

**PROJECT MANAGEMENT INFORMATION SYSTEM AND PERFORMANCE OF
STUDENTS HOUSING CONSTRUCTION PROJECTS IN KENYA; A CASE OF
QWETU STUDENTS HOUSING PROJECTS**

KELVIN SALASYA WAKHULE

**Research Project Proposal Submitted in Partial Fulfillment for the Award of Degree of
Master of Arts in Project Planning and Management of University of Nairobi**

2022

DECLARATION

This research project proposal is my original work and it has not been submitted for an award in any other university.



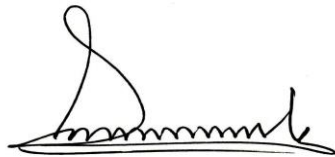
Signature:

Date: **5th November, 2022**

KELVIN SALASYA WAKHULE

L50/10215/2018

This research project proposal has been submitted for examination with my approval as the University supervisor.



Signature:

Date: **5th November, 2022**

PROF. CHARLES M. RAMBO

Department of Finance and Accounting

Faculty of Business and Management Sciences

UNIVERSITY OF NAIROBI

DEDICATION

My parents, Mr. Protus Wakhule Salasya and Mrs. Sarah Achieng' Wakhule, have been my biggest influence and teachers, and I am grateful to them for all the values and virtues they taught me. You have my undying loyalty, inspiration, and gratitude for everything that you have done for me morally and financially. Reflections of your sacrifice and motivation has made me strive to achieve my goals and aspirations.

ACKNOWLEDGEMENT

I want to express my gratitude to God, the Almighty, for His guidance, blessings, and strength during my stay at the University of Nairobi and, more broadly, my whole life. I thank my supervisor Prof. Charles M. Rambo, whose counsel provided the grounding and clarity for this research work. Extensively, I thank the whole Faculty of Business and Management Sciences at the University of Nairobi, with whom I engaged during my degree program. Their steadfastness, devotion, and enthusiasm for education has been an inspiration to those who have seen it.

Finally, special recognition goes to all my siblings Vivian, Richard, Fidelis, Allan, Noelene, Bramwel and Millicent for the moral support and intellectual knowledge shared during my educational journey. Their ideas gave me the passion to start this research work. I also appreciate the contribution of friends and colleagues who would have participated in one way or another in this research.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
ABBREVIATIONS AND ACRONYMS	xi
ABSTRACT	xii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background to the Study	1
1.1.1 Performance of Student Housing Construction Projects	2
1.1.2 Project Management Information Systems.....	4
1.1.3 Students Housing Construction Projects in Kenya.....	5
1.2 Statement of the Problem	6
1.3 The Purpose of the Study	8
1.4 Objectives of the Study	8
1.5 Research Questions	8
1.6 Research Hypotheses.....	9
1.7 Significance of the Study	9
1.8 Delimitation of the study.....	10
1.9 Limitations of the Study	11
1.10 Assumptions of the Study	11
1.11 Definitions of Significant Terms Used in the Study	12
1.12 Organization of the Study	12
CHAPTER TWO	13
LITERATURE REVIEW	13
2.1 Introduction	13
2.2 Project Management Information System.....	13
2.3 Performance of Students Housing Construction Projects.	15

2.4 Empirical Literature Review	17
2.4.1 Indicator Tracking System and Performance of Students Housing Construction Projects	17
2.4.2 Disbursement Planning and Tracking and Performance of Students Housing Construction Projects.....	19
2.4.3 Procurement Activity Tracking System and Performance of Students Housing Construction Projects.....	21
2.4.4 Project Schedule Tracking System and Performance of Students Housing Construction Projects	22
2.4.5 Project Management Information System and Performance of Students Housing Construction Projects.....	24
2.5 Theoretical framework	25
2.5.1 Systems Theory	25
2.5.2 Contingency Theory	27
2.5.3 Theory of Constraints	28
2.6 Conceptual Framework	29
2.7 Summary of Empirical Literature and Knowledge Gaps	31
CHAPTER THREE	33
RESEARCH METHODOLOGY	33
3.1 Introduction	33
3.2 Research design.....	33
3.3 Target Population	33
3.4 Sample Size and Sampling Procedures	34
3.4.1 Sample Size	35
3.4.2 Sampling Procedure.....	36
3.5 Research Instruments	37
3.5.1 Pilot Testing of Instruments	38
3.5.2 Validity of the Research Instrument.....	38
3.5.3 Reliability of the Research Instrument	39
3.6 Data Collection Procedures	39
3.7 Data Analysis Techniques	40
3.7.1 Descriptive statistics	40
3.7.2 Inferential statistics.....	40

3.8 Ethical Considerations.....	41
3.9 Operationalization of Study Variables	42
CHAPTER FOUR.....	44
DATA ANALYSIS, PRESENTATION AND INTERPRETATION	44
4.1 Introduction	44
4.2 Questionnaire Return Rate	44
4.3 Demographic Characteristics of the Respondents.....	44
4.3.1 Distribution of Respondents by Gender	45
4.3.2 Distribution of Respondents by Age	45
4.3.3 Distribution of Respondents by Years of Work Experience	46
4.3.4 Distribution Respondents by Level of Education.....	46
4.3.5 Distribution of Respondents by Designation in the Firm	47
4.3.6 Distribution of Respondents by Level of Skills in Computer Applications	48
4.4 Indicators Tracking Systems and Performance of Students Housing Construction Projects	48
4.5 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects	50
4.6 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects	51
4.7 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects	53
4.8 Performance of Students Housing Construction Projects	54
4.9 Inferential Statistics.....	56
4.9.1 Correlation Analysis.....	56
4.9.2 Regression Analysis	57
4.9.2 Summary of Hypotheses Testing.....	60
CHAPTER FIVE	62
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS.....	62
5.1 Introduction	62
5.2 Summary of Findings	62
5.2.1 Indicator Tracking Systems and Performance of Students Housing Construction Projects	62

5.2.2 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects.....	63
5.2.3 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects.....	63
5.2.4 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects.....	64
5.2.5 Performance of Students Housing Construction Projects.....	64
5.3 Discussion of Findings	64
5.3.1 Indicator Tracking Systems and Performance of Students Housing Construction Projects	65
5.3.2 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects.....	65
5.3.3 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects.....	66
5.3.4 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects.....	67
5.3.5 Performance of Students Housing Construction Projects.....	68
5.4 Conclusions	68
5.5 Recommendations	69
5.6 Suggestions for Further Research	70
REFERENCES.....	71
APPENDICES	77
Appendix I: Letter of Transmittal	77
Appendix II: Respondent’s Questionnaire	78
Appendix III: Approval Letter from the University.....	84
Appendix IV: NACOSTI Research Permit License.....	85

LIST OF TABLES

Table 2.1 Summary of Empirical Literature and Knowledge Gaps.....	31
Table 3.1 Target Population.....	34
Table 3.2 Sampling Procedures	37
Table 3.3 Operationalization of study variables	42
Table 4.1 Questionnaire Return Rate.....	44
Table 4.2 Distribution of Respondents by Gender.....	45
Table 4.3 Distribution of Respondents by Age.....	45
Table 4.4 Distribution of Respondents by Years of Work Experience.....	46
Table 4.5 Distribution Respondents by Level of Education	47
Table 4.6 Distribution of Respondents by Designation in the Firm	47
Table 4.7 Distribution of Respondents by Level of Skills in Computer Applications	48
Table 4.8 Indicators Tracking Systems and Performance of Students Housing Construction Projects.....	49
Table 4.9 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects	50
Table 4.10 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects	52
Table 4.11 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects.....	53
Table 4.12 Performance of Students Housing Construction Projects.....	55
Table 4.13 Correlation Analysis	56
Table 4.14 Model Summary	57
Table 4.15 ANOVA Results	58
Table 4.16 Regression Coefficients	59

