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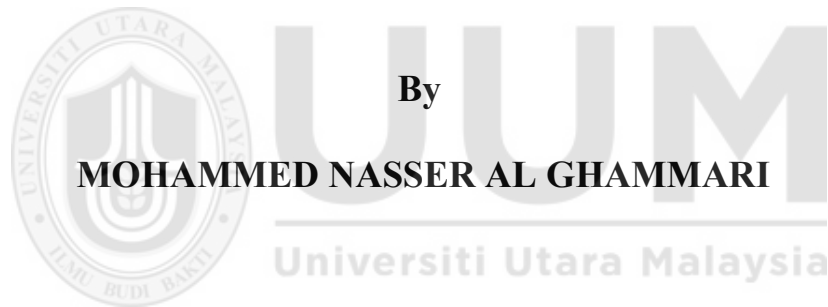


**THE EFFECT OF EXTERNAL FACTORS ON PROJECT
PERFORMANCE OF WATER AND WASTEWATER
CONSTRUCTION COMPANIES IN OMAN WITH
MODERATING EFFECT OF ORGANIZATIONAL STRUCTURE**



**MASTER OF SCIENCE (OPERATION MANAGEMENT)
UNIVERSITI UTARA MALAYSIA
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PERFORMANCE OF WATER AND WASTEWATER CONSTRUCTION
COMPANIES IN OMAN WITH MODERATING EFFECT OF
ORGANIZATIONAL STRUCTURE**



By

MOHAMMED NASSER AL GHAMMARI

**Thesis Submitted to
School of Technology Management and Logistics
College of Business
Universiti Utara Malaysia,
In Fulfillment of the Requirement for the Master of Science
(Operation Management)**



Kolej Perniagaan
(College of Business)
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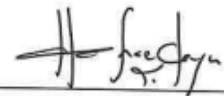
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ABSTRACT

The progress of any country is closely tied to the growth of its construction industry. The development of a construction project requires varying levels of work and a lot of input from both the governmental and private sectors. Construction project performance is critical for the country's economic development, and there are a variety of elements that influence it. The objective of this study is to examine the effect of project external factors and organizational structure on the project performance of construction companies in the water and wastewater sector in Oman. The most important project external factors were selected in this study to explore the effect of these external factors on project performance with the organizational structure. The population for this study was the construction companies operating in the water and wastewater sector in Oman. This quantitative study was carried out with a survey questionnaire. A total of 113 questionnaires were received from project managers of construction companies. Data were analyzed using Statistical Package for Social Sciences software for descriptive, reliability, validity, and regression analyses. This study was successful in achieving its goals by looking at a variety of external factors and examining the organizational structure that has a substantial effect on the performance of construction projects. The findings of the study provide a comprehensive understanding of the various project parameters required to improve project performance, especially in Oman's water and wastewater sector. This is consistent with the industry's observation that technical improvements are causing quick shift in the conventional project management paradigms. In addition to the above, this study demonstrated that organizational structure has a significant effect on project success in Oman's construction firms in the water and wastewater sector. In summary, contractor, customer, and project management elements are the most crucial project-related aspects for medium- and large-sized construction enterprises.

Keywords: Construction, Organizational structure, Project external factors, Project performance, Water and wastewater sector

ABSTRAK

Kemajuan sesebuah negara berkait rapat dengan pertumbuhan industri pembinaannya. Pembangunan projek pembinaan memerlukan tahap kerja yang berbeza dan input daripada kedua-dua sektor awam dan swasta. Prestasi projek pembinaan adalah kritikal untuk pembangunan ekonomi negara dan terdapat pelbagai elemen yang mempengaruhinya. Objektif kajian ini adalah untuk menilai kesan faktor luaran projek dan struktur organisasi terhadap prestasi projek syarikat pembinaan dalam sektor air dan air sisa di Oman. Faktor luaran projek yang paling penting telah dipilih dalam kajian ini untuk meneroka kesan faktor luaran ini terhadap prestasi projek dengan struktur organisasi. Populasi bagi kajian ini ialah syarikat pembinaan yang beroperasi di sektor air dan air sisa di Oman. Kajian kuantitatif ini dijalankan dengan menggunakan borang soal selidik. Sejumlah 113 borang soal selidik diterima daripada pengurus-pengurus projek syarikat pembinaan. Data yang di kumpul dianalisis menggunakan perisian *Statistical Package for Social Sciences* untuk analisis secara deskriptif, kebolehppercayaan, kesahan dan regresi. Kajian ini berjaya mencapai matlamatnya dengan melihat pelbagai faktor luaran dan meneliti struktur organisasi yang mempunyai kesan yang besar terhadap prestasi projek pembinaan. Penemuan kajian memberikan pemahaman yang komprehensif tentang pelbagai parameter projek yang diperlukan untuk meningkatkan prestasi projek terutamanya dalam sektor air dan air sisa di Oman. Ini bertepatan dengan pemerhatian industri bahawa penambahbaikan teknikal menyebabkan peralihan pantas dalam paradigma pengurusan projek konvensional. Selain itu, kajian ini menunjukkan bahawa struktur organisasi mempunyai kesan yang signifikan terhadap kejayaan projek di firma pembinaan Oman di dalam sektor air. Sebagai ringkasan, elemen kontraktor, pelanggan dan pengurusan projek merupakan aspek berkaitan projek yang paling penting untuk perusahaan pembinaan bersaiz sederhana dan besar.

Kata kunci: Pembinaan, Struktur organisasi, Faktor luaran projek, Prestasi projek, Sektor air dan air sisa

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LIST OF ABBREVIATIONS

CSF - Critical Success Factors

DV - Dependent Variable

HSE - Health, Safety & Environment

ISO - International Organization for Standardization

IV - Independent Variable

IV - Independent Variable

KPI - Key Performance Indicator

N - Number of samples

PM - Project Management

PMP - Project Management Professional

RBV – Resource Based View

RQ - Research Question

S - Safety

SOP - Standard Operating Procedures

SPSS - Statistical Package for Social Science

UK - United Kingdom

USA - United States of America

CHAPTER ONE

INTRODUCTION

1.1 Study Background

Among the development acceleration and revolution of countries around world, cities are appearing, and cities are getting collapsed because of certain reasons. These reasons were known as the secret of the success, and it is intimately connected to the government's long-term planning for the direction of the nation to fulfill with a bright network of complied projects with the actual needs of the public. Every day, new technologies and systems appears to the world with faster functions, lower power consumption, lower cost and higher efficiency. Since 1970, His Majesty Sultan Qaboos promised Omanis to build modern cities, provide best and fastest services, attract investments, and provide a comfortable life to them. Nowadays, Sultanate of Oman can be considered as a modern country with all the promises of His Majesty implemented.

The smart leadership of His Majesty led the country to achieve powerful position among the countries with all willingness from the public to provide the maximum support to the country by filling most of the positions with all degrees and grades to maintain and invest its location at the center of the world and compete with other neighbors. During the predicted period of 2021 to 2026, the construction business in Oman is predicted to increase at a compound growth rate of more than 5 percent annually (Al Awadhi, 2018). The COVID-19 pandemic seems to have had a major influence on Oman's building industry. In the short, medium, and long terms, the outbreak slowed growth in important industries, and recovery is anticipated to take longer. Solid economic diversification policies are promoting opening new markets in

the Sultanate of Oman, with the goal of enhancing development and economic growth by adding resources on critical non-oil industries and supporting private investment.

The construction sector consists of a wide variety of operations, including superstructures in domestic, commercial, and industrial structures, infrastructure development, and power and water production. For two decades from 1998 to 2019, GDP from Construction in Sultanate of Oman was more than 1 OMR Billion, with a top of 2.25 OMR Billion in 2016 and a lowest at 2000 by 159 OMR Million (MOF, 2016). See Figure 1.1 for details.

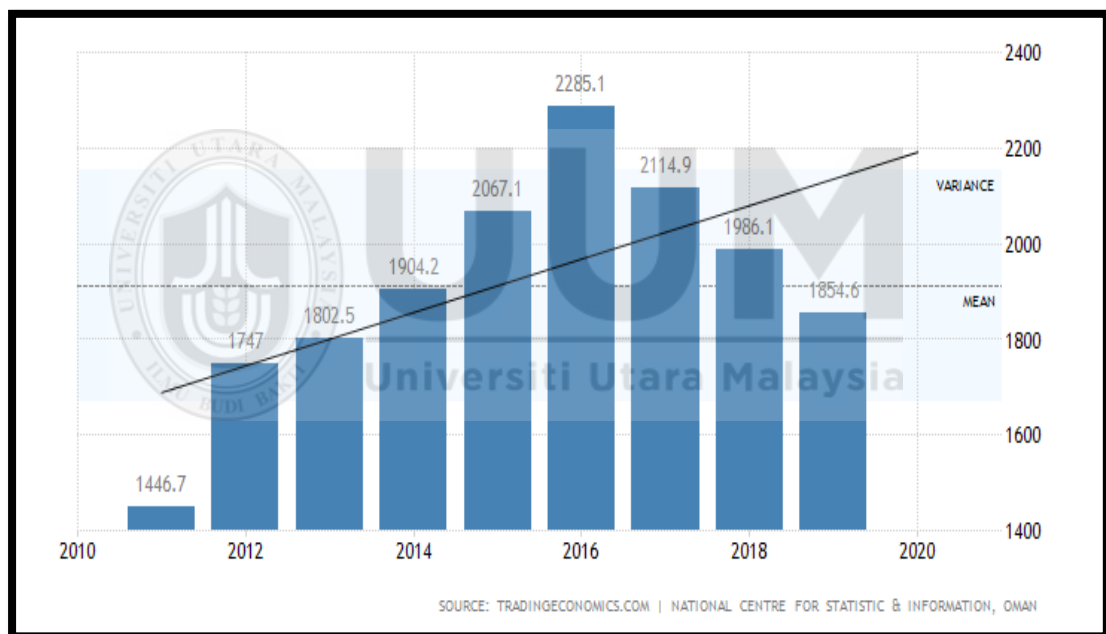


Figure 1.1: *Oman GDP from Construction*
Source: *National center for static and information, Oman*

Actual numbers, historical data, and predicted statistics for Oman GDP from Construction are shown in the graph below. By the end of 2021, Oman's GDP from construction is estimated to reach near to 2 OMR billion. Based on Trading Economics' global macro models and analysts' estimates that in the long run, the GDP from

construction in Oman is expected to stabilize around 2 OMR Billion in 2022 and 2.1 OMR Billion in 2023 (MOF, 2016). See Figure 1.2 for details.

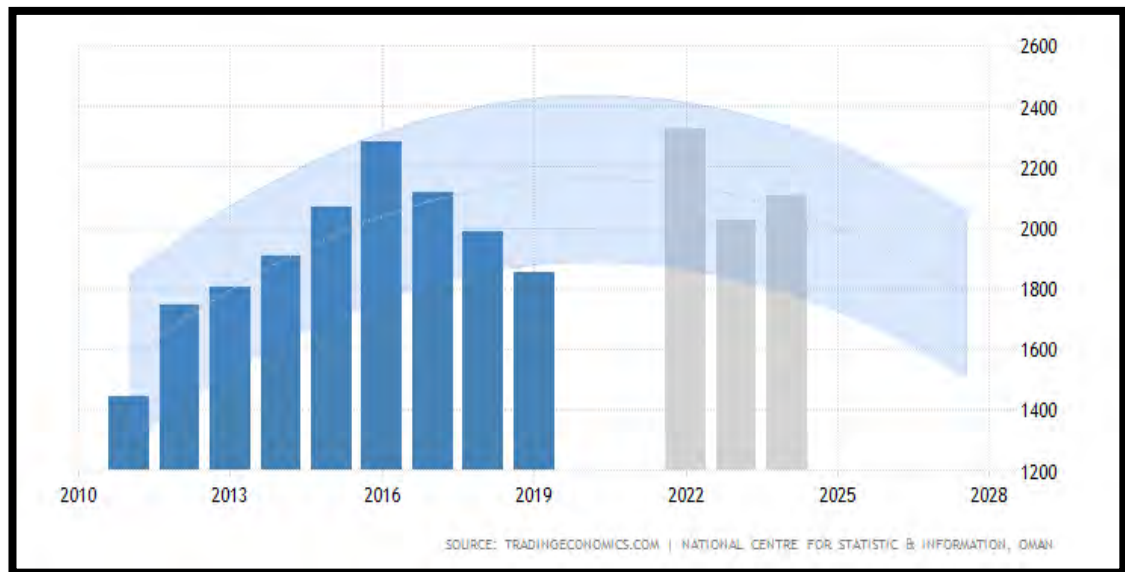


Figure 1.2: *Expected Oman GDP from Construction.*
Source: *National center for static and information, Oman*

1.2 Water Sector Construction in Oman

The water sector in Oman divide to wastewater and desalinated water. The utilization of domestic wastewater is essential in the management of water for the ecosystem, and the socioeconomic elements of a country. In Sultanate of Oman, wastewater operations are considered a critical component of any fundamental changes. The Sultanate of Oman's government holds the Oman Wastewater Services Company, commonly known as Haya Water Company. On December 17, 2002, a governmental decision number 31/2002 formed it to build and operate the wastewater treatment and recycling system. The additive value to country which include all water resources and other infrastructure projects, generate revenue in a variety of ways.

Wastewater projects, for example, could help the farm economic growth by increasing investment, creating jobs, and reducing dependency on public funding. Those projects, on the other hand, have the disadvantages of requiring huge

expenditures, assuring proper maintenance, and running costs of treatment facilities. As a result, a reasonable rate is required to achieve cost recovery and financial stability for such projects. The Public Authority for Electricity and Water, on the other hand, responsible for desalination water process. It is developing strategies effort to increase capacity to meet shortfalls, mainly in the northern region of Oman, which involves nine Omani governorate zones, with demand growth projections for potable water. Until 2040, it is expected that 2.5 OMR billion will be spent on creating new water infrastructure and plants (Al Awadhi, 2018).

