ASSESSING THE ROLE OF PLANNING AND SCHEDULING PRACTICES ON TIMELY COMPLETION OF CONSTRUCTION PROJECTS IN TANZANIA: A CASE OF DAWASA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PROJECT MANAGEMENT

DEPARTMENT OF MARKETING, ENTREPRENEURSHIP AND MANAGEMENT

OF THE OPEN UNIVERSITY OF TANZANIA

2025

CERTIFICATION

The undersigned certify that he has read and do hereby recommend for the acceptance by the Open University of Tanzania a dissertation titled; "**Assessing the role of Planning and Scheduling Practices on Timely Completion of Construction Projects in Tanzania: A Case of DAWASA**" in partial fulfilment of the degree of Masters of Project Management.

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Dr. Salvio Macha

(Supervisor)

.....

Date

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DECLARATION

I, **Adidas Stafford Higima**, do hereby declare that this dissertation is entirely my own work and it has not been presented to any other Institute of higher learning for a similar or other academic award. The sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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Signature

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Date

DEDICATION

This work is dedicated to my God, the enabler and my family for their moral support.

God bless!

ACKNOWLEDGEMENT

I thank God for this work and wish to convey my sincere and heartfelt gratitude to my dissertation supervisor Dr. Salvio Macha, the academic staff of the Faculty of Business and Management and the entire staff of the Open University of Tanzania, DAWASA staff and contractors for their cooperation and my family for support and encouragement.

ABSTRACT

The need for timely completion of construction projects is paramount to all stakeholders. This study aimed at assessing the role of planning and scheduling practices on timely completion of construction projects in Tanzania. The study also worked on the influences of progress payments and the impact of change orders on timely completion, where data were collected from the total of 106 respondents from the case area through questionnaires and analysis of responses received in correlation and regression analysis, revealed that planning and scheduling practices have no correlation with timely completion of construction projects, never the less from literature review and questionnaires responses, they are important in outlining the parameters of projects how they should be executed, their sequences and timings. The study also found progress payments to have positive correlation with timely completion of construction project and change orders to have negative correlation with timely completion of construction projects. The implication of the study findings as related to construction projects in Tanzania is that planning and scheduling practices are important in construction projects, however to effect timely completion of the projects timely progress payments and avoidance of excessive change orders are important.

Key words: *Planning, Scheduling, Progress payments and Change orders.*

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ABBREVIATIONS AND ACRONYMS

COs: Change Orders

CPM: Critical path method

DAWASA: Dar es Salaam Water Supply and Sanitation Authority

GERT: Graphical Evaluation and review Technique

MoFP: Ministry of Finance and Planning

PDM: Precedence Diagramming Method

PERT: Programme Evaluation and review Technique

PMBOK: Project Management Body of Knowledge

R&D: Research and Development

SGR: Standard Gauge Railway

TANROADS: Tanzania National Roads Agency

TRC: Tanzania Railways Corporation

WBS: Work Breakdown Structure

FTC: Full Technician Certificate

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

1.1.1 The Project life Cycle

The project life cycle has identifiable start and end points, which can be associated with a time, scale (Archibald, 1992). Frimpong and Oluwoye (2018), outlined the project processes from start to end as project initiation, planning, execution and closing. Project time management has evolved from simple roots to the more complex, computer-aided it is today (PMI, 2003). No one can achieve the project on schedule if the time commitment for each activity is not followed (El-Reedy, 2011). Deadlines are missed so regularly that it has become the norm; it is a surprise when a project is completed on time (Thomsett,2010). Even in projects for which the design is finalized before construction begins, change orders representing changes in the "final" design are often issued to incorporate changes desired by the owner. The result for the larger, less defined project is an increased likelihood of more change orders after the contract is awarded, possibly leading to project schedule delays and cost overruns (FTA, 2011).

1.1.2 Construction Projects Delays and Effects

In their study titled Types and Causes of Construction Delays, Uddin et al (2017), found delays in progress payments as one of the factors which affects the project completion on predefined time. Similar findings were reported by Bekr, (2015) and Jongo et al (2019). Delays in construction projects have negative effects both for owners and contractors. While owners suffer a loss of revenue through, for instance,

a lack of production facility, dependence on present facilities or a loss of income from rentable space, the contractor faces higher overhead costs due to, for example, longer work periods, higher material costs caused by inflation as well as increases in labor costs (Assaf and Al-Hejji 2006).

1.1.3 Construction Projects Delays Mitigation

Masood et al (2015) in their study titled; Investigating The delay factors of The Construction Projects in Metropolitan City of a Developing Country found that ineffective planning and scheduling of projects are among the 10 most critical causes of construction projects delays in Lahore- Pakistan, out of the 53 studied causes. Bender (1997) states not only on the lack of planning, but also adds that a person who plans but does not control is in worse shape than a person who controls without planning. AlNasseri and Aulin (2015) states that, Planning and scheduling provide the road map for organizations concerned with timely delivery of projects and the efficient use of resources. Mnyao (2017), in the study titled; The Role of Program of Works in Timely Completion of Construction Projects in Kenya, in which the author declaring to use the term program of works interchangeably to a project schedule, which is a result of planning and scheduling; In the study, 80% of the respondents, majority of whom are project participants, ascertain project schedule to be an important tool in construction management. Block and Peterson (2015) states that when a schedule is prepared thoughtfully and monitored appropriately throughout the project, delays can be identified early and potential claims and their associated damages can be avoided or minimized. However, when the schedule is either poorly prepared or improperly updated, the completion projection is often inaccurate.

In Tanzania, Kikwasi (2012), in the study titled Causes and Effects of Delays and Disruptions in Construction Projects in Tanzania, reports 78%, 70% and 56% respondents for clients, consultants and contractors respectively to have had experienced projects delays in the projects they were involved in and poor project management is reported to be one of the highly ranked causes of delay, which may reflect on having no, or poorly prepared projects plan and schedule and general inability to apply project schedules as tools for monitoring and control of projects progress for timely completion. Laurent (2017), conducted a study on factors affecting Performance of Airport Construction, as partial fulfilment of the requirements for the degree of Master of Project Management of the Open University of Tanzania and found that 72.8% of the Airport construction projects in Tanzania, were not completed on time, sighting causes of which to a considerable proportion, fall under planning and scheduling ineffectively. Evidently, there are many factors contributing to untimely completion of projects, this study will assess the role of planning and scheduling practices on timely completion of construction projects in Tanzania, taking DAWASA as the case.

1.2 Statement of the Research Problem

Construction projects in Tanzania register huge time overrun and budget overrun that are associated with dissatisfactory quality and safety standards (Mwishwa, et al, 2013). Improper planning at the initial stages of a project manifests throughout the project and causes delays at various stages. Only a project that is well planned can be well executed (Sambasivan and Soon, 2006). Planning and Scheduling of a project is a very important phase for any work. It has a vital role for the success of projects.

Any defect on planning or scheduling process will cause great losses in time and money (Moder and Phillips, 1964). Various studies have attempted to quantify efforts made during pre-project planning as it relates to a project's success (Ruwanpura et al, 2006). The most prudent approach for avoiding delay of a construction project is to prepare a comprehensive and project-appropriate schedule and to maintain that schedule throughout the duration of the project (Block and Peterson, 2015). Progress payments and change orders in the construction projects are among many factors that contributes to construction projects untimely completion. Of all the studies conducted, no study has been conducted to assess the role of planning and scheduling practices, the influence of progress payments and the impacts of change orders on timely completion of construction projects in Tanzania.

1.3 Research Objectives

1.3.1 General research Objective

To assess the role of planning and scheduling practices on timely completion of construction projects in Tanzania.

1.3.2 Specific research objectives

(i) To assess the role of project planning and scheduling on timely completion of construction projects in Tanzania.

(ii) To evaluate the influence of progress payments on timely completion of construction projects in Tanzania.

(iii) To assess the impacts of change orders on timely completion of construction projects in Tanzania.

1.4.0 Research Questions

(i) What is the role of planning and scheduling practices on timely completion of construction projects in Tanzania?

(ii) What is the influence of progress payments on timely completion of construction projects in Tanzania?

(iii) What is the impact of change orders on timely completion of construction projects in Tanzania?

1.5 Significance of the Study

The significance of this study is to add insights to the project management body of knowledge in Tanzania, on the role of planning and scheduling practices on timely completion of construction projects and if planning and scheduling practices are the only necessary and sufficient requirements for projects timely completion.

1.6 Scope of the Research

This research has only presented data as collected and analysed from the case area and has not extended to all areas where construction projects are executed across the country, due to limitation in time and financial resources.

1.7 Relevance of the Research

This research contributes to the body of knowledge by providing empirical evidence about the role of planning and scheduling practices, the influence of progress payments and the impacts of change orders on timely completion of construction projects in Tanzania. It also serves as a partial fulfilment for the award of a Master of Project Management degree to the researcher.