LIST OF FIGURES

Figure 2.1 SIPOC Process.....	19
Figure 2.2 Conceptual Framework for Study Variables	30

ABBREVIATIONS AND ACRONYMS

AEC	Architectural, Engineering and Construction
AHL	Acorn Holdings Limited
BIS	Business Intelligent Systems
CAGR	Compound Annual Growth Rate
DPTS	Disbursement Planning and Tracking System
EPT	E-Procurement Technology
GDP	Gross Domestic Product
ICT	Information Communication Technologies.
ITS	Indicator Tracking System
IS	Information System
KNBS	Kenya National Bureau of Statistics
KPI	Key Performance Indicator
PPMS	Procurement Planning and Monitoring System
PATS	Procurement Activity Tracking System
PMIS	Project Management Information System
PPP	Public Private Partnerships
PSTS	Project Schedule Tracking System
NHC	National Housing Corporation
NCA	National Construction Authority
OSHA	Occupational Safety and Health Administration
TOC	Theory of Constraints

ABSTRACT

Most students housing construction projects in Kenya have been spending more time, budget or delivery of poor quality of works than planned. These projects are challenged by how they monitor and measure project resources and execution steps, to ensure they are effectively followed to meet project goals and objectives. Therefore, construction firms must plan, monitor and manage these projects with proper tools for efficient execution of their projects so as to improve the performance of the project outcome. The purpose of this research was to examine how project management information systems influence the performance of students housing construction projects in Kenya: a case of Qwetu students housing construction projects. The objectives of the study were to establish influence of indicator tracking systems, disbursement planning and tracking systems, procurement activity tracking systems and project schedule tracking systems on performance of students housing construction projects in Kenya. The theories guiding the study are systems theory, contingency theory and theory of constraints. Descriptive survey was used as the research design for gathering, summarizing and presentation of data. The target population was 105 respondents, with a cumulative sample size of 82 respondents adopted using a stratified random sampling procedure. The research instruments primarily used were questionnaires which were pilot tested for validity and reliability. Data collection procedures was mainly done through hand delivery and distribution of questionnaires. The Statistical Package for the Social Sciences (SPSS) was used to code and input the data for analysis. The data analysis techniques used were frequency, percentages, mean, median and standard deviation, composite mean, and composite standard deviation for descriptive statistics, as well as Pearson correlation analysis and simple linear regression analysis for inferential statistics. The four independent variables were found to have a strong and positive correlation with the dependent variable (performance of students housing construction projects in Kenya). Therefore, it was concluded that the use of Project Management Information Systems helps in improving performance of students housing construction projects. Hence, the study recommends use of right PMIS tools to lead/govern students housing construction projects in Kenya in order to have better performance. Future studies could evaluate other important factors that influence performance of students housing construction projects in Kenya as well as students housing projects overall performance framework and modeling system.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

There has been a fascinating transformation in the construction industry since the turn of the century. Increasingly particularly, the development projects for student housing are becoming more in demand as the number of students enrolled in higher institutions continues to rise. There are several challenges which face the students housing construction industry endangering its downfall. Ideally, it is the role of the project managers to ensure that the sites are running smoothly with the project plans running as planned to ensure success. Sometimes, this is a very difficult ask. According to a study by Akintoye & Fitzgerald (2012), 98% of students housing construction projects in the UK go beyond their set budget plan and 77% of them delay in completion. So, these delays and budget issues affects the overall performance of these projects, requiring project managers to prepare beforehand with some proactive strategies to curb them. Often, most project managers ensure that they work to eliminate long term issues but they however, leave short term issues hanging, giving a challenge in project development (Adisa & Fapohunda, 2019). Whether it's subcontractors who become dysfunctional with time, there is a need to ensure that there is strategic planning and training when necessary to ensure that the project hits its set goals and objectives. After all, it is the project's success in line with its time line which counts (Akintoye & Fitzgerald, 2012).

Regionally, according to Fugar & Agyakwah (2010) who conducted a study on delays in building construction projects in Ghana describes construction as a very much a reputation-based industry in the region. They describe that most construction firms prefer working with familiar organizations. Although this can be a great idea for team members because it will propel good relationships and communication channels in students housing construction projects or improve the projects' performance, there is a need to identify the skill gaps which will impact the projects positively. After identifying the above gaps, it is easier to manage through each efficiently so as to ensure the project's success.

Communication as earlier described is one of the major challenges affecting student's housing projects performance in the region due to inadequate infrastructure and developed project

management information systems. According to Haughey (2010), communication is vital in ensuring a project's success, especially in an environment of delegating tasks. Poor communication leads to assumptions to be made in project implementations and this may lead to errors which may be difficult to rectify later. The project managers need to ensure that there is a good communication channel among all team members. Good communication ensures that each member plays accordingly to the set role and this improves project success and implementation. Good communication also ensures that each team member feels part of the process by communicating vital information.

In Kenya, projects have repeatedly been a victim of unrealistic expectations or bad forecasting (Lusuli & Rotich, 2014). In project management, some clients may request the project managers to deliver the project as per the set timeline or within an accelerated period especially when on a budget and this may affect the budgetary plan. Some issues are common in project management but some are however, difficult to handle. A project set without goals is likely to fail or crumble in between because the workers may exhaust the resources before completion. Poor forecasting can lead to detrimental impacts as well as short term challenges. For the project to have better performance one needs to break those forecasts down into smaller segments based on either weekly or monthly sections (Lusuli & Rotich, 2014). It is also necessary to communicate any change made to the project manager and ensure that you work in line with the goals to ensure achievable results.

Additionally, most of the construction projects in Kenya, suffer from cash flow delay. The construction industry mostly deals with invoice payments and this can sometimes be challenging especially when it comes to outdated versions. In case of delayed payment, there is a likelihood of a negative cash flow; which can lead to change of financing options, leading to delay. Therefore, there is a need for new and improved invoicing systems to eliminate the payment challenge which may lead to delay in performance (Lusuli & Rotich, 2014).

1.1.1 Performance of Student Housing Construction Projects

In Kenya, higher learning institutions were traditionally seen to be responsible for providing student housing or residence halls. However, due to public sector budget limits, particularly in regard to university finance, and a lack of land availability for both public and private universities,

the tertiary institutions must look to the private sector to fill the gap. To solve the dormitory shortage, a few of higher learning institutions such as University of Nairobi, Moi University, Kenyatta University, South Eastern Kenya University, and the University of Embu, established PPP (public-private partnerships) to bridge this deficit in their respective colleges (Moses, 2019). Despite the fact that these agreements were signed as early as 2014, none has been successful so far, owing to the problems and challenges public-private partnerships (PPPs) face in Kenya. Furthermore, with a design, build, own, operate, and transfer model, PPP hostel projects have a longer time frame, with developers recouping their investment after 20 years, whereas investors like to exit projects within 3-5 years (Moses, 2019). This exhibits the need for improved performance of students housing construction projects.

Students' accommodation is one of the most important aspects to a student life in the University or College. Students spend most of their time in campus hostels after various lectures they have to attend. To most parents, student accommodation is a serious challenge as it dictates the kind of environment their children grow up, as they pursue their education (Oluoch & Musuya, 2019). The current situation paints a grim state of student accommodation in Kenya, since it is not adequate nor up to standards. As a result, some parents opt to move closer to school so that their children can commute from home to campus while others take their children to accommodations provided by religious organizations or private residences, most of which are not customized for students' life and residency (Chavez & Sosa, 2021). Accommodation is not guaranteed to students due to the ever-increasing number of students being admitted to training colleges and universities. Most students are forced to look for accommodation away from the learning institutions, except for the few early birds (Opiyo, 2019). It is in this regard, that companies like Acorn Management Services Limited have flourished taking advantage of the student housing deficit, constructing unrivaled purpose-built student accommodation units while employing its performance-oriented project management systems during the construction process. Since AHL launched its business in 2017, it has shown significant growth with increased students and blocks of up to about 750b students per unit, accommodating over 5,000 students. The above project has spread across Nairobi and it plans to expand across East Africa (Opiyo, 2019).

