays in the construction project in Yemen.

Moreover, figure 7, 8, 9 and 14 revealed that quality, project scheduling, and planning plays a significant role in the construction projects. In literature, the research of Khalid (2019), proposed that management and planning of the construction projects depend on the organization, coordination, monitoring, and controlling of the achievement of the project objectives in the best possible manner as proposed by the partners of the project according to their requirements. Also, Ahcom (2004), stated that the delaying effect of construction products can be reduced through pre-planning the project, continuous monitoring of the project plan by the project management

team, coordination between the contractor and the external parties that are associated with the project, including suppliers, subcontractors and others.

Furthermore, interpretation of figure 10, 11, 12, 13 stated that poor and insufficient engineering and administrative planning affect the completion of construction projects. In the literature review the research of Jarkas and Younes, (2014) and Raidén, Dainty and Neale, (2006), revealed that there is a statistically significant effect of administrative efficiency in its dimensions, such as understanding the internal environment of the contractor, team building, external parties dealing, and human relations employees and management, on the time set for the construction project completion. Also, good selection of human resources and taking care of training, participation, support and motivation to enhance motivation at all organizational levels.

4.3 Analysis of Research Objectives

It is important to understand that the current research covers the research objectives through primary and secondary data. In order to validate this point this section discussed the primary and secondary evidences from the current research. The **Objective 1** was based on the factors that influence planning process of a construction project. In the analysis of primary data figure 5, 6, 7, 8, 16, 17, and 18 postulates that factors such as cost, economy, time, quality, and project scheduling influence the planning process of a construction project. Then the researches of Nyoni, (2018): Alaghbari, Saadan, Alaswadi, and Sultan, (2018): Alias, Zawawi, Yusof and Aris, (2014) and Radosavljevic and Wuyi, (2014), mentioned in the literature review identified that additional required time and costs are among the significant impacts of the delays in the construction projects of the country. The management operations in the construction projects of most construction firms could be effectively implemented through the exploration of the critical success factors (CSFs) to ensure the improvement of project productivity.

The **Objective 2** has been analyzed through primary data and presented in the figure 15, 14, 13, 12, 11, 10, and 9 because all these figures explained the role of administrative and engineering aspects. The lack in proper implementation of projects leads to failure and delays of construction projects. In the literature review these aspects has been highlighted through mentioning the past researches of Khalid (2019): Alias, Zawawi, Yusof and Aris, (2014) and Samarah and Bekr, (2016). These studies explored that there several construction firms have to face issues related time overrun and delay in the completion of the projects, which results in surpassing the time and costs of the project. The literature analysis of the research shows that according to many researchers, poor project management and planning is a major cause of delays occurring in the construction projects.

The **Objective 3** has been covered through the correlation analysis which explained that there is a positive correlation between poor planning and duration of construction projects. It shows that the aspect of planning is essential in the completion of construction projects. The poor planning can cause severe damage to a construction project. In the literature review, the study of Miozzo and Ivory, (2000), recommended the necessity of using modern technology in managing and planning construction projects at all stages, starting with the idea and ending with the delivery of the project and placing it under investment. The researcher has benefited from this study in enhancing understanding of the components of the construction project and finding ways to ensure balance between all parties to construction projects. Also, research of Raidén, Dainty and Neale, (2006), postulates that The study recommended that good selection of human resources and taking care of training, participation, support and motivation to enhance motivation at all organizational levels. The researcher profited from this study in formulating the items of the questionnaire, especially with regard to the stage of preparing the plan.

Chapter V: Conclusion

5.0 Introduction

For any nation's development, the construction sector plays a major role and contributes to the Gross Domestic Product (GDP) and national employment. The United Arab Emirates experience significant growth in the real estate sector in the last decade as a result of foreign investments. This notable image of Emirate also placed some responsibilities on construction companies such as commitment to deliver work on time and ensure the highest quality and reasonable costs. This paper aims to highlight that proper administrative and engineering projects play a significant part in the successful completion of the projects within the stated time, however, bad planning and lack of understanding of effective planning can increase the implementation time, quality of the implementation, and cost of implementation. It also focuses on the causes that contribute to the slowing down of construction projects. The research objectives of the paper aim to introduce administrative planning and engineering planning in its general form by identifying the factors, impact of these factors, the relationship between negligence on the duration of the projects and recommending methods that reduce delays in the construction projects.