1.8 Organization of the Research

This research is organised into five chapters. Chapter one is an introduction beginning with describing background to the study and proceeding with statement of the problem, general research objective and specific objectives, scope of the research, relevance of the research and organization of the research. Chapter two starts with conceptual definitions, under which the concepts of planning, scheduling and timely completion are explained, followed by critical literature review, empirical literature review, research gap identified and conceptual framework. Chapter three is on research methodology which starts with research paradigm, research design, data collection, data processing and analysis, data validity, data reliability and ethical issues. Chapter four is on presentation of the findings or results and discussion, while chapter five presents the conclusion, recommendation and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Definitions

2.1.1 Planning and scheduling

Planning and Scheduling are closely related subjects, but they are completely separate processes; however, the terms are often used as if they were interchangeable (APM, 2015). Planning and Scheduling of a project is a very important phase for any work. It has a vital role for the success of projects. Any defect on planning or scheduling process will cause great losses in time and money (Moder and Phillips, 1964). Planning is 'a decision-making process performed in advance of action which endeavours to design a desired future and effective ways of bringing it about' (Ackoff, 1970). Construction project planning is a method of determining "What" is going to be done, "How" things are going to be done, "Who" will be doing activities and "How much" activities will cost. (De Marco, 2011). A project always has a planned end date. To help ensure that the end date coincides with the actual completion of the project, a detailed schedule must be prepared (Benetor and Thumann, 2003). A major cause of failure in projects is poor planning or not planning at all (Graham, 2014). Scheduling is just one part of the planning effort (Mubarak, 2010).

The project schedule precisely defines deadlines and duration of all tasks needed to achieve the objectives. It starts with defining of a list of tasks, followed by considering the possibility of concurrent execution of individual tasks (thereby shortening the duration of the project) on which the network plan is based. When the

start of project execution and the duration of all tasks are defined, the schedule is finished (Stare, 2019). Project schedule is an estimate of the time required to construct the Project (Trauner, 2009). It establishes how human resources and equipment are allocated, and discloses how costs are to be distributed along the project's timeline, enabling identification of possible ways to enhance cost controls as the project moves towards completion (El-Reedy, 2011). When preparing new works, it is important to seek the timely involvement of the relevant partners. Sufficient time needs to be allocated in work schedules for each of the envisaged activities. Experience shows that the planning stages may take a similar amount of time as the actual works implementation. The time and duration of the activities and inputs from various stakeholders should therefore be clearly described in the work programme (ILO, 2019). According to DVir et al (2002), planning is considered a central element of modern project management. Commonly accepted professional standards, such as the PMI Guide to the Project Management Body of Knowledge, emphasize heavily the need to invest in project management processes and procedures to support planning. The assumption behind this position is that planning reduces uncertainty and increases the likelihood of project success. Furthermore, the PMBOK encourages project managers to believe that although planning does not guarantee project success, lack of planning will probably guarantee failure.

2.1.2 Timely Completion

Time is the total count of working days from the beginning of a project; typically, one working day would be one shift (Naylor, 1995). This project time is the best advance estimate available of the actual work duration required (Sears et al, 2015). In

any case, the purpose and function of a project are often based on the completion of the project by a certain point in time (Halpin and Senior, 2011). Simply put, for a project to be capable of being managed, it must have a beginning, middle and an end. If there are no clearly defined aspirations, along with a clear definition of the project and completion criteria, uncertainty will prevail and the likelihood of arriving at an intended completion date on time will be reduced (Keane and Caletka, 2015).

2.1.3 Change Orders

Change orders are defined as scope changes (e.g. quantities, functions, materials, time, etc.). Change orders can, for example, be changes in the technical scope which the Employer has not specified in his Employer's Requirements. Change orders can also be proposed by the Contractor, if he identifies possibilities to decrease costs, working time or optimizations towards the technical design (GIZ, 2013). Change orders are amendments to the contract that are agreed to by both parties and are normally approved only after a cost estimation process has been undertaken and the project manager or contract officer determines that sufficient funds are available to make the change (Kassel, 2010).

2.1.4 Progress Payments

Progress payment is the amount invoiced by the contractor for work completed in that period (typically monthly). It is the summation of the earned value of each line item in the Schedule of Values less any retainage (Del Pico, 2013). Such payment claims must be made against the achievement of recognizable events or be supported by certificated measurement (Lock, 2007).

2.2 Critical Literature Review

2.2.1 Introduction

The project definition is a set of activities that has a start time, time period, and end time. These activities vary from project to project depending on the nature of the project (El-Reedy,2011). A standard project typically has the following four major phases (each with its own agenda of tasks and issues): initiation, planning, implementation, and closure (Watt, 2014). The PMBOK Guide® defines project initiation as "the processes performed to define a new project or a new phase of an existing project." (Dobson, 2015). Next is the planning Phase, where the project solution is further developed in as much detail as possible (Heerkens. 2002). Closely linked to the planning phase is a scheduling task, which precede implementation or project execution phase. The final step in the construction project life cycle is the project closeout (Del Pico, 2013). The objectives of this study are to explore the concepts of planning, scheduling, change orders and progress payments as related to project execution through to completion or close out.

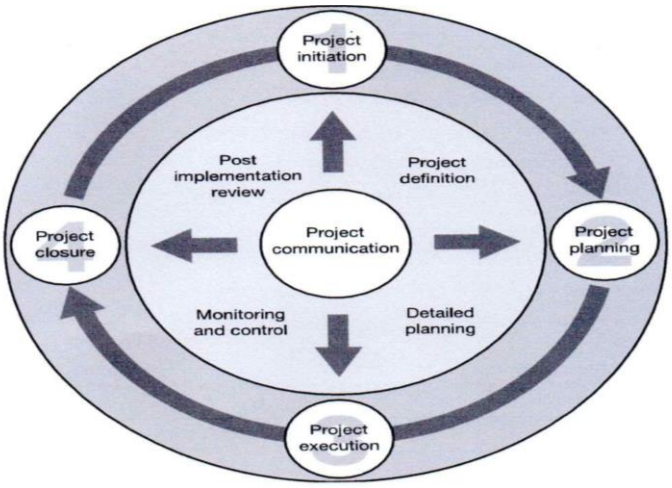


Figure: 2.1: Project Life Cycle (Source: Westland, 2006)

2.2.2 Planning

The project planning stage is the most important aspect of defining and executing a successful project (Keane and Caletka, 2015). Planning is the process of identifying the methods, resources and activities necessary to accomplish the project's objectives (association for project management, 2015). The planning of a project involves the concept of an objective or facility, and a scope of work defining the work product or deliverable (Halpin and Senior, 2011). The plan will typically identify the major work items (activities) and depict the sequence (logic) in which these work items will be constructed to complete the Project (Trauner, 2009). The first step is to define the problem or opportunity that the project will address, and collect project requirements. The next step is to define the project objectives in terms of time, cost, and project scope (Richman, 2011). Time, cost, and scope are competing factors, where a change that may happen to any of the three factors could lead to a change for the other two factors (Rugenyi, 2015; Van Wyngaard et al., 2012).

2.2.2.1 Project Time

One of the most difficult time management activities involves estimating the time required to produce a defined work unit or the entire project (Jackson and Richardson, 2019). The duration of a project is the elapsed time in business working days, not including weekends, holidays, or other non-work days (Wysocki and McGary, 2003). It is important that someone experienced in and familiar with the type of work involved be responsible when the activity durations are being estimated (Sears et al, 2015). When estimating how long activities are expected to take, each activity should be evaluated independently (Kloppenborg, 2015). An activity's

duration estimate must be based on the quantity of resources expected to be used on the activity (Gido and Clements, 2009). Without a precise and complete definition of the work, there is no foundation for the management of time, resources and costs (Levine, 2002). The word activity is generally used when discussing time control or scheduling to refer to the work elements that appear in the schedule in their expected sequence or logical order (Halpin and Senior, 2011).

2.2.2.2 Project Cost

To estimate the cost of a work package, we first have to estimate the effort it will take to complete the work package. Then we can determine the cost of materials and other expenses that will also be needed to complete the work package and that, with the cost of labour, will translate into an estimated cost for the work package (Kuehn, 2011). The WBS offers a top down sub-division of the work, while estimating at the work package level, offers a bottom up roll-up of project costs (Burke, 1999). Construction project estimates are based on identifying, quantifying, and estimating the cost of all the resources (material, equipment, systems, furnishing, and people) required to complete all the activities within the required schedule and specifications (Rumane, 2017).

2.2.2.3 Project Scope

Scope is the content of the project, the deliverables — the expectations of your customer (Miller, 2009). It is the overall definition of what the project is supposed to accomplish, and a specific description of what the end result should accomplish (Jain, 2009). Scope Definition is the process of specifying the breath of the project

and its full span of outputs, end-items, or deliverables; these sought-after requirements and end-results are termed “inclusions,” referring to what is to be included in the project (Nicholas and Steyn, 2008). Poor project scope definition is the source of project changes, rework, schedule delays, and cost overruns (Oberlender, 2000). The first step is usually to define the work breakdown structure (WBS), as this is the framework for the project work scope (Levine, 2002). Work Breakdown Structure is defined as a task-oriented, detailed breakdown of activities that organizes, defines, and graphically displays all of the work to be accomplished in order to achieve the final objectives of a project (Mubarak, 2015). It defines project scope hierarchically, from the complete project level to the work package level. Work packages complete the hierarchy by specifying the project tasks necessary to deliver the scope (Leach, 2000). Division of the major deliverables into smaller, more manageable components to: 1) Improve the accuracy of cost, time, and resource estimates; 2) Define a baseline for performance measurement and control; and 3) Facilitate clear responsibility assignments (AACEI, revised 2021).