Students housing is continually becoming an appealing investment class in its own right on a global scale. According to Knight Frank's Global Student Property Report (2019), the market in the US has risen from a portfolio of USD 2.5 billion in 2007 to USD 17.2 billion in 2018, a CAGR of 19.2 percent over 11 years. In the US and the UK, student housing depicted average rental yields of 4.6 percent and 6.0 percent, respectively, according to Savills, a UK-based real estate services firm, compared to their respective bonds on a 10-year basis floated by their governments of 1.0 percent and 2.49 percent, correspondingly. As a result, high-net-worth stakeholders looking for big returns on their investments continue to flock to the sector (Lederer et. al., 2021).

Student housing also acts as a buffer against economic downturns, since it has proven to withstand both economic downturns and normal real estate cycles. This is because, despite the current economic climate, student enrollment rises year after year, and also appears to rise during tough economic seasons when people seek to exercise their skills, thus house seeking. This is backed up by the growing middle class, which, according to the World Economic Forum, sees 140 million households in the middle-income category each year and another 20 million enter the high-income level (Globally, 2011). As a result, their spending on necessities like food and housing has increased by 225.0 percent on average, while spending on services like healthcare and education has increased by 350.0 percent. As more people pursue quality higher education, the expansion in disposable incomes leads to increased student mobility, which expands the market for student accommodation sector. As a result, to be successful in student housing construction projects, companies need to employ effective project management information systems to monitor and control the quality of the project output for higher return on investment (ROI) (Lederer et. al., 2021).

1.1.2 Project Management Information Systems

Among the most crucial support systems in the business world currently is the Project Management Information Systems (PMIS), which ensures that firms currently remain relevant even within the improved market plans in supply and demand. PMIS is a single computerized software which enables project management easier to manage and run with limited errors (Raymond and Bergeron, 2008). PMIS is used to establish methods, equipment, and other resources for gathering, evaluating, storing, and reporting data. PMIS ensures that it delivers data from all team members

and this improves project performance and collaboration; and it is also cost effective (Raymond and Bergeron, 2008).

PMIS also ensures that it filters data and it gives a clear report based on each process, avoiding delay and transparency issues. The system also improves performance by ensuring transparency due to its report form management hence improving project management practices. According to Caldwell (2010), PMIS allows project managers to measure and monitor project financial flow and schedule performance targets. PMIS ensures a project completion and closure are done within the limits of stated budgets, forecasts, and timetables when project managers are monitoring and overseeing a project. Project performance on the other hand, is measured through the effort, cost, profitability and earned value in relation to the capital cost and targets of a project, which requires frequent interim evaluations hence making PMIS a mandatory tool to measure progressive performance of a project (Bonner, 2013).

The functional structure of the PMIS system may be determined from its components, which primarily comprise of indicator tracking systems (ITS), disbursement planning and tracking systems (DPTS), procurement activity tracking systems (PATS) and project schedule tracking system (PSTS), as described by Lee & Yu (2011). These components form the main basis of study to understand how these components influence the performance of students housing construction projects in Kenya.

1.1.3 Students Housing Construction Projects in Kenya

Kenya is among the developing countries category and it has a population of roughly 40 million people, a GDP of US\$40.77 billion, and a GDP growth rate of 5.5 percent. Up until the early 2000s, Kenya's economy was primarily agricultural, with agriculture accounting for more than half of the country's GDP and employing more than 80% of the working population. Despite the fact that agriculture employs 75 percent of the country's workforce, its contribution to GDP is just 16.3 percent, which is lower than the contributions of construction industry and related services, which are respectively 18.8 percent and 65 percent (Republic of Kenya, 2007).

Buildings such as office space, houses, industries, retail space, and many more; roads, railroads, irrigation schemes, water supply schemes, and other infrastructural support services are provided

by the construction industry to the Kenyan economy. Kenya's annual growth rate being 14.2% from 2006 to 2011, Kenya's building and construction industry is among the top growing globally. Kenya's economic growth, as measured by real GDP, averaged only 4.3 percent over the same period, declining to 4.38 percent in 2011 from 6.33 percent in 2006. Extremely challenging macro conditions across the globe such as the effects of the rising oil prices that were recorded at the onset of the financial crisis in August 2007, combined with the post-election violence that was witnessed in 2008 in the height of the high inflation that was also recorded at the same time, Kenya's inflation averaged 9.0 percent, which contributed to the nation's restrained economic growth during the same period (Mose, 2021).

Kenya's construction industry produces 7% of the country's gross domestic product (GDP), according to the Kenya National Bureau of Statistics (KNBS). The Kenyan construction industry, like that of other developing countries, faces many of the same difficulties and challenges that some of the other developing nations face, albeit with more strictness. Given the essential role that the construction industry plays in the nation as well as other developing nations, as well as the industry's poor input in those nations, increasing the industry's input should be a top priority. Construction project managers and contractors comprise some of the most important stakeholders in the business and the creators of the end product, thus any industry development and improvement initiatives must take into account measures to improve their capacity and capability (Mose, 2021).

1.2 Statement of the Problem

In the last several decades, Kenya has undertaken large project development projects. These programs have demanded for contributions from both private donors and the Kenyan government; yet, the outcomes have been disappointing (Onyango & Olima, 2015). According to the results of a study done by La Roche & Copeland (2010), forty percent of the residential housing projects ran into issues with their budgets or their schedules, which may result in severe delays. According to the research conducted by Shehu et al., (2014), just thirty percent of the housing developments in Malaysia were successful. In Nigeria, 7 out of 10 projects showed poor execution whereas only 6 out of 10 projects were counted to be on time and cost (Owolabi, 2015). The above data reveals that project management, performance and contractual issues have been the major challenges in

project development. The above challenges have pointed out to room to further study on housing project development. Luvuga & Ngari (2019) focused on determinants of successful completion of housing projects at National Housing Corporation (NHC) in Kenya. This study was required to fill up the information gaps created by these studies, which were conducted in domains other than the student housing construction sector.

The most crucial measure of whether project funds and execution steps were used and followed appropriately to meet project goals and objectives is through measuring and monitoring project performance tools against its set targets. Many projects, however, fail to attain and realize the anticipated targets set by a conceptualized project or program. As a result, some projects experience delays and cost overruns due to unresolved challenges and facing unforeseen circumstances. Project failures have been recorded more frequently than project successes around the world. According to the Standish Group report 2009 by Cerpa et al., (2009), in the United States, just 32% of project initiatives succeed, 44% are challenged, and 24% fail. Stewart (2003) went on to say that averagely just 25% of programs end up generally successful.

Furthermore, project failure is particularly a concerning and developing issue in developing countries due to the attributed poor support infrastructure and poor project planning strategies (Haughey, 2010). Every business project comes with the assumption that performance will be tracked and evaluated in order to assess return on investment and determine if objectives were met. The intended effect of the project, its financial objectives, anticipated durations, resource input, output quality, and return on investment are some of the primary methods to assess project success and the key performance indicators (KPIs) that really count. Previous research has revealed that projects managed by well-planned and automated information systems contribute to about 68% success rate, as opposed to projects managed manually without support of automated information systems, which have a 45 percent success rate, according to Baljkas (2000). PMIS integration in project management has practically become a requirement for every firm in the modern world. According to the several studies conducted on PMIS, its adoption by numerous emerging but successful organizations illustrates the strategic importance of PMIS and the overall optimism about its ability to give companies a competitive advantage when conducting its business. That's

why project management information systems (PMIS), are so crucial for successful project execution now and in the future.