Those constructions paying the cost of upgrading current transmission and distribution facilities. Also, this involves activities to promote the growth of distribution companies, new storage to increase supply continuity, and operations to extend the volume of desalination water plants. Although the drop in oil prices, Oman started to invest extensively in water projects, resulting in greater need for materials such as glass, plastic and propylene used in these projects.

1.3 Problem Statement

The development of any nation depends on the construction industry. In many ways, the construction of physical infrastructure, such as buildings, roads, and bridges, may be used to gauge the rate of economic growth in any given nation. The development of a construction project requires many stakeholders, numerous procedures, varying levels of work, and a lot of input from both the public as well as the private sectors, with the main goal being to deliver the project to a successful end. Among the major water infrastructure projects are numerous desalination and treatment plants, including nine facilities that generate more than 100,000 m³/d of water and three more that will go into operation in the following two years (MOF, 2016).

Also, some of the biggest sequencing batch reactor (SBR) and membrane bioreactor (MBR) sewage treatment facilities can be found there. Desalination facilities are crucial parts of Oman's utility infrastructure investments since they provide millions of Omani citizens with drinkable water. For the next seven years, water demand in the Main Interconnected System is predicted to increase by 5 percent to 7 percent yearly (Tender, 2016). The degree of success in executing construction project development activities will be greatly influenced by the caliber of the respective parties' management, finance, engineering, and team outcomes, while also considering the possible risk management, the business climate, and the state of the economy and politics.

The construction sector suffers constant obstacles worldwide, including unstable economic conditions, intense competition, more complex demand, and fewer resources that increase the complexity of construction projects (Antunes & González, 2015). Due to increasing complexity, it is now more difficult to complete a project without making changes to the project scope, plan, or procedure that result in variation orders (Othman, 2016). Much scientific research on the numerous factors and their effects on the time and cost performance of projects have been carried out in various parts of the world. Ahmadabadi (2019) discovered that three quarters of construction projects run 10 to 30 percent beyond schedule, with huge costs of around fifth of the initial estimated price. Furthermore, this research has indicated that a variety of factors affect project in terms of time saving and cost efficiency in the construction company.

Quality difficulties such as reworks, and failures, are main concern as well as time and cost issues, are all involved in infrastructure projects. Moreover, in compared to other industries, the construction companies have the greatest rate of safety problems such as accidents, incidents, and deaths, which has a considerable influence on project performance. In construction works, impacts on timeline, costs, quality

issues, and safety subjects have a consequence on the project's financial condition. Project is considered successful, according to Kerzner (2013), if it is finished on schedule, under budget, and receives positive feedback from clients. Additionally, a project may not be deemed successful if unless the agreed-upon scope has primarily been met. According to the Project Management Institute (2018), project management is the process of using information, skills, tools, and techniques to organize activities that will fulfill the project's targeted scope and satisfy its goals and objectives.

The project management will be successful when a project's scope comprises all features and functions that are necessary to finish the project as intended, as well as an explanation of the procedure and works associated with it (Adedeji, 2018). Dangayach et al. (2011) shown that the key elements of project management success for projects realistic timetable, defined scope, and well-defined "goals/objective" are essential for success incorporates every element of the project. Moreover, Tammy and colleagues (2016) reported that the project's completion would not qualify it as a success unless the specified expense, duration, and achieving the required quality (scope). Although new technologies and effective construction techniques have enhanced project outcomes to some significant degree, time overruns, cost overruns, quality problems, and other project success related continue to affect many development projects worldwide, which researchers are trying so hard to investigate further.

Regarding project performance, past research on variables influencing project success, performance have mostly focused mainly civil building construction projects and infrastructure projects. Few studies have focused on projects in the water sector, such as the construction of water treatment plants and the moderation of organizational structure to project factors and project performance. This is an area of research that

needs to be more investigated. Moderate variables relating to studies can be a qualitative or quantitative variable. For this study it is quantitative since focus on firm's size and financial that affects the strength relationship between the project performance and project external factors. Moderator variable which is organizational structure in this study acts like the second independent variable.

When Moderator is exerted, it maintains a causal relationship with project performance. Also, it plays the same function as project external factors and does not have any correlation with project external factors. The organizational structure of the company can impact the effectiveness of project management, who takes final project decisions, how goals set, and tasks are conveyed, and how the project manager interacts with his staff. The collaboration required to complete projects successfully can be heavily influenced by organizational structure.

According to Khan (2010), organizational structure is described as a collection of interconnected relationships and responsibilities that occur throughout the organization. He concluded that organizational structure relates to how a person and his group are assisted inside company to accomplish organizational targets. According to Iranmanesh et al. (2021), most organizations have concluded that to succeed in business and remain in the market, they need to make modest organizational changes at least once a year, or a large change every 4 to 5 years.

1.4 Research Questions

The following research questions (RQs) were formulated for this research:

RQ1. What are the effects of external factors have on the performance of water plant construction projects in Oman?

RQ2. Does organizational structure moderate the effects of external factors on the project performance of water plant construction in Oman?

1.5 Research Objectives

The leading purpose of this research is to:

RO1. To determine the effects of external factors on the project performance of water sector in Oman.

RO2. To investigate the moderating effects of organizational structure between external factors and project performance of water sector in Oman.

1.6 Research Scope

The research will cover construction government own projects in water sector in the Sultanate of Oman. Oman has been selected for this research for two main causes. First, restructuring of governmental companies and starting governmental merge plan between companies in same sectors (Tender 2016). Second, very diminutive consideration was given to the issue of variation orders by the researcher in the Sultanate of Oman which indices the needs for this research in the Sultanate (Alnuaimi et al., 2010). The study focusses on the construction of water plants. The organization was selected because it has several initiatives that can provide the study with the information it needed. The research carried out in the organization's headquarters, as well as in locations where they are now working and projects that have been completed in the last ten years.

1.7 Significance of the Study

Integrated and coordinated focal point for water and wastewater projects can be the critical factor in developing a strong infrastructure for the water sector in the country.

Every company will know its role, budget and scope along with specifying the duration of the project and the exact time to deliver their part. In this study, critical guidelines and aspects will be discussed to come up with a systematic approach to plan these projects, assign focal points from each company to monitor the execution of these projects along with assessing them based on the actual deliverables. Centralized project's management between water and wastewater project will direct the government to approach the following concerns:

- Deliver projects with high quality and within budget, time and scope.
- Avoid duplicating many assignments that relates originally to the same project that will reduce government's expenditures.
- Create new vacancies for expert nationals in various departments.
- Allow the strategic teams to focus on economical outcomes from the projects.

1.7.1 Theoretical Contribution of the Study

Much research on hard factors or project element and their consequence on project performance have been done during the last three decades. This research adds to the current body of knowledge in this field from a scientific perspective. This study uses Resource Based View (RBV) by considering external factors as resources in project management. Practitioners of RBV adopt that it is more practical to take advantage of external opportunities by modifying available resources rather than developing new things for each occasion. In the RBV approach, resources play a critical role in helping companies in achieving increased organizational performance. There are two categories of resources, according to Argyres et al. (2007) namely physical and immaterial. For physical resources, property, building, machines, technology, and capital are examples of real assets. All these assets are observable. To be more specific, the construction

industry has not done much research on organizational structure and its moderation on project performance. Furthermore, research on project performance has so far been carried out in three primary factors of time, cost, and quality Milan et al. (2013). As a result, this research contributes to the theoretical understanding of how external project elements and organizational structure influence project performance.

1.7.2 Practical Contribution of the Study

Daily, water industry professionals face multi project performance challenges, and most of their time is spent on diagnostics, adjustment, and immediate corrective which are not only consume time but also have an influence on project budget. All these factors contribute to negative business performance. Several organizations in the water industry try to learn lessons from last projects due to a variety of organizational factors such as leader behaviors, culture, the importance placed on continuous improvement initiatives, and a failure to understand of how these factors affect project outcomes. Thus, the results of this study should help corporate leaders, politicians, strategic planners, construction managers, and project businesses better understand how organizational variables affect factors that determine whether a job is successful. This research is aimed to provide Omani water sector experts with a basic understanding of project and organizational structure, as well as their impact on project outcomes. As a result, this research will assist water sector specialists in realizing crucial aspects and their contribution to overall performance.

1.8 Definition of Terms

Term definition is crucial in demonstrating the link between variables in this study. External project factors and organizational structure are the elements impacting project performance by construction companies in Oman in this study. It is critical to define

terminology to gain a better knowledge of the topic presented in this study. See Table 1.1 for the definitions used in this study.

Table 1.1: *Definition of Terms*

Variable	Definition	Source
Project Performance	The achievement of the business plan's consented aims and objectives is known as project performance. A successful project has completed its specific tasks, adhered to its timetable, and remained within cost restrictions.	Davies, C.T. (2002)
Project External Factor	Project element relating to project stakeholders such as the client, contractors, consultants, and labor. These stakeholder-related concerns are sometimes referred to as project management's "hard factors". The factors include: • Client Factor • Contractor Factor • Consultant Factor • Labor Factor • Contract Management Factor	Memon et al. (2014)
Organizational structure	The regular arrangement of hierarchical positions of lines of authority, communication channels, rights, and obligations of an organization, as well as the verification of how influence, roles, and responsibilities are distributed among the various levels of administration in that organization.	Milan, et al. (2013)

1.9 Organization of Thesis

The study is divided into five chapters. The study's context, problem statement, research question, and objectives are covered in the first chapter followed by the discussion on the study's significance, as well as its theoretical and practical implications. The literature review for the current study is presented in chapter two. In more detail, the literature is classified into two parts. The literature on the research variables relevant to the topic is presented in the first section. Following that, the second portion focuses on project management theories. The study's research strategy was as follows: the variable measurement, survey development, sampling procedures and research subjects, data collection method, and quantitative models used to analyze the data are all covered and will be presented in chapter three. The result and discussion will be presented in chapter four. The fifth chapter will specify for conclusion and recommendation.

CHAPTER TWO LITERATURE REVIEW

2.1 Introduction

This chapter include a review of the literature relevant to the current research. For greater clarity, the literature is divided into two sections. The first portion is oriented to project management theories. The literature on the study variables connected to this study is included in the second section.

2.2 Water and Wastewater Industry

In nations and areas where water shortage is a major concern, treatment plants sewage treatment plants and desalination plants have become increasingly crucial (Asano et al., 2007). It is sometimes required to conduct an analysis of the project or analysis in order to determine the benefits to be gained from implementing a wastewater treatment and desalination project. When compared to an industrial project for producing commercial goods or products, however, the advantage from a wastewater treatment and desalination project may be minimized if the treated wastewater is treated as a simple product and its profit for reuse is the only consideration considered. In addition to the potential value, the wastewater treatment and desalination project's environmental benefit should be addressed. In Oman, infrastructure investment businesses like water and wastewater, which are almost always operate as mega corporations, have been controlled and regulated by the government.

However, the industry is starting to privatize both in terms of management and ownership. Water and wastewater infrastructure investments are distinctive and complicated, and there are no well-established overall performance evaluation frameworks to assess their effectiveness performance measurement, which is used to

assess the entire efficiency of project implementation, is a multifaceted concept that cannot be quantified by a particular element. It entails several requirements as well as other elements that must be considered. Project performance is a multifaceted phrase that cannot be evaluated by a single aspect. It is used to analyze the overall success of project execution. It includes several prerequisites as well as additional factors to consider.

2.3 Project Performance

2.3.1 Time Factor

In all projects, the scope of work has a huge effect on project time lag. As a result, particular scope management is critical to completing projects on time. Project success is dependent on both macro and micro-perspectives. However, successful completion is the vital to deliver projects. The timeline of the project, according to Davies (2002), is the keyway to achieve this goal; the more the timeframe, greater likely the project would be postponed, and the lower the period, greater likely the process will be done on time. Preserving the stability of the performances delivery baseline timetable is also vital to a project's success.

Ahmadabadi and Heravi, (2019) in their research observed that time overrun is a key reason for project failure in infrastructure projects, and that disruptions have a big effect on project success in Nigeria. They also reported that in Nigeria, speed efforts failed to meet building project in time scale. According to Assaf and Al-Hejji (2006) more than half of projects suffer time and cost overruns, with the estimated duration loses time 10 percent to 30 percent of the time agreement. They also revealed that the most common cause of postponement is change requests. However, another main contributor of construction project delays, they noticed, is a lack of cooperation among the different parties involved in the project. Moreover, project timeframes closely

linked to project success in industrial projects. Nixon et al. (2012) reveal that failures of project and errors are directly associated to company's internal procedures, such as fulfilling timelines.

Moreover, According to Hamzah et al. (2012) financial struggles, poor guidance, slow authorizations, late supervision, slow decisions, and design changes are all conditions that create disruptions with construction projects. According to Truman (2014), most common cause of implementation failure in the United States is the inability to set acceptable timeline and schedule controls, as well as the failure to meet such deadlines. Also, another of the causative factors project delays in Egypt, according to Marzook and El-Rasas (2014), is contractors' inadequate scheduling.

2.3.2 Cost and Financial Factors

Capital cost is a major barrier to implementing in building projects, and expenses demands throughout delayed periods have a considerable impact on the majority of nations' project success. Furthermore, pre-contract emergency funds were proven to be inadequate to cover huge costs and damages. The leading reasons of going over budget projects, according to Sambasivan and Soon (2007), are improper decision by contractors, limitation in project site management, poor experience and knowledge, delays in installments by customers to contract workers for finished project, poor collaboration between customers and sub-contractor.

In addition, problems are strongly linked to the organization's internal funding and expenditures management practices. Due to change orders, many construction projects failed to meet their intended goals, particularly those related to schedule and cost performance. Furthermore, Yadeta et al. (2016) found that the two highest-ranked 34 effects of the variation order are a delay in the project's completion timeline and a rise in the project's overall expenses. According to Truman (2014), one of most obvious

cause for failed projects in the United States is a lack of financial planning and cost controls effectively in projects. Memon et al. (2014) found that inadequate planning and preparation is a major issue affecting the construction cost performance.