The activity definition process is a further breakdown of the work package elements of the WBS. It documents the specific activities needed to fulfill the deliverables detailed in the WBS. These activities are not the deliverables themselves but the individual units of work that must be completed to fulfill the deliverables (Watt, 2014). The work package is extremely important for project management because it relates the work to be performed to time, cost, and people (Oberlender, 2000). Integration of the work breakdown structure with the functional organization structure is required in order to provide for assignment of responsibilities for

identified work tasks (Manzanera, 2013). For each work element, assign an individual responsible for producing the outcomes listed under that work element (Martinelli and Milosevic, 2016).

2.2.3 Scheduling

Time scheduling is an important aspect of project planning (Andersen et al, 2009). A schedule is a timetable for a plan and, therefore, cannot be established until the plan has been developed (Gido and Clements, 2009). Scheduling involves converting the work into sequenced tasks (Rowe, 2015). A Project schedule is a written or graphical representation of the Contractor's plan for completing a construction Project that emphasizes the elements of time and sequence. Schedule development includes identifying the detailed activities, durations, and relationships that form the network schedule. It includes entering this information into the scheduling tool and performing the schedule calculations (Carson et al, 2014). The schedule is a dynamic document that will change as some construction activities occur sooner than anticipated and others occur later than scheduled (Levy, 2010). Scheduling determines calendar dates for the start and completion of project components (Sears et al, 2015). The eventual success of a project depends directly upon each task being executed on schedule (Naylor, 1995). The project schedule is the cornerstone of project work and, as such, serves as the working tool for project planning, execution, monitoring, and control (Martinelli and Milosevic, 2016).

Schedule development includes identifying the detailed activities, durations, and relationships that form the network schedule. It includes entering this information

into the scheduling tool and performing the schedule calculations (Carson et al, 2014). The scheduling problem is to determine an appropriate set of activity start time, resource allocations and completion times that will result in completion of the project in a timely and efficient fashion (Hendrickson and Au, 1989). The sequence of activities comprising the longest path through the schedule will be the "critical path" for the project and should be consistent with the overall Contract duration as agreed by the Contractor and the Owner. The Owner should approve the Contractor's schedule only if it conforms to the overall Contract duration and presents a reasonable plan for accomplishing the Works. In accordance with usual contracts, the approved schedule may not be amended unless by written consent of the Owner. The approved schedule is to be used by the parties to monitor the Contractor's progress and to measure any delays to the Works (Manzanera, 2013).

2.2.3.1 Scheduling types for construction projects

There are relatively few basic scheduling systems in use today, although numerous variants of each are in use. Generally, scheduling methods can be classed in four major categories: 1. Bar charts 2. Velocity charts (S-curves) 3. Line-of-balance charts 4. Network diagrams (Reynolds and Fisk, 2010). Although several different types of schedules are used in the construction industry, the two most common types are Gantt charts (also called bar charts) and network diagrams (Jackson, 2010). This study will specifically consider these two commonly used scheduling methods.

2.2.3.1.1 Bar (Gantt) Charts

The most common type of schedule in project management is the Gantt chart, which

is essentially a bar chart of activities on a calendar grid (Dobson, 2015). In the bar chart method, works are first split into activities. These activities are then listed in the order of construction priorities, generally on the left-hand side column, while the time scale is plotted horizontally on the top and/or bottom of the chart (Chitkara, 1998). Each bar represents the amount of time that its respective task will take (De Marco, 2011). The bar is located on a time line to indicate the schedule for planned start, execution, and completion of the project work activity (Halpin and Senior, 2011). Bar charts may provide information at different levels of detail. The time scale adopted may be shown in days, weeks, or months. They may be used to present summary information to senior management or detailed information to work gangs. Different bar charts may be used to show activities for the whole project or only a section of the works (Baldwin and Bordoli, 2014). Gantt charts provide a method for determining the broad sequence and particular actions which need to be taken to achieve a given objective. However, they provide little assistance in calculating early or late event times and are not able to determine the impact of delays or the critical path through the events (Keane and Caletka, 2015).

2.2.3.1.2 Network Diagrams

Two network planning techniques**, program evaluation and review technique (PERT)** and the **critical path method (CPM)**, were developed in the 1950s. Since that time, other forms of network planning, such as the precedence diagramming method (PDM) and the graphical evaluation and review technique (GERT), have been developed. All of these falls under the general category of network planning techniques, because they all make use of a network diagram to show the sequential

flow and interrelationships of activities (Gido and Clements, 2009). The network diagramming process begins by defining the relationships that exist among activities (Heerkens, 2002). To build a network diagram, you must create an activity list from your WBS, then arrange the activities in the order you plan to perform them (Dobson, 2015). The critical path method (CPM) is "a method used to estimate the minimum project duration and determine the amount of scheduling flexibility on the logical network paths within the schedule model." Both CPM and PERT were founded on the concepts still in place today of identifying activities, determining their logical order, and estimating the duration for each (Kloppenborg, 2015). The network diagram highlights, in particular, the dependencies between activities very effectively, although it does have the disadvantage of being large and rather cumbersome (Kuster et al, 2015).

2.2.3.2 Purpose of project schedule

A project schedule is an important tool for communicating with all the parties involved in the development of the project (Carson et al, 2014). According to Berkun (2008), in the book titled: Making Things Happen; Mastering Project Management, the purpose of a project schedule is to facilitate make commitments about when things will be done, to encourage everyone to see her effort as part of the whole, and to invest in making her pieces work with the others and to provide a tool to track progress and break work into manageable chunks. While employers and contractors have similar goals, they have differing needs and expectations from the schedule. Contractors will (or at least should) use the programme primarily as a planning and management tool (Gibson, 2008). It is rather bad if a project is off

schedule and nobody realizes it before it is too late to do anything about it. But as a rule, this is not the main problem. The most common problem is that people know that a plan is off schedule, but they do not have the will or the power to do anything about it (Andersen et al, 2009). This shows that without project schedules realizing that a project is off track and correct deviations, timing of project activities, tracking progress and integrating them as parts of the whole, is impossible, which results into poor performance, delays and in general, project failure.

2.2.3.3 Project Schedule Control

"Time is money," to quote Benjamin Franklin, and that is no more true than when trying to control the cost and schedule of a project (Kuehn, 2011). Projects are undertaken to accomplish important business purposes, and people often want to be able to use the project results as quickly as possible (Kloppenborg, 2015). The schedule for progress monitoring and reporting should be set up at the start of the construction work and then adhered to throughout the construction period, unless otherwise agreed by all concerned (Baldwin and Bordoli, 2014). The project control process involves regularly gathering data on project performance, comparing actual performance to planned performance, and taking corrective actions if actual performance is behind planned performance. This process must occur regularly throughout the project (Gido and Clements, 2009). Regularly monitoring your project's schedule performance can provide early indications of possible activity-coordination problems, resource conflicts, and cost overruns that may occur in the future (Portny, 2017). Nonetheless, the great productivity improvement available through planning and scheduling comes from having some schedule control, not

necessarily incredibly precise estimate accuracy (Palmer, 2006). The value of a schedule will be dependent on the effort expended in its preparation and use as a management tool by both the Engineer and the Contractor. Optimization of the schedule as a management tool requires that it must be constantly updated and kept current. Such schedule maintenance is a joint responsibility of the Contractor and the Engineer (Manzanera, 2014). Schedule updating is just one part of the project control process. Schedule updating must reflect actual work and involves incorporating approved changes into the baseline schedule (Mubarak, 2015).

2.2.4 Progress Payments in Construction projects

Before awarding the work to a contractor, the owner may need to have an idea as to what its total costs for the project will be, and when it will be required to make progress payments (and hence by when money should be obtained) (Carmichael, 2006). Kimms (2007), points out about three possibilities to trigger payments, namely; Payments based on time, where the contractor receives payments at certain dates stated in the contract; payment based on costs where the contractor receives payments whenever costs have been accumulated up to certain pre- set amounts and payments based on key events or milestones, where the contractor receives payments whenever certain milestones are completed. The author also presents on the three alternatives for determining the amount of money to be paid to the contractor, which are: Paying fixed amounts as pre stated in the contract or paying based on accumulated costs and progress payments in which the amount of money paid is determined by the work content that has been completed. Reflecting the often-long duration of construction work, the payment process is split in several parts including

the advance payment (in some cases), the interim payments and final payment (European Construction Sector Observatory, 2020). During the construction period, the contractor is reimbursed on a periodic basis. Normally, at the end of each month, the owner's representative (e.g., project or resident engineer) and the contractor jointly make an estimate of the work performed during the month and the owner agrees to pay a progress payment to cover the contractor's expenditures and fee or mark up for the portion of the work performed (Halpin and Senior, 2011).