As a result, it is envisaged that without resolving the developing signs on forecasted challenges and issues in the management of projects, this can greatly reduce the performance of students housing construction projects such as delays, poor resource planning, cost overruns among other issues. There has been very little research on the application of PMIS in the construction industry, particularly in student housing construction projects. This study intends to close the gap by examining the influence of PMIS on performance of student housing construction projects in Kenya, with particular focus on Qwetu Student Housing done by Acorn Holdings Africa Limited as a case study.

1.3 The Purpose of the Study

The purpose of this research was to examine how project management information systems influence the performance of students housing construction projects in Kenya: The case of Qwetu students housing construction projects.

1.4 Objectives of the Study

This study was guided by the following research objectives:

- i) To establish how indicator tracking systems influence performance of students housing construction projects in Kenya.
- ii) To determine how disbursement planning and tracking systems influence performance of students housing construction projects in Kenya.
- iii) To assess how procurement activity tracking systems influence performance of students housing construction projects in Kenya.
- iv) To examine how project schedule tracking system influence performance of students housing construction projects in Kenya.

1.5 Research Questions

The following questions served as the foundation for this investigation;

- i) How does indicator tracking systems influence performance of students housing construction projects in Kenya?
- ii) How does disbursement planning and tracking systems influence performance of students housing construction projects in Kenya?
- iii) How procurement activity tracking systems influence performance of students housing construction projects in Kenya?
- iv) How does project schedule tracking system influence performance of students housing construction projects in Kenya?

1.6 Research Hypotheses

These hypotheses guided the research:

1. H₀₁: There is no significant relationship between indicator tracking systems and performance of students housing construction projects in Kenya.
2. H₀₂: There is no significant relationship between disbursement and tracking systems and performance of students housing construction projects in Kenya
3. H₀₃: There is no significant relationship between procurement activity tracking systems and performance of students housing construction projects in Kenya
4. H₀₄: There is no significant relationship between project schedule tracking systems and performance of students housing construction projects in Kenya

1.7 Significance of the Study

The study hopes to be considered beneficial to local and global policy makers particularly the stakeholders and developers in the construction industry. Policy formulators in the government both at international and local level may benefit from this study by being able to point out critical areas in project management that require more focused attention to help improve the students housing construction projects performance. Valuable information on the extent to which Project Management Information Systems influences projects' performance across various platforms can be taken into consideration by various projects during the policy formulation process. The policy makers can use the recommendations of this study in coming up with an effective project

management models. Particularly, the research may be significant to construction projects stakeholders since they may be able to appreciate and consider the impact of adopting and implementing Project Management Information System during the policy formulation process.

This study could also be utilized as a model framework for other construction businesses interested in conducting research on the influence of project management information systems on performance of construction projects. In every field, all businesses aim to keep one step ahead of their competitors. If implementing a project management information system is one approach to ensure this, it may be a desirable element for integration by students housing construction firms to go the extra mile while attempting to achieve their desired objectives.

The study's results may serve as a starting point for further research and scholarly investigation in the future. Academicians may gain because the research findings validate the existing theoretical framework on project management or perhaps generating new theories on the subject. This benefit may be especially helpful in identifying gaps that need to be addressed in subsequent research on students housing construction projects.

1.8 Delimitation of the study

The research confined its study to the influence of project management information systems on performance of student housing construction projects in Nairobi, Kenya. It specifically focusses on Qwetu student housing projects due to its high level of construction activity in the student housing sector. Project management information systems can be described by the nature of communication, monitoring and reporting channels used to manage the sub units of a project, and the study examines its subsequent influence on the performance of students housing construction projects. The researcher administered questionnaires to construction project team members who had knowledge on construction activities drawn from various departments regardless of their age and gender. The population comprised of about 82 respondents from Qwetu students housing construction projects. In order for the researcher to collect quantitative as well as qualitative data from the respondents, the researcher provides each respondent a questionnaire as well as a key informant guide. However, although having a more restricted geographic reach, the results are still reliable and valid despite this limitation. They are generalizable to building projects including student housing in other sections of the region.

1.9 Limitations of the Study

The study faced a number of hurdles, including fear of victimization, which would have hampered research efforts. Some respondents were hesitant to disclose factual information to the researcher for fear that the knowledge may be used against them. Acorn Holdings Africa Limited, like any other organization, has a confidentiality policy that may have prevented responders from answering some of the questions because it would be considered a violation of the organization's privacy policy to reveal private information. The researcher took this into account by extending a letter of introduction from the University and NACOSTI, as well as assuring participants that their responses would be kept secret and used only in research.

The researcher anticipated challenges in persuading respondents to take part in the study by either filling out or submitting questionnaires on time. In addition to making the questionnaires straightforward and easy to comprehend, the researcher stressed the significance of the study to the respondents and pleaded with them to provide completed data. The researcher made an effort to submit the tool on time and do frequent follow-ups.

The study also experienced a scarcity of relevant literature related to the Kenyan scenario in the thematic field of interest. While this study was done in Kenya, the researcher reviewed any applicable literature since the phenomena of the association between project management information systems and students housing project performance is global.

1.10 Assumptions of the Study

Assumptions for this study include that participants shall be easily accessible, shall be ready to answer the research questionnaires, and that they shall fully participate and cooperate in providing accurate data. It also assumes that sufficient information shall be gathered, and that Acorn Holdings Africa Limited management and personnel would be present to answer all the questions. It will also be assumed that the management of Acorn Holdings Africa Limited shall provide the researcher with the relevant information and documentation. The study shall also base on a presumption that all the participants shall comprehend the contents and complete the surveys as instructed by the researcher.

1.11 Definitions of Significant Terms Used in the Study

Construction Project: This is a business enterprise that involves the construction, repair, or demolition of buildings and/ or supporting engineering infrastructure.

Project Management Information System: It describes the logical organization of vital information in the execution of project management processes. Incorporates both human resources and automated software applications in collecting and using critical project information in all phases of the project, from project inception through project closing.

Performance of students housing construction projects: These are the rewarding accomplishments of students housing construction projects, mainly due to the project's successful completion with regards to set expectations and targets.

1.12 Organization of the Study

There are five chapters in this research. The background of the study, the problem statement, the purpose of the study, the objectives of the study, the research questions, the research hypotheses, the significance of the study, delimitation of the study, limitations of the study, assumptions of the study, definitions of significant terms and organization of study are all covered in chapter one.

Chapter two covers literature review of project management information systems, performance of students housing construction projects, an empirical review section to establish the relationship between the study's variables from previous studies; the theoretical framework, conceptual framework, a summary and knowledge gaps section that shows what other studies did not address.

Chapter three covers the research design, target population, sample size and sampling procedure, research instruments, data collection procedure, data analysis techniques, ethical considerations and operationalization of the variables.

Chapter four covers data analysis, presentation of findings and interpretation. Finally, in the fifth chapter, a summary of the findings, discussions, conclusions and recommendations are presented.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of relevant literature from past studies by accredited scholars and researchers. This shall include reviewing studies on project management information systems, performance of students housing construction projects, as well as empirical review of literature to establish the relationship between the study's variables. Finally, this chapter reviews the theoretical framework to understand supporting theories, conceptual framework of the studies, a summary of literature and knowledge gaps that shows what other studies did not address.

2.2 Project Management Information System

It has been previously addressed in the project management literature what exactly constitutes a project. Cleland (2004) identifies projects as a collection of institutional resources analyzed to establish research or a topic that was not in existence before and that will ensure a performance possibility in the structural design and implementation of institutional approaches. Project management information system (PMIS), on the other hand, is defined by Bonner & Gundlach (2013) as a framework or effort that measures a project's success rate and offers critical information for monitoring and directing the project. Others see them as methods or techniques used by project managers to produce specific project management deliverables (Milosevic, 2003). Thus, project management software is frequently at the core of a PMIS, and it calls for significant configuration, adjustment, or customization prior to use.