Almarri and Boussabaine (2017) agreed, stating that using effective project management practices will result in success of the project. Besides the project's schedule, budget, and quality performance, also they claimed that participants and their benefits must be assessed as an element of the project plan. More than half of companies fail to assess the project risks and their impact on the financial statement. Sambasivan and Johari (2003) found in their research that business style and work engagement have an influence on capital success. Ameyaw (2016) proposed a valuation approach for project outcomes, saying that the overall project expense and overall operation expense should be evaluated prior to starting implementation. In order to decide, they presented 12 different approaches to analyse the project's financial condition. Alaghbari et al. (2007) revealed that financial problems between construction players are the leading reasons of infrastructure project delays in Malaysia.

However, capital flow issues and financial restrictions experienced by developers are the main serious issues surrounding the budget project outcome. In their study, Fernandes et al. (2013) found that inventive commercial groups in Spain and Portugal fared better financially, and that economic considerations are a drawback to company effectiveness. According to Marzook and El-Rasas (2014), one of the foremost causes of project interruptions in Egypt is incapacity of contractor and subcontractor to cover those costs. In her investigation, Saunila (2014) found that a company's capacity to innovate had a bigger effect on the profitability than operating efficiency.

2.3.3 Quality Factor

As per Ameyaw, (2016), qualitative differences in projects in terms of maintenance and modification result in a 12.4 percent increment project budget. Quality is a determinant of the success of construction projects. The project management competency and management support have a great effect on the quality of infrastructure projects. According to Ling et al. (2009), one of most key components for project performance for Singaporean businesses performing construction developments in China are the integrity of service contracts and the quality of responding to observed errors. There haven't been a lot of research undertaken on quality in construction field. The creation of quality measurements is among the most crucial elements of quality planning. Beyond standard metrics of scope, time, and money, project management must consider other factors. It is crucial to connect a project to the strategy of the firm, organization, or division. The project manager's efforts on whatever project he or she is overseeing should result in some form of benefit for the business, as stated by Rever, (2006).

In the end, improving some aspect of the business is the purpose of a project. Another important component of quality assurance is process analysis. Root-cause investigation and benefit analysis are subjects covered by process analysis. Most of the project's management are familiar with cause-and-effect or fishbone diagrams, as well as root-cause analysis in general. When examining the causes of issues, it's crucial to keep in mind that root-cause analysis encompasses the five main categories of individuals procedures, equipment, materials, measurement instrument, and environment. It is simple to concentrate most development initiatives and corrective measures on the people.

2.3.4 Safety Factor

Construction is regarded as the most dangerous sector of the economy, and accidents have long been a problem. Construction site incidents or accidents have resulted in several negative effects on project performance, including delays in project completion, increases in project costs, decreased productivity, and poor perceptions of the company. Therefore, to prevent accidents, it is essential for employers to maintain workplace safety and health. Safety training, the implementation of a safe working environment, and the adoption of safe plant and equipment are some of the most mentioned elements that influence the safety performance of a construction project at the project level. The findings of the report could be used as a springboard for additional inquiry into the subject.

From a professional approach, Babatunde et al. (2017) studied the different models of project, project planning, performance outcomes, individual skills and abilities, and other social conditions associated with the project. They challenged the iron triangle principles of time, cost, and quality in project management. These concepts have not improved much in the last few years. They pointed out that research on other project performance indicators such as safety and health, morals, and economics is inadequate, and that these areas must be investigated further. In overall, safety is underexplored, and any new information will add to the body of knowledge of this field.

2.4 Project External Factors

In his study, Chan (2007) found that management of employees, their technological roles, monitoring and reporting, interaction, and solving are all strongly associated to project performance. As per Khang and Moe (2008), appraising the role of non-global projects in developing countries during the conceptualization, planning, delivery, and

closure stages of the project is critical. They also realized that project planning and design are fundamental to a successful completion of a project.

2.4.1 Client Factors

Ahmadabadi (2019) suggest that customers or client should be more involved in ensuring that their efforts succeed. He also said that the customer's selection of the most appropriate project and the rejection of potentially unsuccessful efforts are important for project success. Though opinions have a role in project management, according to Almarri and Boussabaine (2017), customer satisfaction is the most essential element in deciding project outcomes on a macroeconomic scale. Alnuaimi, Taha, Mohsin, and Al-harhi (2010) found that the most important causes resulting in variation orders were the project owner's demands for additional works and changes to the original design or scope, followed by the inability to access the construction process.

Moreover, Babatunde et al. (2013) classified the causes of variation orders according to the customer, consultant, contractor, and additional elements connected to nature. The client or project owner may suggest additional factors, such as changes to the project's scope, timetable, materials, or procedures, or weaknesses or sluggish decision-making. They may also suggest revisions to the specifications. Developing and sustaining a good connection with clients is vital to performance, while using the other Critical Success Factors (CSFs) to meet those requirements. Sambasivan and Soon (2007) in their research determine that one of the 10 largest causes that lead project time and cost overruns is insufficient financing and customer payments for work done. One of the 4 major causes of economic project delays is customer issues.

Babatunde et al. (2017) found that stakeholder interaction and approval are highly related to process improvement in his research. According to Tawil et al. (2013), the major concurrent delays in public construction projects include delays in customer

funding, delays in client clearances, and extended scope of the work provided by the client. Among the most frequent causes of project losses in the United States, according to Truman (2014), is the product development team's incapacity to perform the projects. Customer engagement and frequent adjustments by customers are not important determinant impact the project performance, according to Ahmadabadi and Heravi, (2019). According to Marzook and El-Rasas (2014), delays in building projects in Egypt are caused by customer delays, landowner intervention, shutdowns, delayed judgement, and clearance delays.

2.4.2 Contractor Factors

According to Almarri, and Boussabaine, (2017), involved parties for example subcontractors and their engagement in the work are a key factor of project management. The most prevalent main causes connected to project delays around the world are issues with contractors and subcontractors and errors made during the building stage. Furthermore, according to Hamzah et al. (2012), financial worries, insufficient experience, bad site inspections, faulty planning, and flaws or defects are some of the contracting company causes that induce development delay in the project. In their investigation, Tawil et al. (2013) concluded that inadequate contractual current assets and poor contractor site management techniques are the leading causes of slowdown in government-related construction developments. Elawi et al. (2016) investigated road and bridge construction projects in Saudi Arabia, focused on Mecca, and discovered that average delays are 39 percent. due to contractor inexperience and redesigning the project different times.

2.4.3 Consultant Factors

Ameyaw (2016) noticed in their study that consultant or advisor involvement in a project is essential, and that their involvement contributes to less practical problems and project outcomes. According to Alaghbari et al. (2007) one of the main causes of building project difficulties is consultant concerns. According to Khang and Moe (2008), consultants are essential to the development of non-profit international programs in poor nations. Moreover, Hamzah et al. (2012) reported that all of the reasons for building project disruption in Malaysia is due to a consultant's weakness. In addition to that, according to Tawil et al. (2013), difficulties in consultant certifications are the primary cause of delays in government-related infrastructure projects. Consultant-related fundamental flaws, according to Marzook and El-Rasas (2014), are one of the reasons of development project collapses in Egypt.

2.4.4 Labor Factors

Resources such as equipment and personnel, according to Ahmadabadi and Heravi, (2019), are crucial to the process. They showed that workers aspects are significant for construction projects in their studies. Sambasivan and Soon (2007) revealed in their study that manpower issues are the major problem in construction delay factors. According to Hamzah et al. (2012), two of the main reason for constructing project failures include reduced productivity and a manpower shortage. One of the most common project delays in the United States, according to Truman (2014), is a lack of sufficient personnel. Memon et al. (2014) determined that some of the most important factor that influences project effectiveness of the project is a manpower constraint. Moreover, inexperience staff and their low productivity, according to Marzook and El-Rasas (2014), contribute to the reasons for construction project failure or delay.

One of the most important elements in enabling contractors to conduct their task more quickly and efficiently is equipment. Utilizing factor analysis's have been tracking the production of projects including labor and equipment. In most cases, the equipment maintenance plan of efficient construction by using the frequency analysis method, was identified and significantly increased project cost overrun (Tsado, 2014). The classification of the characteristics and its impact on the choice of equipment are assessed by creating a framework for the management of equipment choice. Modern techniques and new technology could have been used in much research employs arithmetic and geometric gradient methods to calculate the equipment's future life cycle costs, offering the necessary minimal present value of all expenses. choosing equipment that is less expensive and takes the job situation into account, and finding the equipment with the highest production and lowest running costs are a combination of equipment improvement of profit analysis (Jacques, 2015).

2.4.5 Contract Management Factors

Babatunde et al. (2017), said that even for similar projects, scope of contracts varies widely in the industry, and this influences project success. According to Davies (2002), established methodologies for scope management and regulation of these scope changes are essential for project success. Modifications in a project's scope, he noted, have a big effect on profits, scheduling, and other elements. Contract management is among the most significant aspects in project management. According to Ling et al. (2009), the most crucial components for project accomplishment for Singaporean businesses doing construction projects in China are agreement process is carried and the scope of contract changes. According to Truman (2014), poor performance in the United States is due to poor design change management. As per the Marzook and El-

Rasas (2014), some of the causes that lead construction delay are change planning and control problems and postponements in scope change approvals.

2.5 Organizational structure

The term "project" is frequently used in everyday economic and social life, and project management has evolved into a global subject applicable to practically all aspects of business and industry. Diverse forms of organizational structures create different interactions among project participants, especially between project and line managers. According to Berssaneti (2015), organizational structure is described as the collection of interconnected relationships and responsibilities that exist throughout the organization. He found that the way of an individual and his team are supported inside an organization to achieve organizational objectives and goals is referred to as organizational structure. The influence of organizational structure on project success in the water sector construction project in Oman is investigated in this study. The goal is to investigate and determine the impact of project organizational structure in companies on project management. The existence of organizational structure was proven by the company's policy of responsibilities between project and line management in terms of project management authority. This is the mean for how project managers receive resources for projects and who appraises project team performance.

Success of the project was determined in this study by considering whether the project was finished on schedule, on financial plan, and fulfilled all the user needs, as well as measuring the project's overall performance. The organizational structure of a corporation can have a significant impact on project execution. Traditional, functional organizational structures are not the best or most profitable, and they must evolve to keep up with changing markets. According to Milan et al (2013), most organizations have concluded that to succeed in business and remain in the market, they need to make

modest organizational changes at least once a year, or a large change every 4 to 5 years. The expansion and development of the corporation produce dynamic changes in organizational structure. Although no studies directly linking organizational structure and project success have been conducted in countries in transition to our knowledge, it has been demonstrated that organizational structure affects entrepreneurship and innovation within the company, all of which contributes to project success.

Furthermore, it was discovered that different organizational structures create distinct interactions between project participants, especially between project and line managers. The arrangement of resources in an organization's structure helps to strengthen and support specific logistics management enhancing capabilities (Bergfor & Larsson, 2009). The communication between project and level managers, as well as the company's overall perception toward construction projects, are two of the key factors that may be used to assess the degree of the project organizational structure. Studies that focus on specific aspects of organizational structure and their influence on the achievement of the projects were carried out in developing nations showed that the bigger effect of the project management in the company is, the better is the project outcomes in that company as well and the effect of the project management is exactly an indication of project organizational structure. Similar studies were conducted and in countries that are not in developing countries, and it has been shown that the impact of project managers relates to the success of projects (Milan, et al., 2013).

2.6 Project Management Theories

The next theories are the supporting for this research, which are examined for their importance to construction project success: Dynamic Capacity Theory and Resource-Based Theory.

2.6.1 Resource Based View Theory

The Resource-Based View (RBV) is a managerial approach for assessing which resources a company might employ in the long run to acquire a competitive benefit. Barney's study "Firm Resources and Sustained Competitive Advantage" is commonly acknowledged as a pioneering study in the development of RBV. Some experts, however, believe that facts for a resource-based approach existed in the 1930s. The RBV focuses management's attention on the internal business resources to find resources and competencies, that have the importance to generate superior economic benefit. Practitioners of RBV argue that it is far more practical to take advantage of external opportunities by modifying available resources rather than developing new things for each occasion. In the RBV approach, resources play a critical role in helping companies in achieving increased organizational performance.

There are two categories of resources, according to Argyres et al. (2007) namely physical and immaterial. For Hard resources such as property, building, machines, technology, and capital are examples of real assets. All these assets are observable. Tangible assets have a limited long-term worth for firms due to the ease with which competitors can obtain the same assets. Everything that isn't physically present but can be owned by the corporation is considered an intangible asset. Property rights, trademarks, and strong brands are a few instances of intangible assets. It requires a long time to manufacture, but unlike tangible assets, it is a product that other businesses cannot acquire on the stock exchange. Intangible resources serve as a company's main strategic asset. One of RBV's fundamental presumptions is that resources are both diversified and immovable. The basic premise of heterogeneous is that organizations' abilities, competencies, and other resources differ from one another. If both companies had the same number and variety of resources, they couldn't use different strategies to

outcompete each other. What one company achieves may readily be replicated by another, and there is no way to create value.

However, Modern economies are far from competitive markets, and while being subjected to the same international economic circumstances, some businesses may follow different approaches and dominate others. Therefore, theory argues that integrating multiple resource bundles gives enterprises a significant advantage. The alternate hypothesis of RBV is that resources are not transportable and do not change from business to business, at least in its current form. Companies cannot copy rivals' assets or utilize the same strategies because of this static. Intangible assets like as brand image, operations, information, and copyrighted material are examples of immobile key assets. Unlike the industrial organization viewpoint, RBV thinks that sustainable strategic advantage may be achieved more easily by looking at the internal rather than external factors. While this is basically correct, there is also no straight solution as to which strategy management technique is more important. Corporate effects accounted for 30 to 45 percent of organization effectiveness (Resource-Based View) and 20 percent of attaining organizational goals (perspective-based view) (Milan, et. al., 2013). This shows that looking at both factors and combining both viewpoints is the best method for obtaining and enhancing productivity.

2.6.2 Dynamic Capability Theory

Dynamic Capabilities Theory was identified by Teece and Pisano (1994) as an expansion of the company's RBV. Companies in similar fields considerably vary, according to RBV, because they have separate kinds of capabilities. RBV is a static model that cannot explain a performance of the company in a changing economy. A company's ability to integrate, create, and rearrange internally and externally resources to respond to a constantly shifting environment is defined as dynamic capabilities. The

link between dynamic skills and organizational success, according to scientific investigations, is considerable.