The payment period is the time lag between the payment certificate being issued and the payment being made (RICS, 2011). The percent complete of individual activities is more important because it provides the basis for progress payments (Mubarak, 2010). The contractor wants to leave the job with its reputation intact (if not enhanced), but above all it wants to be paid regularly and on time (Whitticks, 2005). The importance of cash flow within the construction supply chain is key to the smooth running of a contract (Cunningham, 2018). The most important aspect of cash flow management is to avoid extended cash shortages which are caused by having too great a gap between cash inflows and outflows. Cash flow management is defined as a process of monitoring, analysing and adjusting projects' cash flow (Abdul-Rahman et al, 2011). A cash flow is the transfer of money into or out of the company. The timing of a cash flow is important. There will be a time lag between the entitlement to receive a cash payment and actually receiving it.

There will be a time lag between being committed to making a payment and actual paying it (Sherif and Kaka, 2003). A client's progress payment terms can be

structured to provide scheduled cash inflows which offset the project's actual cash outflow (Meredith and Mantel, 2009). Payment is considered as the life blood of the construction industry because construction projects often involve very large capital outlay (Ameer-Ali, 2005). The owner is also obligated to make extra payment in case of eventualities that were not anticipated in the contract, as well as to allow extensions of time to complete the work for such unanticipated conditions (Reynolds and Fisk, 2010). From the discussion, it is evident that steady cash inflow to the construction project is very crucial to meet direct labour, materials, subcontractor and suppliers' expenses and other indirect costs associated with the project. No matter how good the construction project may be scheduled, if there is delay in progress payment, financing the project activities will be affected and timely completion of the project will be impossible. The payment chain process includes the client, contractor and active participant in the project. The payment issue of the construction industry has a far reaching effect on all stakeholders. When payment is delayed by one stakeholder, it might affect the whole payment chain of the construction project. Delayed payment problem is interrelated with the flow of funds problem (Odenigbo et al, 2021). In the study about the effect of delayed payments on cash flow forecasting of Ghanaian Road Contractors, Amoako (2011) concluded that efficient and timely payment in construction industry is a major factor leading to a project's success. Contractors' constant headache or fear had been poor payment practices. Payment has been referred to as the lifeblood of the construction industry due to latter's inherent nature that takes relatively long durations and large amounts of money to complete.

Late Payment will cause severe cash flow problems especially to contractors, and this would have a devastating secondary effect down the contractual payment chain. According to Tanzania's Controller and Auditor General report (2020), the overdue interest claim by the contractors on the payment certificates related to the construction of SGR was mainly caused by late release of funds from MoFP due to inadequate follow up by the Ministry of Works, Transport and Communication that inhibit TANROADS and TRC to pay the contractor on time and that the net effects of delayed payments is not only slow progress of works and completion but also the interest charges escalate project costs compared to initial estimates.

2.2.5 Change Orders in Construction Projects

A change order is a written order to the contractor, signed by the owner, and issued after execution of the contract, authorizing a change in the work or an adjustment in contract sum or contract time. Changes in designs and contract documents usually lead to change in contract price or schedule (Khalifa and Mahamid, 2019). Often during execution some changes occur in the construction drawings of the project as a result of the presence of some of the problems at the site during the construction or the presence of some ideas and suggestions that can reduce the time of the project. However, it is important that the change of work be done through documents in order to manage the changes and build them into the drawings (El-Reedy, 2011). Often, change orders may also be necessary to adjust the original contract schedule because of delays occurred in the project due to unanticipated circumstances. The owner, the contractor or a third party may be responsible for delay (De Marco, 2011).

In practice as soon as a change or variation has been requested either verbally or by a change order, it must be confirmed back to the originator with a statement to the effect that the cost and time implications will be advised as soon as possible (Leister, 2014). The change order clause in the contract may require the contractor to have a fully executed change order before starting the change order work; however, in some contracts the contractor may be allowed to start work before the change order is executed (Carson et al, 2014). In construction, COs are usually inevitable. However, well-planned and well-managed projects may have few or no Cos (Mubarak, 2015). Questions about changes must be resolved quickly to prevent disputes. A contract amendment or change order must be prepared and approved for payment for changes. Payment is usually included in the pay period following completion of the change (Phillips, 1999). Many contractors fail to ask for additional time when they process the cost of the change, thinking that they can wiggle the extra work into the existing schedule. Then all of a sudden, these seven or eight little change orders are causing the job to run two weeks behind, and then it is a big deal (Jackson, 2010).

Change orders have effects on the schedule base line and consequently on a completion time, since the time required to work on the variations will most likely not match the time allocated on the schedule baseline activities. Staiti et al (2016); Oladiran et al (2018) reported the major sources for change orders to be the owners due to financial problems, change in mind and designs which did not comply to their requirements and consultants due to errors and omissions in project designs and specifications. This is mainly due to their role in the project which can influence the scope and plans of the project. Studying the impact of change orders on construction

projects, Gunduz and Mohammad (2019); Yadeta (2016); Alaryan et al (2014); Thomas and Napolitan (1995) found the increased project re-planning as the highly ranked change order impact, increased completion time and cost of the project, disruption, rework, loss of productivity, delay in progress payment.

2.3 Empirical Literature Review

Planning and Scheduling is a central theme in the area of construction project management, in which it serves to produce a project schedule baseline against which project progress and costs can be monitored. The planning and scheduling can help the project complete within time without cost overruns (Gaur, 2022).

Jones (2021) presents that detailed and strategic planning is the most important aspect of successful construction project management. The more complex the project, the more planning will be required. A well-planned project maximizes efficiency and provides a step by step roadmap for completing the work on schedule and within budget.

Owusu and Aggrey (2020), examining the effect of project delays in construction field in Prime Engineering and Service Ghana Limited, reports that, greater percentage of respondent agreed that addressing the question of ineffective planning and scheduling were some of the measures to prevent project delays.

Jelodar and Saghatforoush (2021) found that the most significant causes of delay among others were ineffective planning and scheduling of project. Kuryanto et al

(2020) presenting on the implementation time of the Laggeng Bridge construction project at Lumajang Regency in Indonesia which was 22 weeks, with the aid of project schedule, it was possible to identify critical activities in 16th and 21st week, thus paying attention to mobilize resources accordingly, so that the project complete on time.

Thaddee et al (2020) in their study on the influence of project management practices on project success in Rwanda, relates the success of Grinka Project in Kamonyi district in Rwanda to well planned projects plans, with clear objectives, effective in progress monitoring and evaluation, capable of bringing a project on track following deviation. These are none other than a well prepared project schedule baseline which could be used by project implementation stakeholders to control the project.

Manyara (2020) found that adequate planning and scheduling, review and update of the project plan and project manager skills had a positive influence on project delivery. The regression coefficient results showed that with 1 unit increase in adequate planning and scheduling project delivery improved by .709 units, which was statistically significant. Good and well-prepared project schedule is associated with project success which includes timely delivery.

Raghuwanshi and Paliwal (2021); Tshidavhu and Khatleli (2020); Mejia et al (2019) associate poor and ineffective project planning and scheduling to project delays and failure.

Hassan (2019) in the unpublished paper submitted in partial fulfilment of the requirements for the Degree of Master of project management of the Open University of Tanzania, analysing determinants of delivery delay of water projects in Zanzibar, using descriptive statistics found that there is a significant and positive relationship between improper planning and scheduling and delay of water projects in Zanzibar.

2.4. The Research Gap Identified

Researchers in various empirical studies reviewed have been able to analyse factors that influences construction projects completion on or beyond their scheduled durations. According to empirical review various studies have been conducted on the role of project planning and scheduling practices, influence of progress payments and impacts of change orders on facilitating construction projects timely completion. Never the less, a gap ranging from geographical locations studied, time of study and variations in organisations studied does not address the role of planning and scheduling practices in facilitating timely completion of construction projects in Tanzania of which this study is determined to address and is aimed to contribute to the body of knowledge in that perspective.

2.5. Conceptual Framework

A conceptual framework is a detailed mental formulation of ideas that give direction to a study. It enables the interaction between dependent and independent variables to be portrayed (Kothari, 2004). In this research, timely completion of construction

project is a dependent variable, with planning and scheduling, progress payment and change orders are independent variables.