The Project Management Information System's task is identified as being subordinate towards achieving the goals and strategies of the project, it provides project managers with critical information on a project's fee, time factor, performance metrics, and interrelationships between these factors. According to data, 75 percent of large construction projects run under the assistance of a project management information system achieve success, while 75 percent of the projects handled without such assistance do not (Light et al., 2005). However, there are still only a few studies on the use of PMIS, which focus on the demographics of project performance systems and

evaluating specific tasks of the identified performance tools to ensure specific functions in the event of the project management life cycle, for instance, communicating, planning, and reporting, risk management, estimation, and scheduling (Love and Irani 2003).

Information systems are now being built with the use of information technology to help individuals do their activities more efficiently and effectively. The PMIS is usually regarded as a critical component of project management. These PMI systems have advanced from simple scheduling and planning to sophisticated systems which can quickly generate data needed in decision making to improve efficiency in project implementation. The extremely variable nature of their application context, which primarily differentiates Project Management Information Systems from other information systems, and hence, they must maintain greater adaptability in their capabilities than some of the other business information systems (Ali et al., 2008).

PMIS has a number of key components that play a role in performance of a project further described as follows. One of PMIS key components is Indicator Tracking Systems (ITS) which is used to combine all performance indicators and stores them in a database. Then they are coded in outcomes such as completed successfully, due, in progress, minor problems detected, and not anticipated. With this kind of information, the project manager can record the status of each indicator as the process continues and the actions are taken, which helps in providing a report that is well updated. This is used to assist project managers follow a step-by-step approach with a systematic plan of indicators that shall be used in tracking the project's success. The project managers are then expected to feed the expected project success indicators on the ITS and monitoring starts. The system automatically changes the indicators and alerts when a particular step slips. Different projects have different success indicators, and the ITS when customized can apply different approaches to each. ITS provides information for project activities for the entire project life cycle hence acts as a reminder of the activities for the next step

The other key component to PMIS is Procurement Activity Tracking Systems (PATS) which is used to assist procurement officials follow a step-by-step approach with a systematic plan or tracking in some projects. People who get to successfully bid and get awarded project tenders have to provide when the goods and services are available. The procurement team then feeds the expected dates on the PATS, and monitoring starts. The system automatically changes the dates

when a particular step slips. Different projects have different procurement steps, and the PATS can apply different approaches to each. PATS provides information for procurement activities for the entire project life cycle hence acts as a reminder of the activities for the next step.

Disbursement Planning and Tracking Systems (DPTS) is also another PMIS component, designed to provide a planned schedule of goods and services payments for a project. Actual payment dates are fed to the system against the payment schedule. After data is fed, the system automatically processes the data and provides reports according to the desired format. Procurement Activity Tracking Systems (PATs), also another component of PMIS, assists in tracking the numerous procurement activities that occur when a project is being implemented, such as contacting suppliers to provide price quotations. The PATs tracks this activity and provides reports. This system is required for projects where procurement data is extensive. The system keeps track of procurement orders and deliveries made, which help pay the suppliers on time. Finally, PMIS also uses Project Schedule Tracking Systems (PSTS) which are fed with the project plans and dates for completing these plans. The systems then can monitor if the programs have been completed within the required period.

2.3 Performance of Students Housing Construction Projects.

Students' residence halls are no longer merely places to sleep; they are integral elements woven into the campus fabric and one of the most effective college and university recruiting tools. Whether it's a modern off-campus apartment or classic on-campus dormitory, firms need to understand what it takes to deliver facilities that are both profitable and make students feel right at home. Construction in this student housing market is now a vital part of the industry. Every inch of a residence hall must be thoughtfully designed and constructed to minimize wasted space and provide for maximum functionality, maintainability, sustainability and security. The Government of Kenya is committed to upskilling the country's workforce, driving an increased number of enrolments at Kenya's public universities and colleges. However, with the students' number increasing, universities have experienced the demand for on-campus accommodation. With a rough estimate of 23% of students securing accommodation through their respective learning centers, there has been a rise in the use of off-campus accommodation hostels which have high prevalence of insecurity, poor sanitation and overcrowding. The Government of Kenya has

identified the need for private sector investment into safe, affordable student housing to ensure that students are able to achieve the best educational outcomes (Lusuli & Rotich, 2014).

Studies have been done to pinpoint some of the elements that affect how well housing projects for students are completed on both a local and global scale. Descriptive research design was used for the majority of the studies. The investigations were best served by the descriptive study approach since it accurately explains the circumstances behind the successful completion of the student housing projects. The majority of the study's target population consisted of the project management team members at the construction businesses, with an observation unit of between 100 and 150 staff members. Both primary and secondary data were employed in the research investigations. To gather crucial data on the independent study variables, namely planning, monitoring, and evaluation, shareholder engagement, and resource accessibility, a five-point Likert scale poll was employed. Primary data was collected via giving questionnaires to participants in the study. Due to their capacity to collect data from a broad population, questionnaires were used. Using multivariate linear regression, the independent and dependent variables were influenced.

A research on automated project performance control for construction projects was carried out by Navon in 2005, and it found a substantial and favorable association between the independent factors and dependent variables. The success of the student housing projects was significantly and favorably influenced by the project planning ($\beta = 0.079$ and $p = 0.03$). The completion of student housing projects was positively and significantly ($\beta = 0.122$ and $p = 0.02$) influenced by monitoring and assessment. Additionally, it was shown that the completion of student housing projects was positively and significantly ($\beta = 0.164$ and $p = 0.045$) influenced by stakeholder participation. Furthermore, the research found that the completion of student housing projects was positively and significantly ($\beta = 0.09$ and $p = 0.038$) influenced by resource availability. According to the research, in order for the student housing projects to be completed successfully and provide a distinctive contribution to theory, practice, and policy in the construction sector, businesses must include their stakeholders in all project endeavors. The research suggests that in order to prevent project failure, project managers (PMs) should provide more information about their planning.

As deduced from various literature review sources, the study also recommends an evaluation based on the previous occupancies to evaluate major technical and functional performance factors on a

type of student housing facilities be conducted. Analyzing past maintenance work calls for the need to identify past complaints and discomforts based on the occupants' reports. One needs to establish user satisfaction through giving a platform or an indicative feedback plan to allow the students to share their experience concerning performance elements. The survey's findings can be analyzed and established to depict the level of satisfaction in line the identified performance elements and the degree to which the success factors were realized. A post-occupancy evaluation provides the necessary feedback to the planners and design professionals to facilitate better planning management. Post -occupancy evaluation also assist in continuous improvement in the long run to facilitate improved design and construction management.

2.4 Empirical Literature Review

2.4.1 Indicator Tracking System and Performance of Students Housing Construction Projects

Project success is the heart of any project. Project performance is the result of how things turn out during project execution (Kerzner, 2017). Measuring the performance of a project is crucial because it tells if the institution will achieve the set goals or not. In many cases, business entities initiate projects with high hopes of the project's success only to encounter a total failure of the projects. Many projects fail because of poor planning and poor ways of execution. In return, the business entities record significant losses in time, capital, and resources. Project performance places a vital role in the success of projects and the overall performance of an institution. For companies to evade losses, proper project performance management is necessary. Project performance management can be defined as inventing, implementing, and managing projects, which contribute to the company's performance and strategy. Companies need to develop project performance management tools like the indicator tracking system (ITS) to compete in the utterly complex globalized environments.

However, there is a need to note that the performance metrics vary based on the definition, content and purpose. The above explanation therefore gives the challenge to identify various methodologies in selecting the key performance indicators (KPIs), which match a competitive environment and strategy. A study done by Kabirifar & Mojtahedi (2019), on identification and

categorization through KPIs through qualitative approach, gives the relationship between systematic performance indicators, project management and project success. There is a need to analyze student housing information to facilitate innovation project-based organization. There is a need to note the business performance rate to address the above issue; it is vital to note the scope, size and identify the resources to control the progress performance. To establish organizational objectives and manage improvements via efficient and effective monitoring, measuring methods must be put in place. KPIs provide an unbiased assessment of a variety of business activities that support success and are crucial for planning and predicting the future of the company.