Dynamic capabilities have also been a focus, mainly in strategic planning (Barreto, 2010), and a company's performance is defined not just by its assets, but also by how well it reacts to the market where it works. It is vital to note that dynamic capabilities aren't separate from the resource-based approach, but they are a keyway of understanding competitive advantage, especially in a global condition. Besides this, in a volatile and rapidly expanding market, resources must be dynamic, and management must understand how to change strategy to the dynamic world to generate new capacities that can keep up with the market's changing dynamics. The mechanisms that enable businesses to maintain outstanding performance over time are referred to as dynamic capabilities. Strategy implementation and integrating the company with the environment are the goals of dynamic capabilities. They can be conceptualized as the company's ability to shape possibilities, as well as develop, extend, and transform its resource base. Dynamic capabilities good understanding performance in a variety of ways; they modify resource bases to changing surroundings, produce market change, and improve multi performance, Wilden et al. (2013).

Dynamic capabilities boost the performance and effectiveness of an organization's reaction to environmental events, which can help it perform better. They enable businesses to take privilege of income possibilities while also adjusting processes to reduce costs. Finally, dynamic capabilities give the organization with a new type of choice possibilities, which have the potential to improve company performance, by sensing opportunities.

2.7 Summary

Many research projects have been conducted on critical success factors, which for example the relationship between project factor and project performance. As evidenced by literature review and gaps mentioned to organizational performance. However, no studies took organizational structure as moderator and its influence on dependent and independent variables. This gap is addressed in this study. Moreover, project success has been evaluate mostly using the classical form of iron triangle of time, cost, and quality. On the other hand, safety hazards and safety issues are mostly occurred in the construction industry resulting in the high frequent number of accidents, incidents and fatalities comparing to other sectors of the economy. Thus, to gain a holistic view of project hard factors. The most discussed project-related factors, such as customer, contractor, consultant, resource, manpower, and tools, and contract management, are chosen from among the research gaps identified in the literature. The most critical soft elements including in organizational structure such as leadership, corporate culture, creativity, and knowledge society, are chosen as organizational structure which is moderated. The relationship between project factors and organizational structure in the term of time, cost, and quality is analyzed.

CHAPTER THREE

CONCEPTUAL FRAMEWORK, HYPOTHESIS DEVELOPMENT AND METHODOLOGY

3.1 Framework of Study

This research framework was formed according to the research gap raised in the study as well as the scope of the study. The efficiency and effectiveness of key stakeholders' resources, including those of the clients, contractors, consultants, employees, and equipment, is a necessary component of success in the construction industry. These stakeholders' resources are sometimes labelled as a "hard factor" in project management because they are selected as an independent variable. Good performance connects Time performance with cost performance that maintaining within budget. Also delivering the project without any errors ending without any accidents and reaping benefits from completed projects. Time, cost, quality, safety, and finance are all factors that contribute to project success. Every one of those five important performance dimensions has been chosen as a dependent variable. Refer to Figure 3.1 for the proposed framework.

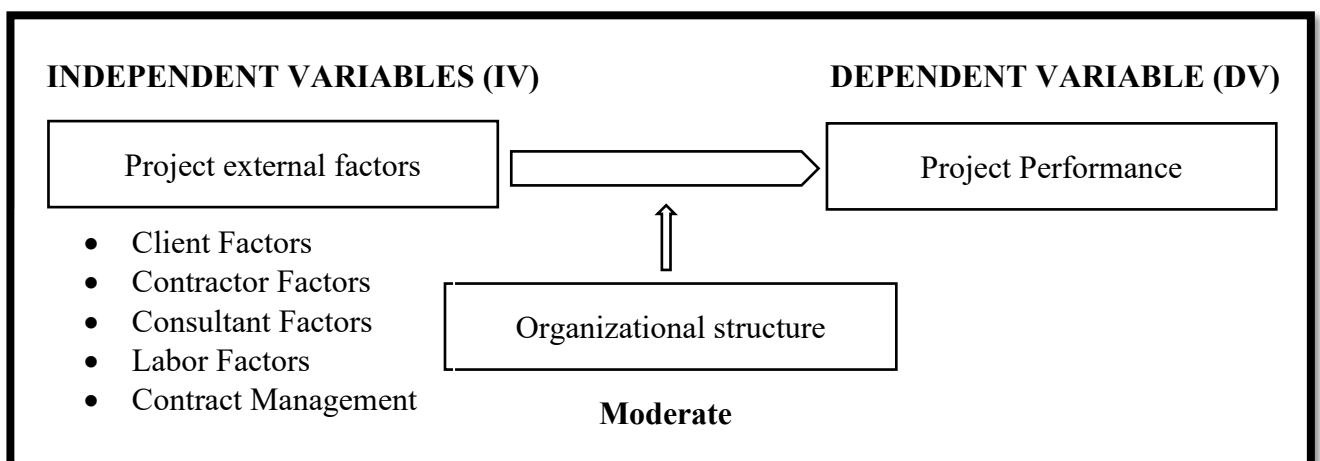


Figure 3.1: *Research Framework*

3.2 Formulation of Hypotheses

Figure 3.2 show the development of hypotheses, which is discussed in the next sub-sections.

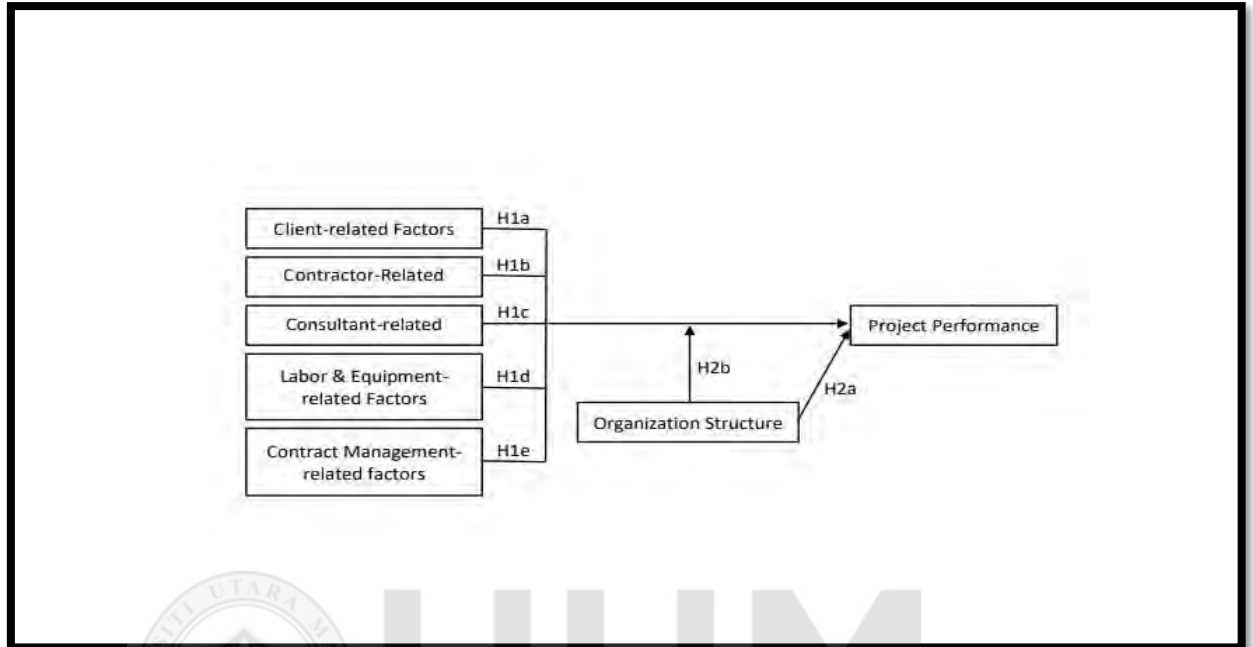


Figure 3.2: *Conceptual Framework for Hypothesis Testing*

3.2.1 Project performance and project external factors:

Hypothesis H1 considers all project-related aspects, including:

H1 The success of a project is heavily influenced by project factor. To accomplish targeted and scheduled complete, cost, quality, and other stakeholder objectives, construction projects involve a variety of events and operations at various phases of their life cycle. H1 Individual project factors has a positive relationship with project success, as stated below:

3.2.1.1 Client Elements and Project Performance

Clients are important stakeholders in the building projects since they are the players who come up with a working concept, fund it, and specify the project's requirements in order to achieve its organizational plans. The significance of clients in a successful

project cannot be emphasized. Putting the entire project in the hands of contractors and subcontractors can have major implications, while engaging too much with the work of contractors by the customer might result in project delays and clashing challenges. Customers' impact on project outcomes in general of time and expense overruns had been investigated in previous study. One of the biggest causes of project delays is the client's insufficient financial resources and the delay in paying contractors for finished work according to Sambsivan and Soon (2007). Alaghbari et al. looked on the relationship between holders and project delays (2007). They determined that there is a link between the two. Hamzah et al. (2012) looked at the many causes of customer delays in construction projects and discovered that one of the 24 causes of project delays is caused by clients. As a result,

H1a: Client has a positive relationship with the project success.

3.2.1.2 Contractor Elements and Project Performance

Contractors, who carry out the project on-site, are the second most important stakeholder in a construction process after the client. Their role is critical since the project's technological capacity, material availability, project management team efficiency, and budgetary capacities influence the achievement of project objectives. Poor planning of contractor, improper management of the site, insufficient competence, technical errors during construction, and disagreements with other stakeholders are five out of ten reasons of construction project delays in many countries, according to Ahmadabadi, (2019). Hamzah et al. (2012) researched the different causes of contractor delays in construction projects and noticed that contractors are considered one of the 24 causes for project postponements. As a result,

H1b: Contractor has a positive relationship with the project success.

3.2.1.3 Consultant Elements and Project Performance

Consultants are the third most influence stakeholder in a project. These consultants are technical professionals offering technical and regulatory support to help customers and contractors achieve project goals. Ahmadabadi (2019) studied the correlation between consultants' considerations and project delays. They revealed that the link is obvious, and that consultants are among the four leading causes of building schedule delays. In addition to that, consultants are considered one of the 24 effects of project overruns, according to Hamzah et al. (2012). Tawil et al. (2013) demonstrated that consultant failures are one of the most important issues in construction. As a result,

H1c: Consultant has a positive relationship with the project success.

3.2.1.4 Labor Factors and Project performance

The existence of qualified and required employees, as well as their skill and integrity, is a critical element in the rapid completion of the projects. Similarly, the availability of essential industrial machinery and the availability of qualified controllers and technicians to keep the equipment in proper working order, are also aspects to consider. Labor shortages and equipment failures are the most common causes of construction project postponements in most countries, according to Sambasivan and Soon (2007). Moreover, Marzook (2014) looked at the relationship between the reasons of delays and their effect on productivity, concluding that labor and project delays are correlated. As can be notice from the foregoing, labor and tools element have a substantial impact on project success. As a result,

H1d: labor has a positive relationship with the project success.

3.2.1.5 Contract Management and Project Performance

Many parties, including customers, vendors, advisors, supplier, and labors are regulated by contracts. According to Davies (2002), established mechanisms for overall project, modifications and control them are essential for the project success. According to Westervel (2003), contract management is among the six significant aspects for project success. As a result,

H1e: Contract management has a positive relationship with the project performance.

3.3 Organizational structure

Organizational structure according to Berssaneti (2015) is described as the collection of interconnected relationships and functions that exist throughout the organization. He concludes that the way of an individual and his team are supported inside an organization to achieve organizational objectives and goals is referred to as organizational structure. As a result, people must be monitored, and structure, which defines reporting relationships, is a crucial instrument for establishing coordination. (Who reports to whom) represents formal channels of communication and shows how individuals' distinct activities are connected. The fundamental concepts of any organization are its organizational structure. In fact, the variety of definitions and the impact of structure on organizational operations demonstrates its importance. Essentially, any organizational progress is guided or controlled by organizational structure characteristics. An organizational structure is a set of patterns in which specific proportions and characteristics of an organization are provided. Therefore, the following hypothesis are:

H2a: Project performance is affected by organizational structure.

H2b: The relationship between external factors and project performance is moderated by organizational structure.

3.4 Research Design

According to Guest (2012), a research design is a plan that controls collection of data, and data analysis. The design of a report is also important because it gives a clear image of the information gathering and analytical techniques. The purpose of this study was to examine the factors that influence project success and the correlations between the factors in the water sector using a descriptive research design. The descriptive test approach was excellent for this study because it allowed the researcher to confirm the connection between all parameter without changing them. A survey is a typical method in quantitative study. Using the survey method used in the sample survey research, researchers can explore public attitudes, opinions, and viewpoints on specific study subjects, as well as actual data. The relevant quantitative data will be collected utilizing a range of measuring method employed from past research and revised to match the objectives of this investigation. The leading data gathering process began after a successful pilot study. For data collection, the study questionnaire is sent by email to the designated sample population. The quantitative data used to examine project and organizational structure issues, as well as their outcome performance.

3.5 Questionnaire Design

In questionnaire design, the study variables available in this research consist of project factors as independent and organizational structure as moderator and project performance as the dependent variable. These parameters of this study were taken from previous findings. The elements rated on 5-point Likert quantitative scale from “strongly disagree” to “strongly agree” will be used to measure the variables.

The variables under study and their dimensions are summarized in Table 3.1 below.

See Appendix for the example of questionnaire.

Table 3.1: *Research Variable Measurement*

Variables	Items No	Source
Respondent Background	6	-
Project Performance factor	5	Truman, D. (2014)
Client elements	4	Tawil et al. (2013), Memon et al. (2014)
Contractor elements	6	Sambasivan and Soon (2007), Tawil et al. (2013)
Consultant-related factors	4	Alaghbari et al. (2007)
Labor and equipment elements	4	Assaf and Al-Hejji (2006)
Contract management elements	5	Truman (2014)
Organizational structure	6	Milan, et al (2013)
Total	40	

3.6 Target Population and Sample Size

3.6.1 Target Population

The definition of population according to Mertler and Vannatta (2010) is a group of people, things, or artifacts that share a common characteristic. Collis and Hussey (2014) go on to conclude actual population size from which the data is gathered is a focus group. The population of this study made up of all construction companies in water and wastewater sector in the Sultanate of Oman. All sample from two types of water plants construction companies. The construction companies involved in this research are those companies that registered in the Ministry of Oman Labor. The respondents include managers and other supervision employees in each company. They can provide the study with accurate information in questionnaire since they work in top managements positions. Therefore, the total number of populations of this research will be based on more than one hundred and fifty (150) construction companies.