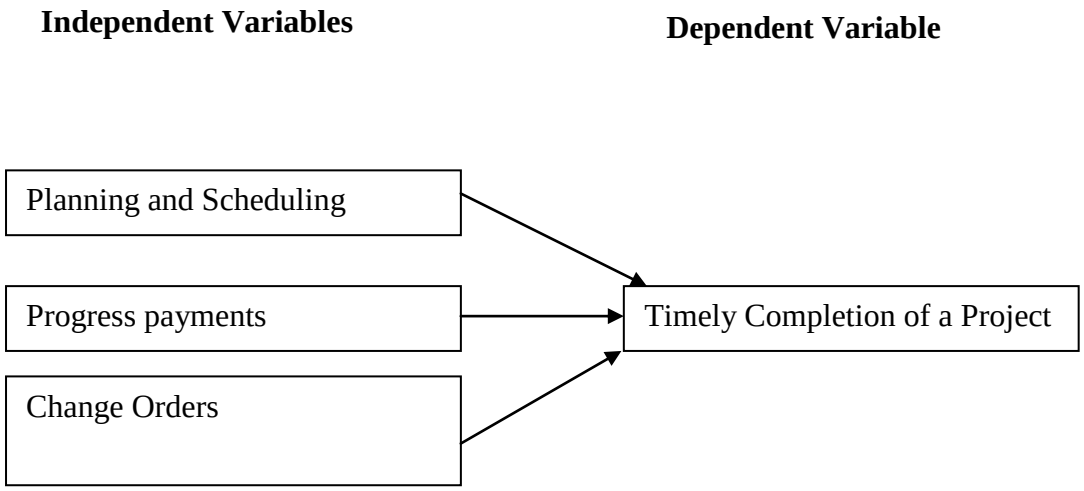


Figure 2.2: Conceptual Framework

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

The Chapter presents on research methodology as is adopted during the research. It explains about the research strategies applied in the research, survey population, area of the research, sampling design procedure, variables and measurement procedures, method of data collection, data processing and analysis using scientific software.

3.2 Research Paradigm

This research used positivism research philosophy descriptive or explanatory or causal relationship to create law-like generalization. Positivism relates to the philosophical stance of the natural scientist and entails working with an observable social reality to produce law-like generalisations (Saunders et al, 2016).

3.3 Research Design

A research design is a roadmap that you decide to follow during your research journey to find answers to your research questions as validly, objectively, accurately and economically as possible. It is a procedural-cum- operational plan that details what and how different methods and procedures to be applied during the research process (Kumar, 2019). This explains about gathering relevant data in an accurate way, minimizing cash expenditure and time consumed for information collection. Descriptive or explanatory or causal research design approach is used throughout this research and surveys, interviews, questionnaires and observation were employed within the case area which is DAWASA, Dar Es Salaam.

3.3.1 Area of the Study

The area of the research is DAWASA which has services covering a wide geographical area but can still be accessible in a most economical way. Also, DAWASA are involved in various projects and has a vast mix of project staff, contractors and sub-contractors who can give a comprehensive experience regarding the existing practice of planning, scheduling and control of construction projects.

3.3.2 Target Population

The target of this research inquiry were the practicing project managers, engineers, technicians, surveyors, suppliers, material managers, contractors' staff and subcontractors of DAWASA who have been involved with DAWASA construction projects and have rich experience on how construction projects are implemented. These stakeholders were involved in the study to give their perception and experiences on the research topic and they were approached at their work stations or sites, where also physical observation of what is taking place regarding planning and scheduling and construction projects control was observed.

3.3.3 Sample and Sampling Techniques

All necessary precautions were taken to ensure the sample of chosen staff were truly representative and the questionnaires were designed in a way that would assure good response rate without affecting time for the respondent's daily routine. The respondents approached were relevant individuals irrespective of their gender and age distribution, who have got some insights regarding supervision of projects. After a brief introduction, questionnaires were distributed and responded almost on the spot due to a brief and to the point nature of questionnaires.

3.4 Data Collection

In this research quantitative and qualitative, primary and secondary data were collected using surveys, interviews, questionnaires and review of various documentaries. These data were reconciled with information as obtained from various literatures relevant to the study, such literatures as obtained from books, journals and internet. Data collected are of two types namely;

3.4.1 Primary data

Primary data was collected from respondents through questionnaires, interview or inquiry sessions and observations on how work schedules were applied in managing construction projects, the common term used for work schedule is work programme.

3.4.2 Secondary Data

Secondary data are other than those collected at work sites, these are data already processed as can be obtained from various sources including and not limited to books, journals, articles, reports (both published and unpublished), and the internet.

3.4.3 Methods of data Collection

All data, primary and secondary, were collected from the sources through observations, questionnaires, structured interviews and reviewing various documents relevant to the research objectives.

3.4.3.1 Questionnaires

Questionnaires were sent to the respondents and asked to read through, understand and respond according to how they think it is proper and they have to answer the

questions on their own. A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms (Kothari, 2004). For this study a self-administered, structured and standardized questionnaire consisted of two part was prepared and used to obtain information from target population. The first part of questionnaire involves questions relating to personal information of the respondent and the other part consist of questions relating to subject matter.

3.5 Data Processing and Analysis

Quantitative data in a raw form, that is, before these data have been processed and analysed, convey very little meaning to most people. These data, therefore, need to be processed to make them useful, that is, to turn them into information. Quantitative analysis techniques such as tables, graphs and statistics allow us to do this, helping us to explore, present, describe and examine relationships and trends within our data (Saunders et al, 2016). In this research, while qualitative data collected were analysed for relevance to the study before being presented in the report, quantitative data were also analysed with the aid of Statistical Package for the Social Sciences (SPSS for Windows, version 20) and Ms Excel, 2019.

3.5.1 Pearson Correlation Coefficients

Bryman and Bell (2011) defines Pearson Correlation Coefficients as a method for examining relationships between interval/ratio variables, the chief features of this method being that the coefficient will almost certainly lie between 0 (zero or no relationship between the two variables) and 1 (a perfect relationship) which indicates the strength of a relationship; The closer the coefficient is to 1, the stronger the

relationship; the closer it is to 0, the weaker the relationship; Should the coefficient be either positive or negative, this indicates the direction of a relationship.

3.5.2 Multiple Regression Analysis

Kothari (2004) states that; when there are two or more than two independent variables, the analysis concerning relationship is known as multiple correlation, which can take two or more independent variables and one dependent variable.

3.5.2.1 Model Specification

Mathematically the model for specific objectives of the study is expressed as follows;

$TC = f (PS, PP, CO)$

$TC = \beta_0 + \beta_1 PS + \beta_2 PP + \beta_3 CO + \varepsilon$

Where;

TC = Timely Completion

PS = Planning and Scheduling

PP= Progress Payments

CO = Change Orders

β_0 is the intercept

β_1, β_2 and β_3 are coefficients of independent variables

ε = error term

3.6 Data Validity

Validity refers to the issue of whether or not an indicator (or set of indicators) that is devised to gauge a concept really measures that concept (Bryman and Bell, 2011). In this research, validity of the data was critically regarded. All qualitative and quantitative data collected in the research passed the criteria of being accurate, correct, true, meaningful, right and relevant to the objectives of the study.

3.7 Data Reliability

Reliability refers to the consistency of a measure of a concept (Bryman and Bell, 2011). All qualitative and quantitative data collected in this research have to be consistent and dependable regarding presenting facts as intended and in alignment with the objectives of the study.

3.8 Ethical Issues

In this research, ethical issues and standards were observed and adhered to. The aspect voluntary participation and the right to respect respondent's privacy, voluntary withdrawal and none disclosure of respondent's anonymity, high confidentiality to respondents as regarding the data they provide were highly observed.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

Descriptive analysis and interpretation of the data as collected from respondents are presented using tables followed by explanations on the implications of the findings. DAWASA staff involved and informed about projects at various levels were involved in the response to yield a significant representation of what is going on in the projects.

4.2 Results and interpretation

4.2.1 Response to Questionnaires

A total of 120 questionnaires were distributed to DAWASA staff involved in projects namely Engineers, Technicians, procurement staff and stores personnel, out of which 106 were collected from the respondents and processed.

Table 4.1: Response to questionnaires

Distributed	120
Returned	106
Percent (returned)	88.3%
Percent (Not returned)	11.7%

4.2.2 Demographic characteristics of respondents

According to data presented in Table 4.2, there are 35,40 and 31 respondents in the age groups of 18-30, 31-45 and 46-60 respectively. Male respondents form the large part of the group which is equivalent to 65.1 percent while female respondents form the remaining 34.9 percent. The table also show that out of the 106 respondents, a

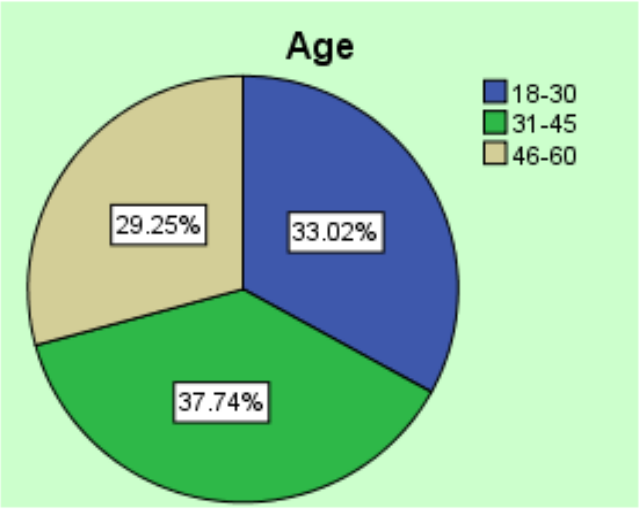
total of 69 respondents are married, 30 respondents are single, while 3 respondents are widows and 4 respondents are divorced.