5.1 Testing of Hypothesis

The hypothesis has been tested according to the findings of questionnaire analysis and the secondary data that has been gathered in the literature review. It has been observed that '**Main Hypothesis 1 and 3**' has been proven true as per the findings of question 3, 4, 5, 6, 7, 8 and 12. The responses of these three questions and findings of correlational analysis also proved that poor planning in construction firms is considered to be the major reason behind the delay of construction projects which has been corroborated through the past researches of (Yang and Wei,

2010: Khalid 2019: Assaf and Al-Hejji, 2006: Lapinski et al. 2006: Radosavljevic and Wuyi, 2014: Jarkas and Younes, 2014: Ahcom, 2004:).

The findings of the analysis and literature review depicted that ‘**Main Hypothesis 2 (H1)**’ has been proved true whereas, ‘**Main Hypothesis 2 (H2)**’ has been proved wrong. The findings of question 1 and 11 have shown that cost is a significant factor in construction projects and cost overruns lead to delay in the projects. This has been validated through different researches (Abdul Rahman, Memon and Abdul Karim, 2013: Larsen, Shen, Lindhard and Brunoe, 2016: Memon, Rahman, Abdullah, and Azis, 2010: Nyoni, 2018: Alaghbari, Saadan, Alaswadi, and Sultan, 2018), provided in the secondary data.

The findings of the analysis and literature explained that ‘**Main Hypothesis 3 (H1)**’ has been proved true, although ‘**Main Hypothesis 2 (H2)**’ has been proven wrong. The findings of question 13 have shown that economic factors are important for the completion of construction projects. This notion has been validated through the research of (Al Mousli and El-Sayegh, 2016; Khodeir and Mohamed, 2015: Forteza *et al.*, 2017; Sbia and Alrousan, 2016: Samarah and Bekr, 2016), incorporated in the secondary data.

5.2 Discussion

In this research, primary data is gathered through questionnaires and secondary data is collected through books, articles, and journals, after analyzing both data it can be said that the research objectives are achieved. There are many studies presented in the literature by Miozzo and Ivory (2000), Ahcom (2004), Raidén, Dainty and Neale, (2006), Zawawi, Yusof and Aris, (2014) that confirms these findings.

Many studies suggested that poor planning leads to delay in the completion of the project. The literature discussed this problem in detail by focusing on different countries around the world. The studies discussed in the literature suggested that these delays negatively impact the duration and completion of the project and may result in losing the projects. The findings of our questionnaire also suggest that most respondents strongly agree that the planning of the construction project is important to save time. However, by proper pre-planning of the projects, these delays can be reduced or prevented. Similarly, the study conducted in Qatar (Jarkas and Younes, 2014) on the importance and impact of organizational factors on the performance of construction project between 2005 and 2008 revealed that there is a significant effect of leadership's competence (leadership capabilities, skills, human resource selection, awareness of performance elements and timely dealing) on the time of the completion of the construction projects. The findings of Answer 10 of our questionnaire also suggested that the majority of the participants also agreed that the poor administrative and engineering planning of construction companies is the main reason for the delay in the completion of their projects. Similarly, a study was conducted on constant and long-term delays of construction projects in Zimbabwe and found out that due to delays in completion, major goals of the projects are not achieved and have a significant impact on the client, team members, sponsors and participants of the projects which can lead to conflicts, financial problems, and lawsuits.

When analyzing the key issues producing a delay in the completion of the project in Yemen, the research points out that financial factors are among the first of all factors. These factors are delays in receiving payments by contractors, financial challenges, the unsatisfactory experience of the contractors, inadequate site management and regulation, and insufficient cash for project implementation. A study by Skitmore and Al-Kharashi (2009) pointed in their

research that in Saudi Arabia the two major causes of project delay are lack of finance and delay in payments by the owner. (Sambasivan, and Soon, 2007). In addition, the literature discussed the Critical Success Factors (CSFs) are the conditions, characteristics, and variables that can influence the success of the project if it is effectively managed and sustained. Although CSFs was developed almost two decades ago, today many studies still rely on traditional ‘iron triangle’ that are cost, quality, and schedule (Walker and Shen, 2002). In this study, five variables have been identified, these are Project Management Action, Human Factors, Project Procedures, Project Related Factors, and External Issues for achieving a competitive edge in the construction sector. The results would assist the Project Management practitioners to achieve various construction performance levels and also help to define the critical factors that lead to project success and offers a forecasting tool that enables the participants to quickly evaluate the likelihood of the success of the project. Also, de-motivational factors influence the productivity of the workers which resulted in delaying the project. Certain situations and sometimes lack of motivators causes discontent and discourage workers from achieving their desired goals. Studies suggested that offering certain motivational factors such as financial incentives, training, and a sense of recognition can positively impact the performance of workers (Ng, Skitmore, Lam, and Poon, 2004).