3.6.2 Size of Sample

A sample is a subset of a larger population that participated in a research project (Chua, 2007). A sample is a portion of the population that can be selected during the sampling procedure. It is, in fact, a part of the study's target population. Furthermore, it can be linked to a sub-collection selected from the target population. Bartlett et al. (2001) and Sekaran et al. (2010) list several reasons for utilizing a sample in a study, including the inability to collect data from the full population and the potential to record a lower error in the data collection technique. The sample size for this study will be drawn from a total of 150 construction firms. The sample size that will be utilized to choose the respondents is determined by Krijcie and Morgan (1970). Based on this, approximately 113 managers were chosen.

3.6.3 Sampling Technique

The current study is cross-sectional technique focused on gathering the data from construction firms which worked in water sector. The researcher will gather data from management level of project and operation departments since they are most ideal respondents. All data related to this study are online collected through email. This was done by classifying organization into sectors and selecting large size companies. The sample of this study consist of 150 large companies. These companies have good corporate governance practices.

3.7 Data Collection Procedures

After the proposal was accepted, the researcher acquired approval from the NCSI National Centre for Statistics and Information (NCSI) in Sultanate of Oman to continue data gathering, and in accordance with government regulation, the researcher obtained a permit from the Oman water and wastewater service company. An introductory letter

was written before going to the data collection field. At various workplaces, data was collected from senior management and middle management. The sampling techniques were done utilizing a specified approach due to the staff's hectic schedules. It was also associated to increase response rates by allowing respondents to finish the survey at their convenience.

3.8 Pre-test Instrument

The questionnaire items were pre-tested to confirm their validity and reliability before being given to all target respondents. Before beginning the pilot test, the researcher ran a pre-test for a month. (From June 2022 to July 2022). An expert or a member of the target population assesses the questionnaire instrument during the pre-test process. The researcher has asked academics and members of the target audience for feedback and recommendations to make sure that the survey is straightforward and simple for respondents to understand. Based on the comments and suggestions received, the researcher will tweak the questionnaire's design. The instrument is pre-tested and gone through two reviews to guarantee a high grade of content accuracy, readability, and precision. The items are picked after a thorough assessment of the literature and are assessed by several academics and specialists as a requirement for verifying what's inside a quantitative research tool.

As a result, the pre-test in the first stage involves three academic staff members and three expert practitioners from the field of study. All comments and suggestions are offered after the instrument has been examined, and they are carefully considered to raise the instrument's quality-test questions are crucial because they can quickly highlight the limitations and weaknesses of the survey instrument, reducing bias (Sekaran, 2003). As indicated in the following Table 3.2, the researcher collected a

summary of the academicians and practitioners' comments and thoughts as well as information from utility companies that functioned as representatives for the pre-test stage.

Table 3.2: *Summary of Academies and Practitioners Comments obtained from Pre-test Results.*

Representative	Comment and suggestions
Academician 1	The instrument is easy to understand. Suggestion to conduct a focus group discussion to discuss the matter.
Academician 2	The survey questions are clear and easy to understand. Suggestion to include respondents' names and to use the native language.
Academician 3	The instrument is great and focused. Suggestion to remove age and gender sections from part one and to not duplicate the items.
Practitioner 1	The instrument is easy to understand. Suggestion to use 5-Likert scale instead of 6-Likert scale.
Practitioner 2	The instrument is easy to understand. Suggestion to consider some more statements and to use reversed phrased statements to reduce the response bias.
Practitioner 3	The instrument is easy to understand. Suggestion to simplify some terms to be clearer.

3.9 Study Instruments

The primary and secondary data were integrated, with the primary data being obtained by a semi-structured questionnaire. According to Summer (2013), a questionnaire is a series of questions around a topic that generates answers. In the survey, a five-point Likert scale was conducted to identify how much system consensus impacts outcome. As a result, the participants were able to give extensive answers to the research question. Surveys are easy to understand, can be delivered to respondents, are simple, and decrease biases by providing a consistent (objective) question structure. Most statistical survey instrument can also simply manage them.

3.9.1 Research Instruments for Pilot Study

A pilot study is a small-scale preliminary study conducted before any large-scale quantitative research to evaluate the potential for a future, full-scale project. By

conducting a pilot study, researchers will be better prepared to face the challenges that might arise in the larger study, and they will be more confident with the instruments they will use for data collection. This include determining the questionnaire's suitability. In this research, conducting pilot for the first 30 samples. Then performing validity and reliability tests. Multiple revisions were made to the questionnaire's initial draft in order to address any issues and clear up any ambiguity. After that, a pilot test utilizing information from a small group of participants was necessary for Verify the measurement's accuracy and dependability (Sproull, 2004).

Respondents in the pilot test were selected from the same study group as the actual data, and the survey was examined and assessed by multiple experts (Bradburn et al, 2004). On the other hand, before the distribution, the measure was refined in order to obtain correct research data, reword difficult questions, ascertain the time required for answering the survey, and validate the reliability and validity of the measure. To gather information for the pilot project, the executives of 30 companies from the construction companies of Oman were asked to respond to a questionnaire. To lower the possibility of misunderstanding, they were also asked to comment on whether the questions were simple to understand. As a result, to eliminate any confusion and enhance the study's data quality, some of the questions were modified. The validity and reliability of the instrument were evaluated using the data that had been gathered. The instrument's validity and reliability were proven after the pilot study.

3.10 Validity of Findings

According to Fisher (2010), the concept of validity is the degree to which the analysis tool gathered the data necessary to test the subject of the study. The study's integrity as well as its utilization of academic and professional expertise to build a reputation were evaluated for material validity. Building validity is the measurement of how accurately

and reliably data gathered by a tool matches a theoretical meaning, whereas representing validity is the measurement of how accurately and reliably data acquired through an instrument represents a theoretical meaning.

3.11 Loading Factor and Reliability of Research Instruments

Loading factor test is define as correlational method to identify significant groups of common variances. The goal of factor loading analysis is to break down the high number of interconnected smaller set of groups or factors. The variables are grouped in accordance with the linkages or natural connections that result from factor loading analysis, where variables are highly associated with each other and minimally connected with other variables. A factor loading of 0.5 and above for each of the item is required for further analysis. Seven constructs with 32 items related to project performance, project factors and organizational structure were tested for factor loading analysis. Factor loading analysis helps to identify some of the items, which do not explain the variable by getting a factor loading value of less than 0.5.

Thus, we can eliminate some of the items whose factor loading values are less than 0.5 prior to further analysis of the data. To determine the consistency and stability, a reliability analysis will be conducted. The whole score was merged to show its stability in terms of reliability, which is a multi-item scale that has been summed up. Cronbach's Alpha is used to assess reliability in statistical analysis. In empirical studies, Cronbach's Alpha values of 0.6 or higher for various constructs used in the study variables are considered appropriate. The received responses in this study was put through a reliability test both before and after factor loading analysis. The higher the value, the more precise the scale developed; however, it has been discovered that a threshold of 0.5 and above is sufficient to ensure data accuracy. Table 3.3 shows reliability analysis for pilot study.

Table 3.3: *Reliability, Analysis of Pilot Study (n=30)*

Constructs	No. of items	Cronbach's Alpha
Project Performance	5	0.839
Client Factor	4	0.890
Contractor Factor	6	0.914
Consultant Factor	4	0.622
Labor factor	4	0.843
Contract management	4	0.942
Organizational structure	5	0.778

3.12 Data Analysis

The quantitative data was analyzed using descriptive and inferential statistics. Simple analyses of the items and measures are provided in the form of infographics and quantitative summaries. For each of the variables, it gives the minimum, maximum, mean, standard deviation, skewness, and kurtosis values. For empirical studies, skewness and kurtosis values of less than ± 2.0 and a standard deviation value of less than 10 are considered acceptable. The data acquired for this research study was subjected to descriptive analysis to determine its quality. For several purposes, the data from this study will be examined using the Statistical Package for Social Sciences (SPSS) version 29 software. In addition, Microsoft Office Excel was used to supply the data for both SPSS and relative importance index analysis computations. The first step in the data analysis technique was to collect the data from all the respondents using Microsoft Office Excel. All the variables were categorized so that they could be detected individually for further investigation. Table 3.4 shows the objective of each variable and the method of analysis.

Table 3.4: *Data Analysis Technique*

Objectives	Method of analysis
Demographic variables	Frequency
To determine the influence of project external factors on project performance among construction firms in Oman.	Multiple Regression Analysis
To test the moderation of organizational structure between project performance and project factors among construction firms in Oman.	Multiple Regression Analysis

CHAPTER FOUR ANALYSIS AND FINDINGS

4.1 Introduction

The examination of the responses to the questionnaires that were given to the respondents is presented in this chapter. The study objectives that were mentioned in Chapter One will be addressed by the findings of this chapter. With the help of the Statistical Package for Social Science (SPSS) version 29 for Windows, informative and inferential analyses were carried out.

4.2 Response Rate

The response rates are typically the first thing published in any study. The response rate is determined by dividing the total number of returned surveys by the total number of surveys distributed. 150 questionnaires have been issued to construction companies in the Sultanate of Oman engaged in the water industry. Thankfully, 113 out of the original 150 questions were completed. Hence, a response rate of 75.33 percent was achieved (see Table 4.1). There are no unanswered surveys, and the majority of those that were received were fully completed. According to Sekaran and Bougie (2010), the questionnaire may not be included in the data set for analysis if more than 25% of the items are not fully answered.

Table 4.1: *Response Rate for Sample Study*

Questionnaire Distributed	150
Returned Questionnaire	113
Incomplete Questionnaire	0
Useable Questionnaire	113
Response Rate (113/150)	75.33%

4.3 Demographic Profile of Respondents

Six items make up Section A of the questionnaire, which evaluates the respondents' demography. The items include job, utility service sub-sector, company existence, respondent experience, education level, and number of employees. Table 4.2 provides comprehensive descriptive statistics about the participant's demographic profile.

Table 4.2: *Demographic Profile of Respondents (n= 113)*

Demographic	Characteristic	Frequency	Percentage %
Position in the business	Managing director	34	30.1 %
	General manager	28	24.8 %
	Project manager	32	28.3 %
	Operation manager	12	10.6 %
	Site manager	7	6.2 %
Sub-sector of utility service	Water	23	20.4 %
	Wastewater	20	17.7 %
	Water and Wastewater	68	60.2 %
	Others	2	1.8 %
Company existence	1-5 years	2	1.8 %
	6-10 years	12	10.6 %
	11-15 years	50	44.2 %
	16 years and above	49	43.4 %
Respondents experience	1-5 years	4	3.5 %
	6-10 years	40	35.4 %
	11-15 years	39	34.5 %
	16 years and above	30	26.5 %
Level of education	PhD level	9	8 %
	Master level	39	34.5 %
	Degree	56	49.6 %
	Diploma	9	8 %
	General certificate	0	0 %
Company staff	Less than 5	0	0 %
	5 to 74	2	1.8 %
	75 to 200	22	19.5 %
	More than 200	89	78.8 %

It should be emphasized that of the 113 respondents to this study, 30.1 percent were managing directors, and 28.3 percent were project managers. As the water and wastewater sectors were combined in Oman, most respondents work in these fields. Most businesses in this industry have been around for more than ten years. 35.4 percent of those in their current positions have been there for six to ten years, while 34.5 percent have been for the organization for fifteen to twenty years. 49.6 percent of respondents

have a bachelor's in science, and 34.5 percent have a master's degree. The majority of respondents come from businesses with more than 200 employees.

4.4 Screening of Data

The data was screened to make sure it was accurate and prepared for additional statistical analysis. This is crucial to ensure that the data used to test the causal hypothesis are trustworthy, applicable, and valid. The investigation of the missing data revealed that there are no missing values for any of the questionnaire's items at all. Thus, the data does not contain any missing values.

4.5 Descriptive Statistics Analysis (DSA)

Sekaran and Bougie (2010) claim that data analysis of the variables utilizing mean, standard deviation, and variance can give academics a comprehensive understanding of how the respondents to this research reacted to the questionnaire's components. A descriptive statistic was carried out to identify and summarize the essential characteristics of an information source from the participants' perspective on each variable, namely economy, leadership, customer focus, quality system, and organization effectiveness.

Table 4.3 displays the variables' descriptive statistics. According to the Likert scale used in this study, each construct had to have a lower limit of 1.50 and an upper limit of 6.00. The majority of the variables have above-average means with ranges between 2.5531 and 4.5062 and standard deviations between 0.46219 and 0.64606. Table 4.5 also displays the lowest and highest responses for each variable. Therefore, it was revealed that, in the respondents' opinions, the minority of the indicators have implementation levels that are too high. In other words, practically every dimension is above what is considered good.

Table 4.3: *Descriptive Statistics of the Constructs (n = 113)*

Constructs	N	Minimum	Maximum	Mean	Std. deviation
Project Performance	113	3.40	5.00	4.5062	0.46219
Client Factor	113	1.75	4.75	3.2544	0.64606
Contractor Factor	113	1.17	4.67	2.5531	0.59648
Consultant Factor	113	1.75	4.50	3.1062	0.59462
Labor Factor	113	2.00	4.50	3.3252	0.51632
Contract Management	113	1.75	5.00	2.8761	0.58832
Organizational structure	113	2.00	4.00	3.1646	0.55435

4.6 Assumption of Normality

The symmetrical curve with the largest frequency of scores towards extremes in the small and middle frequencies is shown using normality (Pallant, 2020). To determine if the distribution of scores is normal, some researchers, like Kline (1998) and Pallant (2020), suggested considering the skewness and kurtosis values of the variables that are both independent and dependent. Many scales are part of the essence of social science concepts, and measurements can be skewed either positively or negatively (Pallant, 2020). Kurtosis is another distribution metric that gauges how closely data points cluster around the central mean. Hair et al. (2010) claimed that skewness values outside the range of + 1 to -1 indicate a significantly skewed distribution.