Table 4.2: Age, Gender and Marital Status Distribution of the Respondents

Age				
Age group	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
18-30	35	33.0	33.0	33.0
31-45	40	37.7	37.7	70.8
46-60	31	29.2	29.2	100.0
Total	106	100.0	100.0	
Gender				
Gender	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Male	69	65.1	65.1	65.1
Female	37	34.9	34.9	100
Total	106	100	100	
Marital Status				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Married	69	65.1	65.1	65.1
Single	30	28.3	28.3	93.4
Widow	3	2.8	2.8	96.2
Divorced	4	3.8	3.8	100
Total	106	100	100	

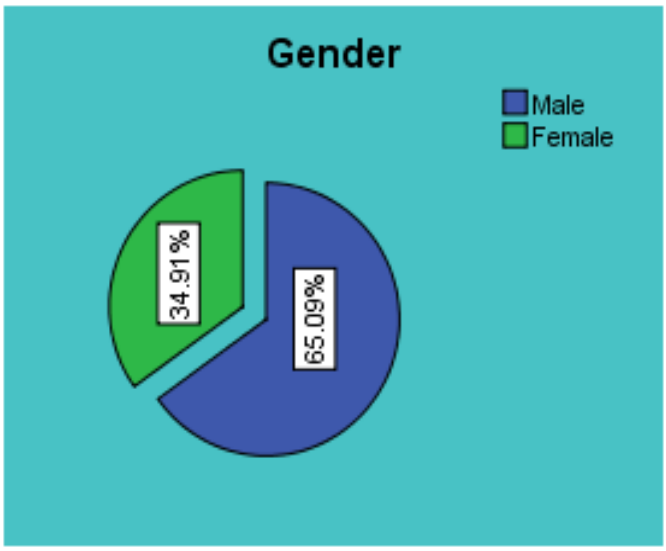
Source: Field data (2021)

Figure 4.1: Age Distribution of Respondents



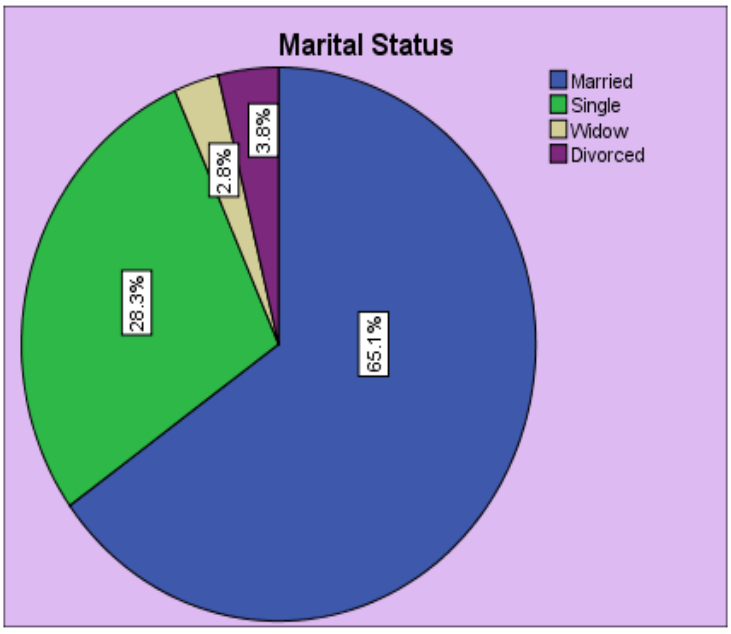
Source: Field data (2021)

Figure 4.2: Gender Distribution of Respondents



Source: Field data (2021)

Figure 4.3: Marital Status Distribution of Respondents



Source: Field data (2021)

4.2.3 Level of Education, Years of Working Experience and Working Position

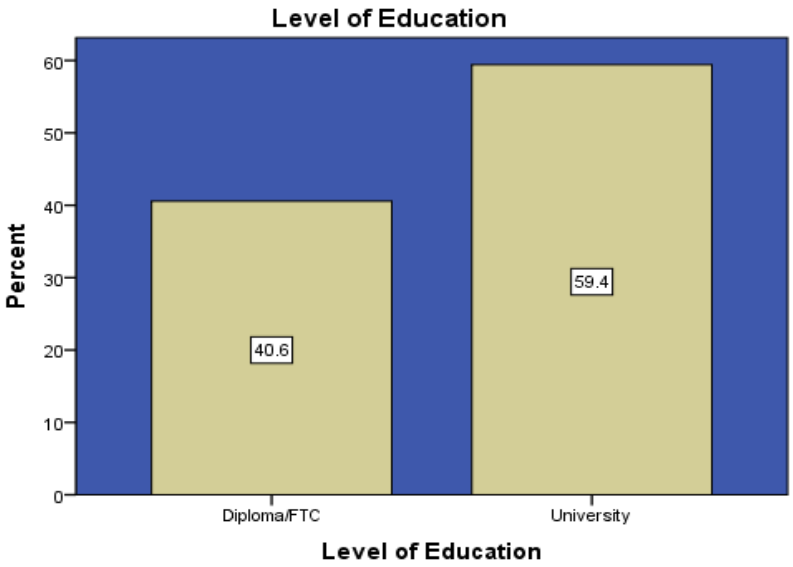
Table 4.3 presents the findings about the level of education, years of working experience and working positions of the respondents, which shows there are 43 respondents with diploma or FTC and 63 respondents with university levels of education. A total of 35 respondents are working as technicians at various DAWASA projects, while 54 respondents are working as engineers and out of 17 respondents working in other positions, 10 respondents are in the stores department, 4 respondents are working in the surveying section and 3 respondents are in the procurement section.

Table 4.3: Level of education, Years of working Experience and Working position

Level of Education				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Diploma/FTC	43	40.6	40.6	40.6
University	63	59.4	59.4	100.0
Total	106	100.0	100.0	
Years of Working Experience				
Experience range	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
2-5	35	33	33	33
6-10	40	37.7	37.7	70.8
11 and above	31	29.2	29.2	100
Total	106	100	100	
Working Position				
Position	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Technician	35	33	33	33
Engineer	54	50.9	50.9	84
Other	17	16	16	100
Total	106	100	100	

Source: Field data (2021)

Figure 4.4: Level of education distribution of respondents

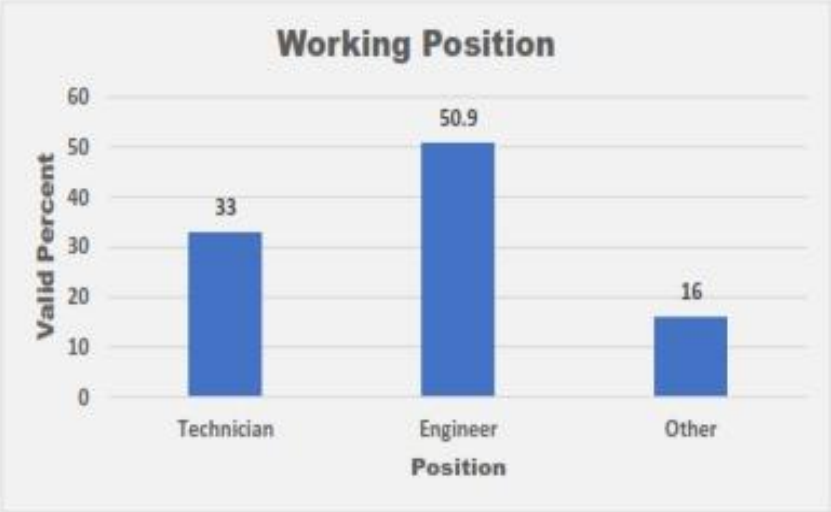


Source: Field data (2021)

Figure 4.5: Years of Working Experience distribution of respondents

Source: Field data (2021)

Figure 4.6: Working position distribution of respondents



Source: Field data (2021)

4.2.4 Crosstabulation of Gender to Age, Marital Status, Level of Education, Working Experience and Working Position

From Table 4.4, in relation to Marital status, age, level of education, working experience and working position as in regard to gender distribution of the respondents, it is found that there are more males than female respondents. With regard to age, there are 25, 23 and 21 males in the age groups of 18-30, 31-45 and 46-60 respectively as compared to 10, 17 and 10 female respondents in the same age groups. Marital status of the respondents indicates that there are 42, 22, 2 and 3 male respondents in the married, single, widow and divorced groups respectively as compared to 27, 8, 1 and 1 female in the same groups. Education levels indicates that there are 33 and 36 male respondents with diploma/FTC and University degree respectively as compared to 10 and 27 female respondents with the same education level. There are also more male respondents within all the three experience ranges

surveyed resulting to 25, 23 and 21 male respondents with years of experience in the range of 2to5, 6 to 10 and over 11 years of working experience respectively, while there are 10, 17 and 10 female respondents with similar working experience year ranges. In working positions of engineers, technicians and other positions, male respondents are found to be 27, 28 and 14 for technicians, engineers and others respectively as compared to 8, 26 and 3 female respondents in the same positions.