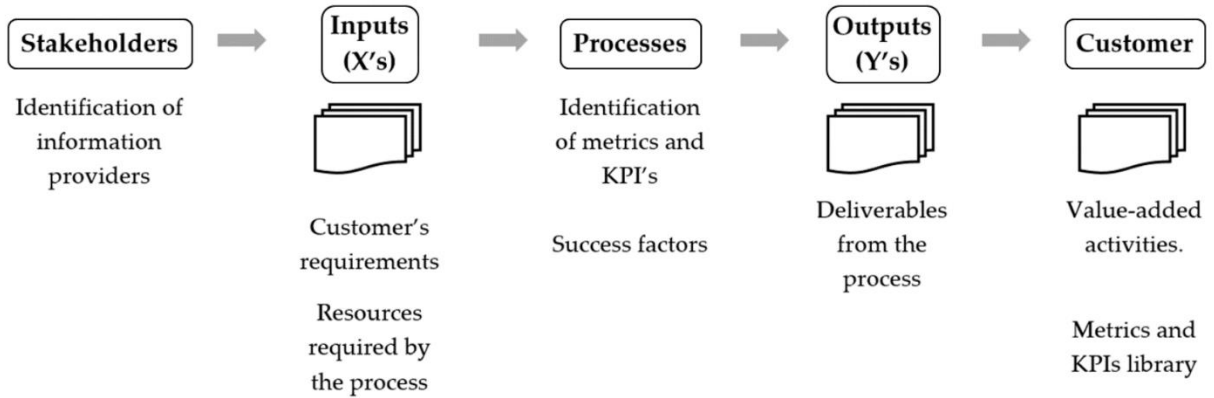
According to one study by Taniguchi & Onosato (2018), a qualitative approach, was adopted, to analyze and compare project research success and the use of key performance metrics. A KPI model was proposed to guide in identifying the performance indicators during project evaluation. This model's development followed and modified the cycle-based Six Sigma method known as DMAIC (define-measure-analyze-improve-control). A case study in a project-based organization focused on student housing eventually used to verify the approach. KPIs validation recommended validation and adequacy since the study's focus is on indicators and categorization.

The link between project success, lean, and performance metrics in a project-based setting was also the main topic of Kabirifar & Mojtahedi's (2019) study. The use of identifying performance indicators, tools and concepts for KIPs, success criteria, and businesses that utilize KPIs were all covered in the scope section. The last topic of choice was the case study's context. Additionally, the study required utilizing several documents for additional research.

ITS is a component of the project management indicator systems, and it is essential to the project's performance. The systems keep track of project performance measures like return on investment, productivity, project cycle time, cost performance, customer satisfaction, schedule performance, and cost of quality. The system combines all performance measures and stores them in a database. Then they are coded in outcomes like completed successfully, due, in progress, minor problems detected, and unexpected. With this kind of information, the project manager can record the status of each indicator as the process continues and the actions are taken, which helps in providing a report that is well updated. The ITS helps keep track of all aspects of the project activities like

materials used and enables managers to communicate with contractors to ensure they work best per the set budget.

Figure 2.1 SIPOC Process



2.4.2 Disbursement Planning and Tracking and Performance of Students Housing Construction Projects

It is impossible to understate the significance of businesses' resource allocation. According to Oyeyipo et al. (2016), building projects are not autonomous entities capable of acting independently. Permanent relationships between construction projects and other outside parties are common, and asset transfer links might occur. The team may be required to modify its strategy to fit the present project due to a lack of resources and other unpredictable considerations. According to the resource dependency idea, organizations are dependent on the resources present in their surrounding contexts. However, attracting resources necessitates cost management and resource planning, which requires good judgment (Samson et al., 2002).

The management of resources is essential for ensuring that a project is completed on time and as per the estimated budget. Disbursement simply denotes the money that is paid out in business processes. Disbursement planning and tracking involve all the activities that manage the payments and the method of disbursement in a project. The DPTS is designed to provide a planned schedule of goods and services payments for a project. Actual payment dates are fed to the system against the payment schedule. After data is fed, the system automatically processes the data and provides reports according to the desired format. Disbursement management is essential in a project, and that is why all organizations need the DPTS for the proper performance of the task. Disbursement

planning helps plan all the project's cash flow and helps improve and maximize the organization's cash flow by making financial operations easier. Disbursement planning systems help enhance and optimize the operations of a project by minimizing disbursement costs and promoting financial control across the organization.

Luvuga & Ngari (2019), focused on the determinants of successful completion of housing projects at National Housing Corporation in Kenya. Mortgage finance, savings, venture capital, and equity financing were the independent factors. A descriptive survey approach was appropriate for the research since it presents the situation based on people's beliefs, actions, and expectations for the future. Using the real estate firms in Nairobi as the population, the results showed that mortgage financing was highly preferred and venture capital least preferred. The results depicted a positive correlation between project financing and real estate development. The above finding depicted a gradual increase in mortgage financing in the years 2008 to 2011.

Construction firms therefore have to create an equilibrium of value and ownership. The above process is achieved through joint ventures, integrating horizontal competitors and retaining multiple resource supply (Powell & Dent-Micallef, 1997). When a construction business is unable to guarantee the continued availability of essential resources for a project, it cannot prosper. In order to accomplish the aforementioned, a construction business must first address its underlying interest. Link mediators are necessary for the relationship between methodology and implementation. They focused more on the company's growth and used process as a method to achieve dominating execution. A firm's innovation strategy and performance are affected by its environment (Mohammed & Yahya, 2010).

Construction projects tend to be large projects that need a lot of funds to run, and it can be complicated to manage and plan the funds; this is why the DPTS is required. Using a system to disburse and prepare for funds, the risk of mismanagement of funds decreases, and the vendors, contractors, and suppliers can expect to be paid on time as expected. The institutions or individuals owning the project have faith in the implemented project since there is proper management of funds which is one of the reasons why most projects fail. Lack of a suitable system to plan for funds will lead to mishandling of funds, which slows the process of project implementation, and the whole project's performance drops.

2.4.3 Procurement Activity Tracking System and Performance of Students Housing Construction Projects

Before the advancement in technology, people used to manage purchasing and procurement departments manually, meaning everything was done manually without the help of computer software. Human beings are prone to errors, which is why there was a need to introduce new technologies to help in these departments. Procurement is vital in a project, and slight mistakes in this sector can affect the entire project. The PATS is computer software mainly used by the procurement department to help track all the activities involved in procurement. Procurement is a measure of the performance of a project, and officials in this department need to practice transparency and efficiency for the project to propel as planned. Many procurement activities occur when a project is being implemented, such as contacting suppliers to provide price quotations. The PATS tracks this activity and provides reports. This system is required for projects where procurement data is significant. The system keeps track of procurement orders and deliveries made, which help pay the suppliers on time.

Various empirical studies have revealed the effects of procurement activities and tracking in several instances. Salome (2018) did research on the various issues relating to contract management practices in the construction industry. The scholars identified some of the reasons as chance sharing, securing admission, and obtaining value discounts. The use of direct exertions was noted as unprofitable because of high levels of uncertainty, workload fluctuations, and improved administrative costs. Results display that 53% of the respondents were contented with their current procurement experiences, while 47% of them wanted some adjustments. Research has revealed that the procurement framework should set standards for the construction contractors to ensure success.

Barngetuny & Kimutai, (2015) noted that workers took note of the cautions stated in awarded contracts during procurement than of different threats. Construction projects focus on the performance of each contractor, the level of participation of each task and the performance in general. Cerpa & Verner (2019) discovered that most project tasks delayed because of the contractor's performance and this needs to be highlighted before the beginning of each project. Additionally, Smart (2010) did a procurement activities study and revealed that each team member,

including the contractors and the clients should make a price consideration before commencing to avoid delay. Contractors should have the appropriate budget set, material and agenda in control as well as the system such as the PATS to ensure steady development of the project.