Kline (1998), on the other hand, stated that a cut-off of +3 to -3 might be acceptable. The skewness values were within the acceptable range given by Kline (1998) (+3 to -3), but not acceptable levels according to Hair et al. (2010) (+1 to - 1) based on these criteria suggested by numerous researchers. Similarly, Pallant, (2020) proposed that kurtosis values should be in the range of +3 to -3, which is appropriate based on Table 4.4. The results reveal that some of the skewness values stray from being normally distributed, as discussed above. The results reveal that various skewness values differ from being regularly distributed, as discussed above.

Table 4.4: *Results of Skewness and Kurtosis for Normality Test*

Constructs	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Project Performance	-0.767	0.227	-0.311	0.451
Client Factor	-0.908	0.227	0.066	0.451
Contractor Factor	-0.868	0.227	-0.114	0.451
Consultant Factor	-0.753	0.227	-0.200	0.451
Labor Factor	-0.753	0.227	-0.190	0.451
Contract Management	0.101	0.227	-0.430	0.451
Organizational structure	-0.672	0.227	-0.372	0.451

The normality assumption for this study is identified by examining the skewness and kurtosis of the histogram residual plots. The residual seemed to be normal based on the analyses depicted in Figures 4.1, and the skewness and kurtosis values were near zero. The normalcy assumption is therefore satisfied (Afifi & Clark, 1998).

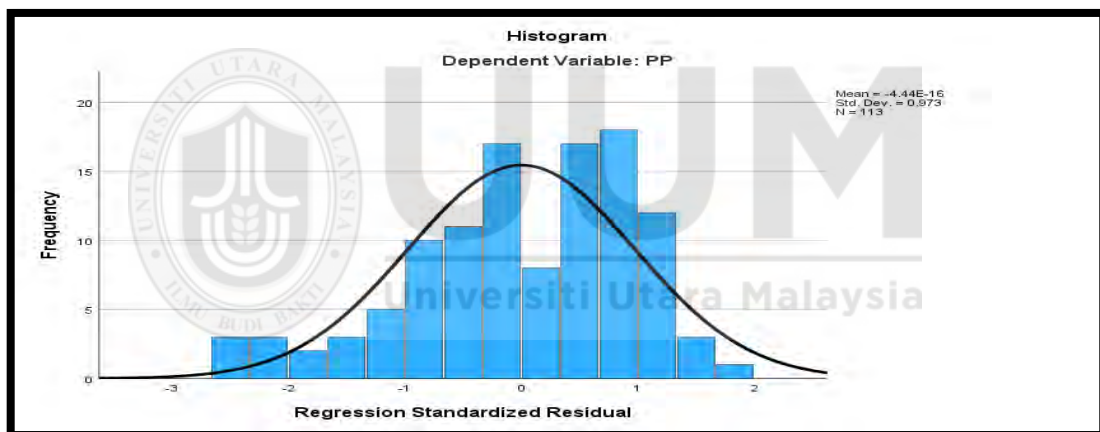


Figure 4.1: *Histogram Residual Plot*

4.7 Linearity Test

In other terms, it forecasts the path in which hypotheses should be evaluated. Linearity testing establishes the link between the dependent and independent variables. A positive value denotes a favorable relationship. When there are multiple independent variables, Hair et al. (2010) recommended using a partial regression plot for each variable to provide the best illustration in the equation. As a result, the normal P-P plot of the regression normalization residual scheme was valued for each independent variable on

the dependent variable. A normal chance in chart of the regression standardized residuals for each independent variable on the dependent variable proved that the circumstances for a normal distribution were fitted. The mass of the values should cluster at 0 points, according to the residual scatter plot, which was employed in the study (Shehu, 2014). The plot reveals that residual values settled towards the zero point at the center, proving that the linearity condition is satisfied. See Figure 4.2 for details.

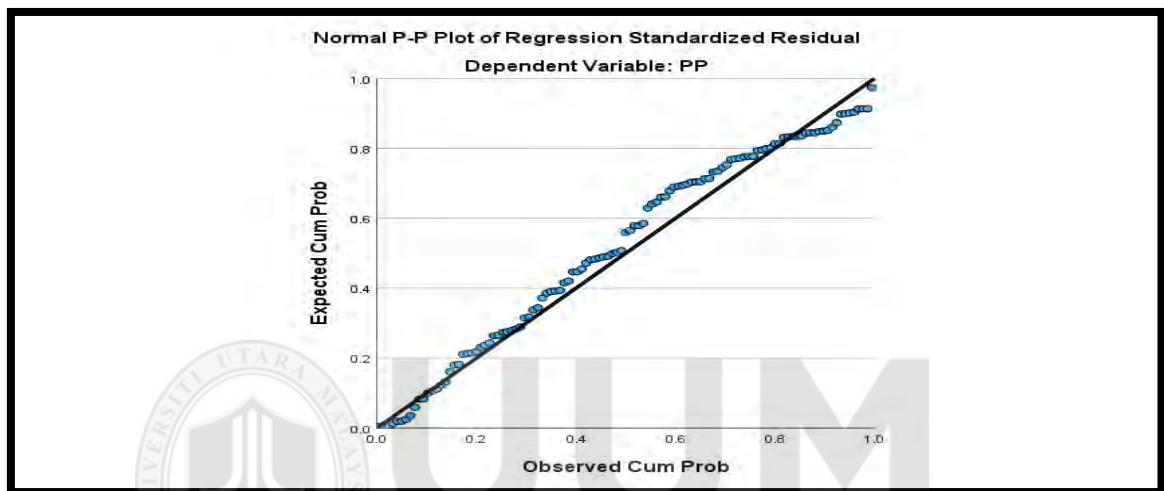


Figure 4.2: *Linearity Plot*

4.8 Multicollinearity Test

When the study variables in a linear regression have a correlation with one another, multicollinearity usually results. As the independent variables are supposed to be independent, this link is unexpected. High levels of correlation could make it difficult to accurately predict model findings. Before putting the proposed model to the test, it's a good idea to check for multicollinearity among the independent variables (Hair et al, 2010). When an independent variable is highly connected with another independent variable, multicollinearity implies the presence of a setback in the correlation matrix. Furthermore, according to Hair et al. (2010), multicollinearity is detected when the correlation value is greater than 0.90. By examining the tolerance value and the variance influence factor, this investigation is made simple.

The variation influence factor (VIF), according to Hair et al. (2010) is the opposite of tolerance. Its tolerance value is the portion of the independent variable's fluctuation that cannot be accounted for by additional independent variables. Given that the tolerance and (VIF) cut-off values are 0.10 and 10, respectively. (VIF) number should be closer to 1.00 to indicate minimal or no multicollinearity. The data on collinearity for every one of the three variables that are independent are summarized in Table 4.5. Multicollinearity was not a problem because the correlations between the factors were often less than 0.90. Although tolerance levels ranged from 0.031 to 0.957, VIF value varies from 1.025 to 32.451. The conclusion thus showed that the multicollinearity condition had not been broken.

Table 4.5: *Results of Multicollinearity Test*

Model	Collinearity Statics	
	Tolerance	VIF
Client factor	0.042	23.665
Contractor factor	0.031	32.451
Consultant factor	0.061	16.442
Labor factor	0.080	12.552
Contract management	0.957	1.025

4.9 Reliability

Reliability is a measuring of general consistency. If a measurement consistently yields similar results, it is said to be reliable. It is a trait of a group of test results that must do with how much possible errors from the measuring method might be present in the results. Very trustworthy test results are exact, reproducible, and constant from one testing session to the next. That is, essentially the same findings would be produced if the testing procedure was duplicated with a group of testers. The level of error in the scores are typically expressed using a variety of reliability coefficients, with values that ranging between 0.00 (many error) and 1.00 (no error). Sekaran et al. (2010) state that measurement instrument is error-free and consistent across several scale items is considered reliable. Because it is a common test for determining reliability, Cronbach's

Alpha coefficient might be utilized in this investigation. Hair et al. (2010) asserts that the reliability of the data of survey, which is described as "the degree of consistency among numerous evaluations of a construct," was verified by the item's constancy in measuring the construct. Even when used regularly, the instrument's durability guarantees accurate and consistent measurements.

To assure testing instrument reliability, researchers frequently employ the four strategies Sekaran (2003) proposed test-retest techniques, alternate form methods, the split-half method, and Cronbach's Alpha coefficient method. Due of practical challenges, Davis (2000) emphasized the first three techniques' limitations. Topic alterations in the first strategy could lead to lower scores; the construction of two distinct but equivalent forms of the same measure in the second strategy could lead to high costs; and item division in the third strategy could lead to different reliability coefficients. On the other hand, Cronbach's Alpha is crucial for figuring out reliability because it gets beyond the drawbacks of all three approaches. The applicability of Cronbach's Alpha has been the driving force behind its use, particularly in the field of social research.

As a result, the current study, like other social science studies, used Cronbach's Alpha coefficient to validate the measurement's reliability. By implying that they have a strong tendency to measure the same construct, the approach indicates an item's consistency when measuring the same construct. Nunnally and Bernstein (1994) defined minimum Cronbach's Alpha standards for exploratory, fundamental, and critical issue-based research, with alphas of 0.844, 0.773, 0.860, 0.745, 0.708, 0.986 and 0.811, respectively. Table 4.6 displays the Cronbach's Alpha coefficients for the research constructs, which nearly exceed the lowest alpha threshold (0.7), indicating that they have an acceptable level of internal consistency (Nunnally & Beinstein, 1994).

Table 4.6: *Reliability Analysis of Research (n=113)*

Constructs	No. of items	Cronbach's Alpha	Item Deleted
Project Performance	5	0.844	Nil
Client Factor	4	0.773	Nil
Contractor Factor	6	0.860	Nil
Consultant Factor	4	0.745	Nil
Labor factor	4	0.708	Nil
Contract management	4	0.986	Nil
Organizational structure	5	0.811	Nil

Test-retest approaches, alternate form methods, split-half method, and Cronbach's Alpha are four methods created by Sekaran (2003) that are widely used by researchers to assure measuring instrument reliability. While reliability is a criterion of good measurement, it does not always reflect measurement quality; thus, while dependability is a criterion of excellent measurement, it does not always reflect measurement quality (Churchill, 1979; Sekaran, 2003). In this study, the validity of the measures was assessed prior to the actual data collection stage. Nunnally and Bernstein (1994) define validity as the degree to which a measurement measures what it is supposed to measure. Various types of validity measurements are available in the research techniques literature, particularly in behavioral science; content and construct validity are two of the most used (Kerlinger & Lee, 2000; Leary, 2004; Nunnally & Bernstein, 1994).

4.10 Validity

In general, content validity is a metric that reveals how well a measure looks to measure the construct qualities it is designed to assess. As a result, content validity relies significantly on expert assessment to ensure that all construct qualities are assessed. Thorough literature research and consultations with academics and practitioners on the themes assure the content validity of the items utilized. A small sample of potential responders was also given the questionnaire to assess the items' understandability and

critical judgment. In the first stage, the Kaiser-Meyer-Olkin (KMO) sample adequacy measure and Bartlett's sphericity test were used to assess the applicability and suitability of factorability of validity analysis. The KMO, according to Kaiser (1974), is an indicator used to compare the size of the observed correlation coefficient and the partial correlation coefficient. The closer KMO is to 1.0, the lower the partial correlation between all pairs of variables, and thus factor analysis is preferable. Furthermore, Kaiser (1974) defined the KMO measure as follows: if it is near 0.90, it is excellent; near 0.80, it is commendable; near 0.70, it is average; and near 0.60, it is mediocre.

Table 4.7: *Validity Analysis and Reliability of the Final Instrument*

Constructs	No. of items	Factor loading*	KMO	Eigenvalue	% Of Variance	Cronbach's Alpha	Items Deleted
Project Performance	5	0.742 0.931 0.935 0.874 0.814	0.710	3.213	64.251	0.844	Nil
Client Factor	4	0.583 0.770 0.717 0.725	0.777	2.666	66.655	0.773	Nil
Contractor Factor	6	0.771 0.612 0.829 0.622 0.813 0.672	0.834	3.935	65.588	0.860	Nil
Consultant Factor	4	0.681 0.581 0.745 0.547	0.735	2.374	59.339	0.745	Nil
Labor Factor	4	0.602 0.932 0.627 0.911	0.593	2.832	35.513	0.708	Nil
Contract Management	4	0.737 0.633 0.789 0.659	0.646	2.196	54.911	0.986	Nil
Organizational structure	5	0.812 0.728 0.656 0.610 0.788	0.614	2.483	49.663	0.811	Nil

Finally, if it is less than 0.50, it is horrible, and if it is less than 0.50, it is terrible. The factors of all constructions have Eigenvalues more than 1.000, as indicated in Table 4.7. The table shows the KMO measure produced from the pilot study, with readings ranging from 0.834 to 0.593, indicating that factor analysis was required. In addition, the validity loadings of the items were analyzed and compared to minimum value of 1.0 for practical significance. Smaller loadings were judged ineffective and were eliminated from their constructions (Hair et al., 2010).

4.11 Correlation Analysis

Correlation analysis is a statistical approach used in studies to figure out the link between two variables and assess the intensity of their linear relationship. To put it another way, correlation analysis calculates the proportion of a change in one variable to a change in another. The correlation method examines the linear relationship between the two variables (IV and DV), which are dependent and independent (Sekaran, 2003). The findings of the Pearson's correlation study are presented in Table 4.8 above, which also displays the correlation and significant value between DV and IV.