Table 4.4: Crosstabulation of Gender to Age, Marital Status, Level of Education, Working Experience and Working Position

Crosstabulation of Gender to Age, Marital Status, Level of Education, Working Experience and Working Position				
AGE				
	18-30	31-45	46-60	
Male	25	23	21	
Female	10	17	10	
MARITAL STATUS				
	Married	Single	Widow	Divorced
Male	42	22	2	3
Female	27	8	1	1
LEVEL OF EDUCATION				
	Level of Education			
	Diploma/FTC	University		
Male	33	36		
Female	10	27		
WORKING EXPERIENCE				
	Years			
	2 to 5	6 to 10	11 and above	
Male	25	23	21	

Female	10	17	10	
WORKING POSITION				
	Technician	Engineer	Other	
Male	27	28	14	
Female	8	26	3	

Source: Field data (2021)

4.2.5 Descriptive Statistics for the statements of the Questionnaires

4.2.5.1 The role of Project Planning and Scheduling on timely Completion of Projects

Table 4.5 presents the mean distribution from questionnaire statements on the role of project planning and scheduling on timely Completion of Projects. The mean distribution for the statements responded on the role of planning and scheduling practices on timely completion of construction projects were all above 4.5 which imply strong agreement to the statements that planning and scheduling is important in construction project to **p**roduce a project schedule which is then used for project control, the project schedule which is a product of the process enables the project team to have a common roadmap thus avoiding role conflicts and confusion and work towards a common target while also cashflows forecasting and allocations for construction project tasks is effectively guided. However, the mean distribution of statement 4 is 4.86 indicating that the respondents strongly agree that knowledge-based planning and scheduling is a challenge to most contractors and project supervisors.

Table 4.5: The Mean distribution on the role of planning and scheduling

Descriptive Statistics						
S/N		N	Minimum	Maximum	Mean	Std. Deviation
1.	Is important in construction project to **p**roduce a project schedule which is then used for project control	106	4	5	4.92	.265
2.	Enables the project team to avoid role conflicts and confusion and hence work towards common targets	106	3	5	4.83	.402
3.	Guides cash flow forecasting and allocations for construction project tasks	106	4	5	4.88	.330
4	Knowledge based planning and scheduling is a challenge to most contractors	106	3	5	4.86	.376
	Valid N (listwise)	106				

Source: Field data (2021)

4.2.5.2 Impact of Progress Payments on Timely completion of projects

Presented in Table 4.6 are the mean distribution from questionnaire statements on the Impact of Progress Payments on Timely completion of projects**.** The mean distribution for statements 1 and 2 is 4.46 and 4.32 respectively indicating that the respondents agree that most construction project owners and consultants have in their mindset that contractors have unlimited funds to finance the projects thus they find themselves having no strong urge to facilitate fast payment of progress payments to contractors while contractors on the other side regard delay in progress payments as one of the critical factors hindering construction projects timely completion, in other

words it imply that most contractors agree that they have limited funds to finance the construction projects.

The mean distribution for statements 3 and 4 in table 4.6 is 4.85 and 4.76 respectively, implying that respondents to the statements strongly agree that slow progress at site result into progress payments delay and timely progress payments cannot be a remedy to poorly scheduled construction projects in relation to timely completion.

Table 4.6: The Mean distribution on the impact of progress payment

Descriptive Statistics						
S/N		**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
1.	Most construction projects owners and consultants think contractors have unlimited funds thus delay progress payments	106	3	5	4.46	.620
2.	Most contractors regard delay in Progress payments as one of the critical factors hindering construction projects timely completion	106	3	5	4.32	.787
3.	Slow progress at site result into progress payments delay	106	3	5	4.85	.409
4.	Timely progress payments cannot be a remedy to poorly scheduled construction projects in relation to timely completion	106	3	5	4.76	.489
Valid N (listwise)		106				

Source: Field data (2021)

4.2.5.3 The effects of Change orders on timely project completion

Table 4.7 are the mean distribution from questionnaire statements on the effects of change orders on Timely completion of projects. The mean distribution to statements

1 and 2 is 4.49 and 4.40 respectively, which shows that respondents to statements agree that critical planning and scheduling by parties can significantly minimize change orders during projects execution and minimizing change orders improves construction project speed and hence timely completion. Statements 3 and 4 have the mean distribution of 4.67 and 4,91 respectively, which imply that respondents to the statements strongly agree that most change orders originate from construction project owners and consultants. However, strong agreement to statement 4 indicate that proper planning and scheduling can enable parties to easily manage Change orders.

Table 4.7: The effects of Change orders

Descriptive Statistics						
S/N		**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
1.	Critical planning and scheduling by parties can significantly minimize change orders during projects execution	106	4	5	4.49	.502
2.	Minimizing change orders improves construction project speed and timely completion	106	3	5	4.40	.510
3.	Most change orders originate from construction project owners and consultants	106	3	5	4.67	.492
4.	Proper planning and scheduling enable parties to easily manage Change orders	106	4	5	4.91	.294
Valid N (listwise)		106				

Source: Field data (2021)

4.2.6 Correlation Analysis Results

4.2.6.1 Correlation of Dependent Variable and Independent Variables

Table 4.8 presents the results on correlation analysis as conducted to describe the

strength and direction of the linear relationship between each two variables of the study namely; planning and scheduling, progress payment, change orders and timely completion of construction projects at DAWASA. The results indicate that there is no statistically significant relationship between planning and scheduling and timely completion. The results also indicate that there is a statistically significant low positive relationship between progress payments and timely completion (r =0.200 and p =0.040), this means facilitating timely payment of progress payments can increase a chance of timely completion of construction projects. However there is a statistically insignificant low negative relationship between change orders and timely completion, with Pearson's correlation Coefficient (r) of -0.021 and the significance value (p value) of 0.832 at significance level (p value) of 0.05 level 2-tail test. This means though the relationship is not significant, but it shows the negative relationship between change orders and timely completion. It is indicative that the more the change orders the less the chance of timely completion of construction projects.

Table 4.8: Correlation of independent and dependent variables

Correlations					
		Planning and scheduling	Progres Payments	Change Orders	Timely Completion
Planning and scheduling	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	106			
Progres Payments	Pearson Correlation	.198*	1		
	Sig. (2-tailed)	.042			
	N	106	106		
Change Orders	Pearson Correlation	.129	.239*	1	

	Sig. (2-tailed)	.188	.013		
	N	106	106	106	
Timely Completion	Pearson Correlation	.144	.200*	-.021	1
	Sig. (2-tailed)	.142	.040	.832	
	N	106	106	106	106
*. Correlation is significant at the 0.05 level (2-tailed).					

Source: Field data (2021)

4.2.7 Multiple Regression Analysis Results

4.2.7.1 Regression Analysis of Independent Variables and dependent variable

Table 4.9 presents the results of Multiple Regression Analysis on independent variables namely; planning and scheduling, progress payments and change orders and the dependent variable which is timely completion. The results indicate the value of Adjusted R square is 0.030, which shows that the predictors (planning and scheduling, progress payments and change orders) can only explain about 3% of the variation on construction project timely completion in Tanzania. In other words, there are other more predictors to explain construction project timely completion. The results also show that progress payments statistically significant low positive relationship to construction project timely completion with regression coefficients and significance values ($\beta = 0.197$ and $p=0.053$).

It follows tha from the Regression model equation; $TC = \beta_0 + \beta_1 PS + \beta_2 PP + \beta_3 CO + \varepsilon$

Where;

TC = Timely Completion

PS = Planning and Scheduling

PP= Progress Payments

CO = Change Orders

β_0 is the intercept

β_1, β_2 and β_3 are coefficients of independent variables

ε = error term and

The regression model becomes: TC= 0.425 + 0.115PS +0.197PP -0.083CC and the implication is that progress payments has effects on timely completion and if all other independent variables are kept constant, a unit increase in timely progress payments will result into 0.197 increase in performance towards timely completion of construction projects.

Table 4.9: Multiple Regression Analysis Results

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
1		.240[a]	.058	.030	.04709
a. Predictors: (Constant), Change Orders, Planning and scheduling, Progress Payments					
Coefficients[a]					
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.425	.172		2.477	.015
	Planning and scheduling	.212	.181	.115	1.172	.244
	Progress Payments	.298	.152	.197	1.961	.053
	Change orders	-.162	.195	-.083	-.834	.406
a. Dependent Variable: Timely Completion						

Source: Field data (2021)

4.3 Discussion of the Findings

This study aimed at assessing the role of planning and schedulling practices on timely completion of construction projects in Tanzania, taking DAWASA as a case area. The study worked on three specific objectives of planning and scheduling, progress payments and change orders as related to timely completion of construction projects in Tanzania, DAWASA specifically being a case area.

Taking the number of respondents as reported in the study, it shows that 33% are technicians and 50.9% are engineers. The respondents with experience ranges of 6-10 years are 37.7% and those with over 11 years of working experience 29.2% of all the respondents. It can then be noted that the information originates from respondents who are well informed about what happens in the construction projects at DAWASA.

In correlation analysis, the results indicate no statisticaly significant relationship between planning and scheduling practices and timely completion of the construction projects.

Planning and scheduling however, is about outlining the exact parameters of the project and how they will be executed to meet the project objectives, while scheduling is about timeline over which the parameters will be executed. The correlation results therefore indicate that planning and scheduling practices are necessary for construction projects, but not sufficient conditions for timely completion of the projects.