Matunga & Okibo (2013) research aimed at analyzing effect of e-procurement practices on effective procurement in public hospitals. The study highlighted that contract management, finance, organizational structure, and labour influenced project delays. They highlighted that some of the challenges experienced by contractors were due to inaccurate time estimates, lack of proper communication between the clients, lack of considering past reports and consultation from the legal authorities. Lewis-Faupel et al., (2014) on how electronic procurement can improve infrastructure provision concluded that poor financial plan may cripple the project leading to failure. However, good procurement activity planning and budgeting were advisable to reach project goals and success. The totality of the procurement activities as a situation in the Kenyan housing constructing industry is however unclear due to impending studies and that will be the focus of the study.

There are fundamental reasons why organizations like the construction industry should have procurement software. One of the reasons is that there are reduced errors. Using computers to help track procurement activities will lead to quality data processing, hence fewer errors and project delays, unlike depending on human processed works. Another advantage is that there is cost-effectiveness in the entire project. The PATS tracks activities like negotiating prices with suppliers and records any discounts, hence saving the organization money in a well-budgeting procuring system, boosting efficiency. PATS as a system also helps promote transparency in a construction company, therefore, increasing the overall performance of the entity. An entity that has openness as one of its core values, helps improve its performance and achievement of its goals.

2.4.4 Project Schedule Tracking System and Performance of Students Housing Construction Projects

Project scheduling which involves the use of plans such as the Gantt charts to report the project progress (Kerzner, 2013). It is vital to define the scope to determine the appropriate methods for project management. Project scheduling helps in creating and keeping the project plan in place while taking consideration of any impending issues of concern such as time and cost. Project

scheduling additionally validates the achievements, planning and the project build up including the methodology that would convey the project objectives. Elements such as time cost and quality are achieved through setting the project scheduling system (Drouin & Besner, 2012).

Arranging project activities calls for planning the standards and operational ideas with key members. The individual standards characterize what the project entails and what it involves, it also demonstrates its significance and its quality based on specialized issues. Also, it underscores the significance of vertical correspondence and enables management in line with the set goals and objectives while ensuring resource management and staffing (Kerzner, 2017). Program scheduling manages authoritative framework plans and structure through reasonable Work Breakdown Schedule (WBS). Work Breakdown Schedule ensures that each party and team member works accordingly to their set tasks and improves resource management and planning (Drouin & Besner, 2012).

Project schedule tracking systems ensure control, booking and organization of data for planned tasks with clear timelines. According to Kartikeyan et al., (2021), the main advantage of methodical scheduling is conducting a complex exercise of breaking down large tasks into smaller groupings, giving an opportunity in decision making, revealing the challenges of various frameworks and giving the project structure. Lester (2014) identified factors impact project management planning and implementation and among the factors included determining the contract duration, financing, supervision and evaluation, and assessing the project delivery method. A descriptive and exploratory or correlative research approach was used in this study. The research used a survey questionnaire. Construction project managers and private developers were included in the study's sample of quantity surveyors and architects, structural and civil engineers, mechanical and electrical engineers. The study's data was gathered via the use of a questionnaire. According to the findings, project timing has a substantial impact on the success or failure of construction projects.

The study proposes a formation of a project schedule tracking system for successful performance of student housing construction projects. This system is fed with the project plans and dates of when these plans should be completed (Park & Park, 2020). The systems then can monitor if the plans have been completed within the required period. A project schedule tracking system acts as

the roadmap of the entire project from the start to its end, which is vital since the project managers can assess the project and detect any possible threats. Having the project schedule tracking systems helps create an efficient plan, thus as well as performance of the task. Scheduling procedures and the project devising strategies will ensure they keep track of the project's activities and tackle them with the planned time and budget. A project with this system has a high chance of being successful in terms of the project's performance due to possession of better scheduling and monitoring tools necessary for achievement of set targets.

2.4.5 Project Management Information System and Performance of Students Housing Construction Projects

Despite facing several obstacles, organizations must maintain the efficacy of their strategic initiatives (Kaiser & Ahlemann, 2010). The modern building market is one of the most complex and varied in existence. Buildings and other civil engineering works are the focus of the construction business, which encompasses the whole process from conception through demolition. Kiruru & Ogola (2020) argue that for developing economies like Kenya's to flourish, the building industry must be a priority. The construction sector drives growth in the economy and helps raise national income. Conversely, the performance of the national economy may be gauged by looking at the degree of activity in the Kenyan student housing building business (Kiruru & Ogola, 2020).

PMIS has been heralded as a technology that helps the student housing construction sector do what it does best: undertake projects to construct new and remodel existing buildings for a wide variety of student clients in low-cost, differentiating, and focus markets. Cost, time, technology, economic resources, and performance have all been linked to the success or failure of student housing building projects, according to research by Kariuki & Nzioki (2018). To be sure, the expansion and success of the construction sector depend on the use of cutting-edge technological solutions, such as PMIS, in building projects. This includes the management of skilled and unskilled labor, consultants, administration, facilities, building materials, machinery, delegation systems, and budgets.

Many people have been killed, injured, or left permanently disabled as a result of the collapse of buildings across the country in recent years. Many people have died, their children have been left without a parent, and investors have lost vast sums of money due to the crash. Nonetheless, most

of the aspects of improving project performance have been bolstered with the use of PMIS, thanks to improved control and monitoring tools.

Onyango & Olima (2015), for instance, conducted research on what influences the success of students housing projects in Kenya, focusing in Nairobi County. This study used a descriptive survey methodology and its primary foci were on project quality, time factor, and performance. Both data collection and analysis relied on quantitative methods. Closed-ended questionnaires were employed as the data collecting instrument, with SPSS serving as the statistical tool of choice for analysis. The study recommended the use of PMIS from planning stages to closure of the project so as to maintain a proper connection and relation among the project stakeholders.

Deduced from these and other studies, PMIS has been widely hailed for its ability to boost the efficiency of building projects. Therefore, PMIS should be used by future stakeholders in the student housing construction projects to boost the efficiency of project teams, simplify the facility project process, quicken the company's turnover, and do away with many of the current project challenges.

2.5 Theoretical framework

A theory, according to Kothari (2004), is a cohesive set of tested statements widely accepted as right that may be utilized as explanation and prediction principles for a class of occurrences. In accordance with this criterion, the study shall mainly employ a hypothesis to explain the arguments presented with additional two to contextualize the study. This study is mainly anchored in the Systems Theory of Management. The systems theory, as further described in this study, enables projects managers to predict the expected benefits and risks. The systems adopted assist in monitoring and foreseeing of challenges in project execution to its set targets. Additionally, the study analyses the contingency theory and theory of constraints as supporting theories to contextualize the research study.

2.5.1 Systems Theory

In the 1940s, the founder, scientist Ludwig von Bertalanffy, proposed the systems theory, which was further expanded by Ross Ashby (1956). Throughout his life, Bertalanffy stressed that factual

systems are closed to their surroundings and interact with them. He also stressed that factual systems can gain new qualities through emergence, which leads to continuous evolution. According to this idea, a business or project is made up of different parts that need to work together for the whole thing to work well. Synergy, dependency, and interrelationships between subsystems are essential. Employees, who are split into departments, workgroups, and business units, are the most important component of a company. Managers should then examine the performance of the business or project by evaluating the patterns and events of various subunits within the organization.

A system refers to an organized whole made up of multiple constituents that interrelate in various ways that are distinctive from how they interact with other components and that last for a specific amount of time (Boulding, 2004). According to another study by Brandell (2010), the systems theory allows researchers to understand the components and changing aspects of project management systems in order to diagnose challenges and build well-adjusted mediation techniques that maintain the balance between people and their surroundings.