Table 4.8: *Analysis of Pearson Correlations*

Variable		Project Performance
Client Factor	Pearson Correlation	0.971 **
	Sig. (2-tailed)	< 0.01
Contractor Factor	Pearson Correlation	0.969 **
	Sig. (2-tailed)	< 0.01
Consultant Factor	Pearson Correlation	0.947 **
	Sig. (2-tailed)	< 0.01
Labor Factor	Pearson Correlation	0.939 **
	Sig. (2-tailed)	< 0.01
Contract Management	Pearson Correlation	0.162
	Sig. (2-tailed)	0.086
Organizational structure	Pearson Correlation	0.981 **
	Sig. (2-tailed)	< 0.01

**. Correlation is significant at the 0.01 level (2-tailed). n =113

4.12 Multiple Regression Analysis

To understand the relationship between the variables that are independent and dependent, and to evaluate out whether independent variables and control variable have a meaningful influence on the dependent variable, the data obtained were examined using various hierarchical linear regression analysis, as was discussed in Chapter three. To construct a forecast toward a dependent variable, this study included more different factors. It is suitable to perform multiple regression analysis in this investigation. Table 4.9 shows more information on the analysis of multiple regressions. Overall, the findings demonstrated that the model's statistical significance and R Square value of

0.956. This finding shows that the six independent variables may account for 95.6 percent of the variation in performance measurement among construction companies. The moderator provided the final 4.4 percent of the project's performance. According to the F-value = 462.91 and significant value of 0.267 ($p < .05$), this model is significant. Individually, the results indicate that the only factors significantly positively associated with project performance are the client, contractor, and contract management.

Table 4.9: *Multiple Regression Analysis*

Variables	Unstandardized coefficient		Standardized coefficient		
	B	ST. Error	Beta	T	significance
constant	-0.119	0.107		-1.116	0.267
Client	0.497	0.101	0.489	4.943	< 0.001
Contractor	0.311	0.118	0.306	2.641	0.010
Consultant	0.087	0.085	0.085	1.027	0.307
Labor	0.108	0.076	0.103	1.427	0.156
Contract management	0.039	0.016	0.049	2.398	0.018
Organizational structure	-0.017	0.079	-0.020	-0.211	0.833
Organizational structure (moderate)	1.154	0.177	1.118	6.501	< 0.001

R square = 0.956; R = 0.978; $P < 0.05$

4.13 Summary of Testing of Hypotheses

In Section 1.3 of this dissertation, a list of the research questions and in Section 3.2, an explanation of the hypotheses to be verified are provided. Using multiple regression with hierarchical structure, the following hypotheses (H1a, H1b, H1c, H1d, H1e, and H2) were examined. The findings are shown below (Table 4.10).

Table 4.10: *Testing of Hypothesis*

No	Hypothesis Statement	Result
H1a	There is a positive significant relationship between client element and project performance between construction companies. ($p < 0.05$)	Supported
H1b	There is a positive significant relationship between contractor's element and project performance between construction companies. ($p < 0.05$)	Supported
H1c	There is a positive significant relationship between consultant element and project performance between construction companies. ($p > 0.05$)	Rejected
H1d	There is a positive significant relationship between labors element and project performance between construction companies. ($p > 0.05$)	Rejected
H1e	There is a positive significant relationship between contract management and project performance among construction firms. ($p < 0.05$)	Supported
H2a	There is a positive significant relationship between organizational structure and project performance among construction firms. ($p > 0.05$)	Rejected
H2b	The relationship between external factors and project performance is moderated by organizational structure. ($p < 0.05$)	Supported

CHAPTER FIVE

DISCUSSIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

In this final chapter, the author provides a summary and highlights the findings from Chapter Four. It is essential that the researcher in this study reach a conclusion and provide a recommendation in light of the findings. This chapter's part is subdivided into the research summary, result expectations, research limitations, and research recommendation sections. The researcher's perspective is included in the recommendations of the study. In addition, the researcher offers a recommendation for future study to increase the worth of the research and help a lot of people in the future. The reader may find this chapter helpful in understanding the significance of the study, as well as the conclusions and recommendations for further investigation.

5.2 Summary of the Research

This study's primary goal is to ascertain how external variables affect the water sector's project performance in Oman. Also, to look into how organizational structure affects how well water sector projects in Oman function in relation to external circumstances. Multiple regression analysis was used to test the research hypothesis. The technique of multiple regression analysis was used to look at the link between the dependent variable, project external influences, and the independent variable, project performance. Table 4.10 displays a summary of the findings of the hypothesis testing. The five-project dimension listed above (client, contractor, consultant, labor, and project management) have a significant impact on how well construction companies working in the water industry perform on their projects, supporting Hypotheses H1a, H1b and H1e. While labor related factors and consultant related factors did not prove

to have a substantial impact on the construction businesses' project performance, rejecting the H1c and H1d hypotheses. In addition to that, regression table 4.9 and hypothesis summary table 4.10 show the findings that support moderation effects of organizational structure between external factors and project performance of water sector in Oman.

5.3 Analysis of the Research Results

The research findings of this study are described in depth along with conclusions in the following parts.

5.3.1 Research Question One (RQ1):

What effects do external variables have on Oman's water plant construction projects?

Five project-external elements discussed in Section 1.3. This research was aimed at determining whether project aspects had a substantial impact on project performance. The project-related variables question RQ1 is further subdivided into five divisions from RQ1a to RQ1e, each representing a different project-related aspect, in order to thoroughly understand the impact of each project-related component and its distinctive relevance for success factors. Findings and reasons from the study for each sub-question are as follows:

Conclusion for RQ1a: Do client-related issues significantly affect project performance?

In the construction industry, client-related variables have an enormous effect on project performance across the board, as shown by the linear regression results in Table 4.9. This outcome correlates with Ahmadabadi's (2019) results, which suggest that clients should play a bigger part in guaranteeing project success by choosing the best projects and rejecting ineffective ones. This result is in line with Memon et al. (2014) conclusion

that the performance of the project in Malaysian construction enterprises is not significantly impacted by client interaction or frequent client design modifications. This result is consistent with that of Almarri and Boussabaine (2017), who discovered that lack of finance from clients and payments for finished work was one of the top ten factors contributing to overruns in time and expenses in Malaysian construction projects. These results are consistent with those of Alaghbari et al. (2007), who identified client concerns as one of the top four causes of delays in Malaysian construction projects. As previously mentioned, these results corroborate those of Hamzah et al. (2012) and Tawil et al. (2013), who discovered that client-related problems lead to construction project delays.

Conclusion for RQ1b: Do issues with the contractor have a big impact on the project's performance?

It is obvious from the multiple regressions results in Table 4.9 that contractor-related issue has a considerable effect on project success as indicated by project completion. The results of this study are in line with those of previous research by Tawil et al. (2013), Marzook and El-Rasas (2014), and Almarri, and Boussabaine, (2017), which found that contractors' involvement in a project and their interest in it are important factors for its success, mistakes made by contractors during construction are important causes of delays, and delays in finishing a project by contractors are the primary reason for its failure.

Conclusion for RQ1c: Do consultant-related issues significantly affect project success?

It is apparent from the multiple regression's findings provided in Table 4.9 that contributing factors to consultants have little effect on the success of projects. In the

construction field, consultant-related variables are key determinants of project success, as per previous analyses by Hamzah et al. (2012), Tawil et al. (2013), and Marzook and El-Rasas (2014). The outcomes shown above conflict with such conclusions.

Conclusion for RQ1d: Do labor-related issues significantly affect project success?

Based on the findings of the multiple regression proven in Table 4.9, it is obvious that issues related to labor do not seriously influence success of a project across all construction sectors. Overall, labor factors have little of an effect on how well construction companies' projects perform. These findings contradict past research in this area by Tawil et al. (2013), Memon et al. (2014), Marzook and Ahmadabadi and Heravi, (2019), which discovered that labor-related problems, such as shortage and price fluctuations, are essential for decreasing construction project delays and overruns of costs.

Conclusion for RQ1E: Do issues with contract management have a big impact on project achievement?

The data analyzed through multiple regression test presented in Table 4.9 indicate that the contract management-related aspects do have a significant effect on project success in the water construction industry. This finding corroborates the assertions made by Marzook and El-Rasas (2014) and Babatunde et al. (2017) that contract management aspects are the most crucial ones for accomplishment factors in the construction field. The construction companies in Oman should take note of this finding on the factors that relate to contract management because it is consistent with the current state of the industry, where construction companies engaged in various construction disciplinary projects have managed to learn from past encounters that proper contracting is essential for avoiding unfavorable issues in projects. Currently, all of Oman's main construction

firms employ qualified contract management experts who reviewed all of the project's contract-related components from the conception stage through completion.

5.3.2 Research Question Two (RQ2):

RQ2. Does organizational structure are moderating the influence of external factors on the project performance of construction projects in Oman?

According to the multiple regressions findings in Table 4.9, and from the summary of the hypothesis Table 4.10 show that conclusion The relationship between external factors and project performance is moderated by organizational structure. This result is consistent with the Milan, et al (2013) and Berssaneti (2015) that the communication between project and level managers, as well as the group's general attitude toward project managers, are two of the key factors that can be used to gauge the level of the organizational structure for a project. Studies conducted in developing nations that concentrate on particular elements of organizational structure and their impact on project success revealed that the greater the impact of project management within an organization, the better the project outcomes within that organization as well, and that the impact of project management is precisely an evidence of project organizational structure.

5.4 Significance of the Study

Considering these research findings, this study adds theoretical and practical knowledge to the body of knowledge already known about the project performance of construction companies in relation to project factors, as well as organizational structure which effects on project performance.

5.4.1 Theoretical Significance of the Study

Much research on hard factors or project element and their consequence on project performance have been done during the last three decades. From a scientific standpoint, this study contributes to the body of knowledge already existent in this area. To be more specific, the construction industry has not done much research on organizational structure and its moderation on project performance. Furthermore, research on project performance has so far been carried out in three primary factors of time, cost, and quality. As a result, this research contributes to the theoretical understanding of how external project elements and organizational structure influence project performance.

In addition, theoretical contribution is on the use of various theories, such as Resource Based View Theory and Dynamic Capability Theory, to strengthen the existing loosely coupled project management theory. These theories are used to develop the research framework used in this study. The implementation of these theories to the project performance of construction organizations adds to the body of knowledge because the success of construction industry depends on resource-intensive hard factors including clients, contractors, consultants, labor, and contract management.

5.4.2 Practical Significance of the Study

The professionals in the construction business will benefit from the research study's outcomes. Clients, consultants, labor and contract management experts, suppliers of project management tools and techniques, legislators, and project professionals in the sector are some examples of these practitioners. The diverse project-related factors that affect success of a project in terms of time, cost, quality, safety, and financial dimensions can now be the subject of the project executives, project managers, construction managers, cost control managers, planning managers, quality managers, safety managers, and finance managers. This will assist them in making the proper

preparations in advance and ensuring that the tasks are handled properly. The research study's extensive investigation of project-related aspects that influence project success in the water construction sectors is its second useful addition.

As a result, project managers may make better decisions on what to consider and how to take the essential safety precautions to avoid project performance lapses. The fact that there are numerous medium-sized and large construction enterprises in Oman that actively pursue and compete in the market is the third practical contribution of this research study. This study is helpful in helping medium-sized, big-sized, and very large construction organizations fully comprehend the significance of the organizational and project-related aspects that affect the project success of the construction sector. The construction industry's organizational structure and the moderation between project performance and project factor can understand the various types of project management tools/techniques used by other construction firms and can choose the best project management instruments and techniques for their respective organizations. This is the fourth practical contribution of this study.

The ability to use the recommendations made by specialists in the construction industry explicitly for the improvement of performance in the construction industry is the fifth practical value of this study. These suggestions can help construction companies, industry professionals, and policymakers take the required steps to enhance project performance. The contributions are helpful for organizing and delivering the required training to professionals in the construction industry, for locating and using the right project management tools and techniques, and for planning manpower recruitment strategies for the construction companies to improve project performance.

5.5 Recommendations for Future Research Studies

The following are suggestions made by the researcher for additional investigation into this subject.

5.5.1 Overall Construction Firms

Project progress similar studies might be carried out everywhere in the world, particularly in developing nations with project variables that are important to further this discipline. This would make it easier for academic's specialist and business professionals to comprehend the significance of project-related aspects around the globe for achieving and targeting the required project performance.

5.5.2 Stakeholders' Impact on Project Performance

This study has limitations because less than 80 percent of contractors were involved, compared to more than 80 percent of clients, consultants, suppliers, and other stakeholders like government regulators, project end users, and the public. The representation of other parties when conducting this sort of study can be expanded by future researchers.

5.5.3 Diverse Project related Factors

There are a lot of exciting suggestions for enhancing the project performance of construction companies in Oman in the areas of consistency, risk assessment, regulatory changes, reliance on foreign labor, lack of skill levels, welfare programs for the current construction industry, government policies, and infrastructure development planning. For investigations on project performance in the construction industry, future researchers may choose to concentrate on some of these areas.

5.6 Limitations of Study

This research has accomplished its objectives that was established in Chapter One. However, during the entire development of this research, there were several limitations met. These are described as follows:

- Limited in-depth information regarding the project scope and costs within the government projects due to confidentiality.
- The difficulty to get updated information for the years 2020 to 2023 specifically which related to variation order costs.
- The current research of investigation covers only five types of project external factors, i.e., Client, Contractors, Consultants, Labor and equipment's and Contract managements. Despite the weaknesses and limitations of this research the analysis and findings are still valid to understand the effects of project external factors on the project performance in construction belong water sector in Sultanate of Oman.

5.7 Conclusion

In conclusion, this study mainly was successful in achieving its goals by looking at a variety of external projects and examining organizational structure modifications that have a substantial impact on the performance of water construction projects. The study's findings offer a good comprehension of the many project parameters that are necessary for obtaining the target project performance in Oman's diverse construction industries. This is a result of the industry's observation that the industry's technical improvements are causing a quick shift in the traditional project management paradigms. In addition to the foregoing, this study demonstrates that organizational structure has a significant impact on project success in Oman's construction firms. Contractor, customer, and project management elements are the most crucial project-related aspects for medium- and large-sized construction enterprises.