The study results also shows low positive correlation between progress payments and timely completion of construction projects, which means untimely progress

payments can have an impact on timely completion of the construction projects. Change orders and timely completion on the other hand are indicated by correlation analysis results to have a low negative statistically insignificant relationship, which means change orders alone cannot contribute to untimely construction project completion.

These findings point to the presence of other more determinants or predictors to projects timely or untimely completion. This is in line with the study of Daba and Pitroda (2018) in their study titled A Critical Literature Review on Main Causes of Delay in Construction Projects, in which they outlined a number of factors which can hinder construction project timely completion, grouping them into consultant related,contractor related, owner related, external related, resource related and project related factors.

Shiri (2015), in the study titled An Investigation of the Causes and Effects of Construction Delays on Zimbabwean Construction Projects, through questionnaire to various parties involved in construction projects in Zimbabwe came out with a list of 22 factors which according to the study contributed to untimely completion of the construction projects. The factors included Financial difficulties by the client, Change order by clients/variations, Contractor's financial difficulties, Late payment, Wrong time estimation, Overcomitment of construction firms, Financial Market instability, Contractor's incapability, Poor site management, Project complexity, Coordination problems, Insufficient financial resources, Loss of productivity, Shortage of equipment, Contractual relationship, General labor strike, Construction

Mistakes and defective work, Labour shortage, Bad weather conditions, International involvement, Acts of God and Language barrier.

Timely completion of projects is a dependent variable which can be determined by several independent variables (Kariungi, 2014). According to Luvara et al, 2018 in their study titled Critical Factors Causing Delay and Cost Overrun in Public Building Projects in Dar Es Salaam, Tanzania, outlined 32 delay factors and ranked them according to their degree of severity and frequency of occurance out of which 13 factors were found to be very critical and the top five of the critical factors in causing untimely completion and thus cost overrun were identified to be; delay in decision making, Incomplete design and estimate at the time of tender/design, change during construction, Design errors and omission in both drawings and in the bill of quantity, Delay of material delivery and Poor site management. Design changes, Unpredictable weather condition, fluctuation in the cost of construction materials, shortage of site workers and incorrect planning and schedule had significant positive relationship with Delay in time completion of groundwater projects in Dar es Salaam (Muganyizi, 2019).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

The main objectives addressed by this study were; (i) To assess the role of project planning and scheduling on timely completion of construction projects in Tanzania (ii) To evaluate the influence of progress payments on timely completion of construction projects in Tanzania (iii) To assess the impacts of change orders on timely completion of construction projects in Tanzania.

From the results of the study it was found that planning and scheduling practices have no correlation with timely completion of the construction project, however from the responses planning and scheduling practices were found to be very important to outline what to do, how to do it, what comes first, what comes next and when to do it in the construction projects. To effect timely completion a number of predictors are involved in additional to the studied predictors.

It can then be concluded that planning and scheduling practices are not sufficient to guarantee timely completion of the construction projects. Planning and scheduling are used for the purpose of deciding project activities, duration, money, required materials, and relations between each activity in order to finish a particular work (Abdulkareem, 2020).

The study also found that progress payments has correlation with timely completion and so suggest that increasing timely availability of progress payment will positively impact timely completion of construction projects in Tanzania.

The study found change orders and timely completion to have no statistically significant relationship; however, correlation analysis results indicate a negative relationship between change orders and timely completion of construction projects. This calls for all stakeholders involved with initiating change orders to keep them at minimum during construction execution so as to avoid the negative influence change orders might have on timely completion of construction projects.

5.2 Implication of the results

The implications of the results suggest that, if timely completion of the construction project in Tanzania is a dependent variable, then there are more several predictors to the dependent variable.

5.3 Recommendations

Recommendations based on the conclusion arrived at are as follows:

First, knowledge-based project management should be encouraged to all stakeholders involved with management of construction projects in Tanzania so as to be able to offer effective projects planning and scheduling. This keeps into consideration the case area staff involved in project management and it is obvious that knowledge-based project management would be an added advantage in their career of managing construction projects. Second, since it has been indicated that progress payments have positive correlation with timely completion of construction projects, it is the recommendation of this study that those involved with processing progress payments should take a serious note that delaying progress payment affects timely completion of construction projects in Tanzania. Third, this study also found

that change orders have negative relationship with timely completion of construction projects. This calls for stakeholders involved with projects to give more time to planning, to know in depth the details of the projects they plan to venture in so as to avoid design changes and change orders, thus facilitating timely completion of their projects.

5.3 Area for Further Research

The results of this study cannot be generalized and are constrained by some limitations. The empirical application of this study considered DAWASA only as the case area. Future research might consider other organizations involved with construction projects to study the parameters of this study so as to offer more insights regarding the role of planning and scheduling practices on timely completion of construction projects in Tanzania. The relationship of progress payments and change orders to timely completion of construction projects in Tanzania can also be areas of further research using other organizations involved with construction projects.

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APPENDICES

Appendix I: Questionnaires

Part I: Letter to Respondent

Dear respondent,

My name is Eng. Adidas Stafford Higima, a student at the Open University of Tanzania (OUT) in the Faculty of Business Management, pursuing Master of Project Management (MPM).

In partial fulfilment of the requirements for the Degree of Master of project Management, I am carrying out a research titled ***"Assessing the Role of Planning and Scheduling Practices on Timely Completion of Construction projects",*** with **DAWASA** as the case selected. I kindly request you to participate in this research by filling out this questionnaire. All questions on this questionnaire are purely for academic purposes only and the information you give will highly be treated as confidential and for the sole purpose of this research and academic use.

Thanking you for cooperation!

Yours Sincerely

Adidas Stafford Higima

Mob: 0762498922

Email: **ahigima@gmail.com**

PART II: Background Information of the Respondents

1. Age (Years)

    1. 18-30 ☐
    2. 31-45 ☐
    3. 46-60 ☐

2. Gender

    1. Male ☐
    2. Female ☐

3. Marital Status

    1. Married ☐
    2. Single ☐
    3. Widow ☐
    4. Divorced ☐

4. Level of education

    1. Primary ☐
    2. Secondary ☐
    3. Diploma/FTC ☐
    4. University ☐

5. Years of working experience?

    1. Below 2 ☐
    2. 2 – 5 ☐
    3. 6 -10 ☐
    4. 11 and above ☐

6. Working position on the Construction Project?

1. Technician ☐
2. Engineer ☐
3. Project Manager ☐
4. Other…… (Specify)

7. Do you often use and strictly observe project schedules in construction projects?

1. Yes, in all construction projects ☐
2. Not in all construction projects ☐

PART III:

Based on your experience in construction projects, tick (√) where appropriate to indicate your agreement or disagreement on the relevance of the statements on construction projects timely completion.

Project Planning and Scheduling on timely Completion of Projects	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly Agree**
8. Is important in construction project to **p**roduce a project schedule which is then used for project control					
9. Enables the project team to avoid role conflicts and confusion and hence work towards common targets					

10. Guides cash flow forecasting and allocations for construction project tasks					
11. Knowledge based planning and scheduling is a challenge to most contractors					

Impact of Progress Payments on Timely completion of projects	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly Agree**
12. Most construction projects owners and consultants think contractors have unlimited funds thus delay progress payments					
13. Most contractors regard delay in Progress payments as one of the critical factors hindering construction projects timely completion					
14.Slow progress at site result into progress payments delay					
15. Timely progress payments cannot					

be a remedy to poorly scheduled construction projects in relation to timely completion					

The effects of Change orders on timely project completion	**Strongly disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly Agree**
16. Critical planning and scheduling by parties can significantly minimize change orders during projects execution					
17. Minimizing change orders improves construction project speed and timely completion					
18. Most change orders originate from construction project owners and consultants					
19. Proper planning and scheduling enables parties to easily manage Change orders					

Construction Project Timely Completion	**Strongly Disagree**	**Disagree**	**Not sure**	**Agree**	**Strongly Agree**
20. Planning and Scheduling is important for construction project timely Completion					

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ISO 9001:2015 Certified
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ADIDAS STAFFORD HIGIMA,
P.O Box 35591,
DAR ES SALAAM.

REF: REQUEST TO ADMINISTER QUESTIONNAIRES AT DAWASA ON A RESEARCH TITLED ASSESSING THE ROLE OF PLANNING AND SCHEDULING PRACTICES ON TIMELY COMPLETION OF CONSTRUCTION PROJECTS .

Please refer to your letter dated 04th November, 2024, requesting for Data Collection on the study titled **"Assesing the role of Planning and Scheduling Practices on Timely Completion of Construction project"** a case study of DAWASA-Tanzania.

2. I am glad to inform you that your request has been accepted. You shall report to the **Director of Planning Monitoring and Evaluation – Maji House** with this letter of acceptance.

3. However, after the end of your data collection, the Final Report should be submitted to the Registry Office at DAWASA - Mwananyamala for record-keeping and enhance the Performance of Authority.

4. Regards.

Jacky Mabeyo
For: Chief Executive Officer

CC: Director of Planning, Monitoring and Evaluation, DAWASA – Maji House
Human Resource Officer, DAWASA - Maji House