In most of the construction projects, project delay is the major problem. These delays can arise at any stage of the project from planning to implementation to completion. Apart from the factors discussed in this research and literature, there are some other issues that causes delay in the successful completion of the project. These are shortage of materials on project place, unlikely project scheduling, late payments, lack of skilled labour, poor site safety, and complexity of projects (Durdyev, Omarov, and Ismail, 2017). Delays due to contractors arise due

to his lack of understanding, inaccurate cost estimate, and poor project planning. Delays also occur due to inadequate client interference, lack of decision-making abilities, and continuous change of plans and orders. Moreover, project efficiency, overall organizational performance, the success of business and customer satisfaction level also affect the project success (Semab, Khan, and Shah, 2017). Natural disasters can also cause delays in the completion of the project as Haseeb highlights in his research that in Pakistan many construction projects are delayed due to earthquakes and floods (Haseeb, Bibi, and Rabbani, 2011). Thus, many studies confirm that these delays negatively impact project success and completion. However, delays that hinder successful and timely contribution of the project can be avoided or reduced by identifying their causes.

5.3 Recommendations

On the basis of the finding obtained from this research, the recommendations that can be effective and useful for the project managers, consultants, and contractors, along with the construction firm owners include:

- An accurate project duration projection, procurement strategy, and control over design process should be produced yet it demands complete alliance and coordination among the project team and the design manager during the design phase that also helps in identifying the weaknesses, which could later allow the improvement of design as well as successful project completion.
- Some significant courses whose training should be ensured include management of the engineering project, construction and design, contract conditions, and value engineering. The resident engineer should also carefully study the design criteria and asses all the steps along with the client so their approval can be ensured before

starting working in the next phase. This would help to avoid any sudden changes that could have an impact on the project, especially related to its costs and time.

- Contractors should provide timely progress payments to the subcontractors so any conflicts or hindrance in the working on the project could be prevented since these could result in causing project delays.

- The main contractor should also be provided with timely payments by the clients to ensure that the funding is sufficient for continuing the work on the project.

- The design must be coordinated prior to the release of the tender documents for construction and bidding to decrease the conflicts that could possibly occur during the construction phase. It is also important for the design manager to gain a proper and clear understanding of the project goals so he is able to develop appropriate planning for the necessary resources. This helps to finalize the budget of design as well as the supervision staff.

- Also, the consultants must focus on the material specifications for ensuring their conformism to the standard specifications prior to the implementation phase. This helps in managing the provided solutions and changes regarding the design documentations so work delay can be avoided.

- The timely submission of the engineering, design, and architectural documents should also be ensured so the project team, including the main contractor, project subcontractors, and clients could review it and determine if the documents need modifications or can be implemented straight away.

- The resident engineer must also gain complete awareness of the methods and procedures of the project management and have adequate managerial and technical

knowledge of construction and design, particularly the analysis method for the contractor's submitted work program and determination of the essential work project activities. Proper review, understanding, and verification of the standard contract conditions, as well as the certain conditions, and the detailed specifications, drawings, and Bill of Quantities are included in the tasks that the resident engineer is responsible for, so he can mitigate any possible delay.

- It is also important for the team management of the project to develop an effective work schedule that would identify the major tasks of the project as well as the duration that is estimated individually for every task so complaints and doubts by the labor force can be avoided.

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Appendix: Questionnaire

1. Age

- 20-25
- 26-30
- 31-35
- 36-40
- Above 40

2. Gender

- Male
- Female

3. Time is an important factor during the planning phase of construction project

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

4. Cost influence the planning phase of a construction project

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

5. The facet of quality is important in a construction project

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

6. Project scheduling is important in planning phase of a construction project

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

7. The planning of a construction project is important to save time

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

8. The poor administrative and engineering planning of construction companies is the main reason for the delay in the completion of their projects

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

9. The delay in the completion of engineering projects is due to insufficient realization of the importance of administrative and engineering planning in the construction companies

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

10. The delay in the completion of engineering projects is due to the lack of a clear understanding of the concept of administrative and engineering planning of construction companies.

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree

- Disagree

11. The delay in the completion of engineering projects is due to the failure of the contracting companies to rely on the elements of effective administrative and engineering planning as the basis for the success of their plan.

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

12. Quality of a construction project is associated with compliance of the product with the required specifications, and following specific requirements in the product or service provided to the customer.

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

13. In most cases the completion of the project in a shorter time requires greater investment

- Strongly Agree
- Agree

- Neutral
- Strongly Disagree
- Disagree

14. Cost is an important factor for the construction projects

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

15. Planning is an important factor for the construction projects

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree

16. Economic Factors are important for the construction projects

- Strongly Agree
- Agree
- Neutral
- Strongly Disagree
- Disagree