REFERENCES

- Afolabi Adedeji, Ojelabi Rapheal, Tunji-Olayeni Patience, O. I. And A. A. (2018). Empirical Review of Variation Orders' Influence in Construction Project Delivery. *International Journal of Civil Engineering and Technology*, 9(7), 412–421.
- Ahmadabadi, A. A., & Heravi, G. (2019). The effect of critical success factors on project success in Public-Private Partnership projects: A case study of highway projects in Iran. *Transport Policy*, 73, 152-161.
- Alaghbari, W., Kadir, M.R.R., Salim, A., & Ernawati. (2007). The significant factors causing delay of building construction projects in Malaysia. *Journal of Engineering, Construction and Architectural Management*.
- Allen I. & Seaman C. (2007). Likert scale and data analyses. *Statistics and roundtable*, 64 -65.
- Almarri, K., & Boussabaine, H. (2017). The influence of critical success factors on value for money viability analysis in public–private partnership projects. *Project management journal*.
- Alnuaimi, A. S., Taha, R. A., Mohsin, M. Al, & Al-harthi, A. S. (2010). Causes, effects, benefits, and remedies of change orders on public construction projects in Oman. *Journal of Construction Engineering and Management*, 136(5)
- Ameyaw, E. E., & Chan, A. P. (2016). Critical success factors for public-private partnership in water supply projects. *Facilities*, 34, 124-160.
- Andersen, E.S. (2016). Do project managers have different perspectives on project management? *International Journal of Project Management*, 34(1), 58-65.
- Angus, G.Y., Flett, P.D., & Bowers, J.A. (2005). Developing a value-centered proposal for assessing project success. *International Journal of Project Management*. 23(6), 428.
- Antunes, R., & Gonzalez, V. (2015). A Production Model for Construction: A Theoretical Framework. *Buildings*, 5, 209–228.

- Argyres, Nicholas; Mayer, Kyle J. (2007). Contract design as a firm capability: An integration of learning and transaction cost perspectives. *Academy of Management Review*. Vol. 32, No. 4 (Oct. 2007), pp. 1060-1077
- Assaf, S.A., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International Journal of Project Management*. Volume 24, Issue 4, May 2006, Pages 349-357
- Atkinson, R. (1999). Project management: Cost, time and quality, Two best guesses and a phenomenon, it's time to accept other success criteria. *International Journal of Project Management*. Volume 17, Issue 6, December 1999, Pages 337-342
- Ayham, J., Staiti, M., & Othman, M. (2016). Impact of Change Orders in Construction Sector. *International Conference on Industrial Engineering and Operations Management (International Conference on Industrial Engineering and Operations Management Kuala Lumpur, Malaysia, March 8-10, 2016)*
- Babatunde, S. O., & Perera, S. (2017). Cross-sectional comparison of public-private partnerships in transport infrastructure development in Nigeria. *Engineering, Construction and Architectural Management*. Vol. 24, Issue 6, pages 875 - 900
- Babatunde, S.O.1, Babalola, M.O.1, Jagboro, G.O1. and Opawole, A. (2013). An Evaluation of Factors Predisposing Building Elements to Variation in Nigeria. *Engineering, Construction and Architectural Management*. Vol. 15, No. 1, March 2013, 11-17
- Barreto (2010). Dynamic Capabilities: A Review of Past Research and an Agenda for the Future. *Journal of management*. Volume 36 Issue 1, January 2010
- Belassi, W., & Tukel, O.I. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management*. Volume 14, Issue 3, June 1996, Pages 141-151
- Bergfors and Larsson (2009). Product and process innovation in process industry: A new perspective on development. *Journal of Strategy and Management*.
- Berssaneti, F.T.; Carvalho, M.M (2015) Identification of variables that impact project success in Brazilian companies. *International Journal of Project Management*.
- Burati Jr, J. L., Farrington, J. J., & Ledbetter, W. B. (1992). Causes of quality deviations in design and construction. *Journal of construction engineering and management*.
- C. Lim, M. Mohamed (1999). success. *International Journal of Project Management*.

- Charabi Y, Al Awadhi T, Choudri BS (2018) Strategic pathways and regulatory choices for effective GHG reduction in hydrocarbon-based economy: case of Oman. *Energy Reports* 4(November 2018):653–659
- Cicmil and Hodgson (2006). New Possibilities for Project Management Theory: A Critical Engagement. *Project Management Journal*.
- Collis and Hussey (2014). Business research: A practical guide for undergraduate and postgraduate students. *4th Edition*.
- David E. Jacques, (2015). Guide to Customer Experience Transformation and Management. *Journal of strategy and Management*
- Davies, C.T. (2002). The “real” success factors on projects. *International Journal of Project Management*.
- Dennis Slevin. (1998). The Influence of Organizational structure on the Utility of an Entrepreneurial Top Management Style. *Journal of Management Studies*.
- Dragana Milan, Slobodan Morača, Nenad Simeunović and Slavica Mitrović. (2013). Impact of organizational structure on success of projects in the food industry in transition countries. *Journal of Food Agriculture and Environment*.
- Dynamic Capabilities and Performance: Strategy, Structure and Environment.
- Fernandes et al. (2013). Financial Literacy, Financial Education, and Downstream Financial Behaviors. *Management Science Vol. 60, No. 8*
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010). Multivariate Data Analysis. *7th Edition, Pearson, New York*.
- Hamzah, N., Khoiry, M. A., Arshad, I., Wan Badaruzzaman, W. H., & Tawil, N. M. (2012). Identification of the causes of construction delay in Malaysia. In Proceedings of World Academy of Science, Engineering and Technology. *World Academy of Science, Engineering and Technology*.
- Iranmanesh, M., Kumar, K.M., Foroughi, B. et al. (2021). The impacts of organizational structure on operational performance through innovation capability: innovative culture as moderator. *Rev Manag Sci* 15, 1885–1911
- Jagboro, G.O., & Aibinu, A.A. (2002). The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management*.

- Jha, K. N., & Iyer, K. C. (2006). Critical factors affecting quality performance in construction projects. *Total Quality Management and Business Excellence*.
- Jugdev and Muller (2005). A Retrospective Look at Our Evolving Understanding of Project Success. *Project Management Journal*.
- Kerzner, H. (2013). Project Management: A Systems Approach to Planning, Scheduling, and Controlling. Membrane Separation Technology. Khan, A. (2010). Project Scope Management. Case Studies in Project, Program, and Organizational Project Management, 48(6), 83–84.
- Khang, D.B., & Moe, T.L. (2008). Success criteria and factors for international development projects: A life-cycle-based framework. *Project Management Journal*.
- Kim, B.C. (1989). Project scope and project performance: The effect of parts strategy and supplier involvement and product development. *Journal of Management Science*.
- Kimberly Fisher (2010). Reliability, Validity, and Variability of the Subjective Well-Being Questions in the 2010. *American Time Use Survey*
- Kline, R. B. (1998). Principles and practice of structural equation modeling. *Guilford Press*.
- Marzook, M.M., & El-Rasas, T.I. (2014). Analyzing delay causes in Egyptian construction projects. *Journal of Advanced Research*.
- Memon, A.H., Rahman, I.A., Abdullah, M.R., & Aziz, A.A.A. (2014). Factors affecting construction cost performance in project management projects: Case of MARA large projects. *International Journal of Civil Engineering and Built Environment*.
- Mertler and Vannatta (2010). Advanced and multivariate statistical methods: Practical application and interpretation: *Sixth edition*
- Mishra, P., Dangayach, G. S., & Mittal, M. L. (2011). An Empirical Study on Identification of Critical Success Factors in Project Based Organizations. *Global Business & Management Research*, 3(3/4), 356–368.
- MOF. (2016). Royal Decree. MOF.

- Munns, A.K., & Bjeirmi, B.F. (1996). The role of project management in achieving project success. *International Journal of Project Management*.
- Nunnally, J.C. and Bernstein, I.H. (1994). The Assessment of Reliability. *Psychometric Theory*, 3, 248-292.
- Olaniran, O.J. (2015). The effects of cost-based contractor selection on construction project performance. *Journal of Financial Management of Property and Construction*.
- Pallant, J. (2020). SPSS Survival Manual: A Step-by-Step Guide to Data Analysis Using IBM SPSS. London: McGraw-Hill, Open University Press.
- Phil Nixon, Megan Harrington, David Parker (2012). Leadership performance is significant to project success or failure: a critical analysis. *International Journal of Productivity and Performance Management*
- Pinto, J. K., & Slevin, D. P. (1988, June). Critical success factors across the project life cycle. *Project Management Institute*.
- Project Management Institute. (2018). A Guide to the Project Management Body of Knowledge -6 edition. *Project Management Institute (6th ed., Vol. 5)*.
- Ralf Wilden, Siegfried P. Gudergan, Bo Bernhard Nielsen, Ian Lings (2013).
- Sambasivan, M., & Soon, Y.W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management*.
- Saunila (2014). Innovation Capability and Measurements. *Journal of Innovation and Entrepreneurship*.
- Sekaran, U. (2003). Research Methods for Business: A Skill-Building Approach. 4th Edition, John Wiley & Sons, New York.
- Sekaran, U., & Bougie, R. (2010). Research methods for business: A skill-building approach. (5th ed.). Haddington: John Wiley & Sons.
- Shehu, A.M. and Mahmood, R. (2014). A Pilot Study on the Relationship between Some Determinants of SME Performance in Nigeria. *Journal of Asian Scientific Research*, 4, 597-602.
- Takashi Asano, Franklin Burton, and Harold Leverenz. 2007. Water Reuse: Issues, Technologies, and Applications. 1st ed. New York: McGraw-Hill Tammy,

- Tareq W M Amen (2014). The impact of relationships management in infrastructure projects performance in the Gaza strip. *International Journal of Project Management*.
- Tsado, P. A., Lawal, B. A., Igwe, C. A., Eze, P. C., & Saidu, O. I. (2014). Assessment of the Suitability of Water Quality for Irrigation in Minna, Niger State. *International Journal of Resource Agriculture and Forestry*.
- Westervel (2003). The Project Excellence Model linking success criteria and critical success factors. *International Journal of Project Management*.
- White, D., & Fortune, J. (2002). Current practice in project management: An empirical study. *International Journal of Project Management*.
- Yadeta, A. E. (2016). The Impact of Variation Orders on Public Building Projects. *International Journal of Construction Engineering and Management*, 5(3), 86–91.



APPENDIX



**UNIVERSITY UTARA MALAYSIA
OTHMAN YEOP ABDULLAH GRADUATE
SCHOOL OF BUSINESS (OYAGSB)**

Research Questionnaire:

**The Effect of External Factors on Project Performance of Water and
Wastewater Construction company in Oman with Moderating Effect of
Organizational Structure**

I am postgraduate candidate working on my master's degree in operation management at UUM. I am carrying out study on effect of external factor with moderation of organizational structure on project performance of construction company in Oman. The study is part of my master research paper, supervised by Dr Faisal. I would appreciate it very much if could give me some of your time going through the questionnaire.

The questionnaire been sent to invite you to take part in my research. All information provided will kept confidential and is used for academic purpose only. Please answer all question as honestly as possible. Participation is strictly voluntary.

Please feel free to contact me if you have any question regarding the study. Thank you in advance for your kind co-operation.

Mohammed Nasser Alghammari (828650)

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A Survey on
Effect of External Factors with Moderate of Organizational Structure on
Project Performance of Water and Wastewater Construction company In
Oman

*Please answer the following question by ticking (✓) the number that best represent
your (dis) agreement with the following statements.*

Section A: Respondent Background

Q	<i>Please tick (✓) or fill in the blank where appropriate.</i>		
1	What is your current position in the business?		Managing director
			General manager
			Project manager
			Operation manager
			others
2	What is the sub-sector of utility service that best describes your company?		Water
			Wastewater
			Others
3	How long your company has been in existence?		1-5 years
			6-10 years
			11-15 years
			16 years and above
4	How long you have experience in this industry?		1-5 years
			6-10 years
			11-15 years
			16 years and above
5	Your highest level of education is		PhD level
			Master level
			Degree
			Diploma
			General certificate
6	How many employees does your company have?		Less than 5
			5 to 74
			75 to 200
			More than 200

Section B: Project Performance

Please tick (✓) the scale of your choice from strongly disagree to strongly agree.

Q	How strongly you agree or disagree with each of the following statements?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	My organization always delivers the project turn-over required documents on deadline to the client.					
2	My organization performs the project within the project's cost/budget limits.					
3	Quality is important to my organization, and we do not interfere on it.					
4	Safety is given the highest importance in my organization.					
5	Most projects in my organization are performed effectively, and profits are made.					

Section C: Project External Factor
Please tick (✓) the scale of your choice from strongly disagree to strongly agree.

Client related factor

Q	How strongly you agree or disagree with each of the following statements that influence your organization?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Lack of funds and failure to pay for finished work					
2	Interference by the owner					
3	Decisions are made slowly by Owner.					
4	Contract duration and requirements that are unrealistic					

Contractor related factor

Q	How strongly you agree or disagree with each of the following statements that effect your organization?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Contractor's poor performance					
2	Contractor's poor site management practices					
3	Poor construction methods used in projects					
4	Improper planning by contractor					
5	Mistakes during construction stage					
6	Contractor's Inadequate experience					

Consultant related factor

Q	How strongly you agree or disagree with each of the following statements that effect your organization?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Contractor management					
2	Preparation and approval of drawings					
3	Quality assurance control					
4	Waiting time for approval of tests and inspection					

Labor related factor

Q	How strongly you agree or disagree with each of the following statements about labor which influence your organization?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Labor productivity					
2	Lack of appropriate skills					
3	Equipment availability					
4	Adequacy of equipment					

Contract Management related factor

Q	How strongly you agree or disagree with each of the following statements about your organization?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Contract document errors and conflicts					
2	Major disputes and negotiations					
3	poor organizational structure related to the project					
4	Failure to communicate between the partners					

Section D: Organizational structure

Please tick (✓) the scale of your choice from strongly disagree to strongly agree

Q	How strongly you agree or disagree with each of the following statements about your organization?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Little action cannot be taken in the organization until supervisor makes a final decision					
2	In an organization, an individual who tries to make a decision will be raised up.					
3	Even minor issues must be referred to someone in a higher position for a final decision.					
4	Any decision made by a person in the organization should be approved by top management.					
5	The majority of employees in an organization will adhere to their job's specified work regulations.					