The study's assumption was that the behavior of specific complex systems is determined by how the components interact and relate, according to Tao and Tam (2013). This aids in the comprehension of the basic structures of distinct project systems with comparable underlying challenges. Project managers, funding agencies, teams, end-users/consumers, budgets, time, and communication practices are all key variables in projects. How these parts work together is what makes a project special and gives it its own unique dynamics. People who have worked on projects know that the results don't show up right away and that small things can have big effects on people and the project itself. Human problems and poor communication can lead to fights and the slow death of a project. Despite the fact that controlling technological issues in projects is given a lot of weight, the actual causes of project failures are primarily due to human and information management systems (Goldrat, 2007).

In relation to the research study, it is evident that student housing construction projects are generally big projects, however, majority of the laws that apply to all the complex systems also apply to smaller initiatives in its achievements, appraised as the project's performance (Kishore et al., 2011). Project managers face a wide range of nonlinearities, stakeholders, numerous

interdependencies, and feedback loops when dealing with complex systems. Nonlinearities, on the other hand, are typically unforeseen changes in the scope of the project, the loss of key project employees, or the breakdown of project funding arrangements. Interdependencies are the linkages between the project team, stakeholders, clientele, outworkers, and suppliers. The study shall be guided by systems theory in order to understand how different project management systems interact with each other and the ways in which such interactions influence students housing construction projects performance.

2.5.2 Contingency Theory

Situational management is the cornerstone of the management philosophy known as the Contingency Approach. Managers must make possibilities of contingency into account when making project design. According to this hypothesis, which was put forward in the 1960s by Austrian psychologist Fred Fiedler, no one management strategy is suitable for all firms. Fiedler contends that a leader's personality attributes directly affect how well they manage their team. In order to adapt to a changing environment, leaders must be flexible. System theory is the foundation of contingency theory. It came to understand that an organization is a web of interrelated parts. However, the research found that both internal and external environmental influences have an impact on individual sub-unit behavior. Examples of this include connections with other sub-units or external systems (Donaldson, 2001).

The contingency theory main assumption is focused on the organizational structure alterations in terms of resource and/or management approaches, and control mechanisms that enable it to respond to environmental variables. In relation to the research study, an organizational structure is influenced by a variety of factors, including the size of the company, the nature of the business and technology's requirement for customization, environmental uncertainty, and individual variations or organizational preferences. The contingency method not only outlines internal interaction patterns of an organization, it also offers the most appropriate responsive and adaptable organizational design systems and management approaches for specific unforeseeable situations (Donaldson, 2001). This ensures that the students housing construction projects performance is upheld despite the challenges the projects experiences.

2.5.3 Theory of Constraints

Eliyahu M. Goldratt introduced the Theory of Constraints (TOC) in his groundbreaking book, "The Goal" in 1984. TOC provides the foundation for identifying what should be changed, what should be changed to, and how to implement the change in order to continuously enhance the performance of a whole system. To evaluate the performance of a project and its success, this concept has been used to project management processes (Blackstone, 2010).

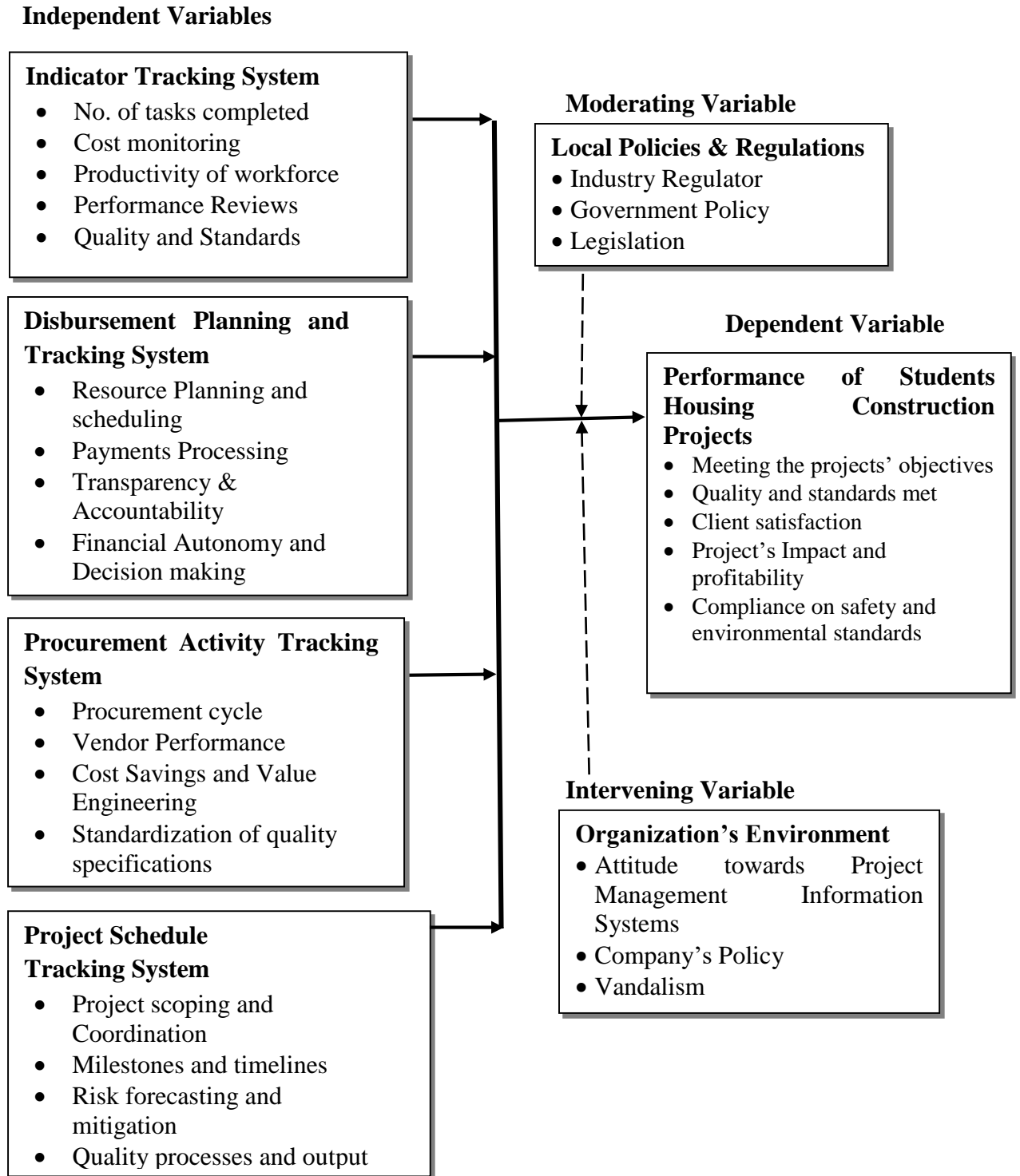
In order to increase performance, this theory assists in identifying the biggest bottlenecks in project implementation processes and systems. The theory of constraints is based on the idea that, like a chain with its weakest link, any complex system typically only has one characteristic at any one moment that prevents it from achieving more of its objectives. If the system is to considerably improve, that restriction must be identified and the system as a whole handled with it in mind. This emphasizes the relevance of project management information systems in relaying pertinent information and automating certain project tasks. This theory is founded on five basic steps: the identification of system constraints; deciding on the ways of exploiting the identified system constraints; subordinating all other issues else to the decision arrived at; elevating the system constraints; and in the case of a constraint being broken in the initial steps, retreating to begin from the first step and not allowing inertia to initiate a further breakdown of a system's constraint (Rand, 2000).

In general, the theory's core premise is that project management duties are often focused on job completion. It is presumably reasonable to assume that if these activities are finished on time, the project will also be finished on time. However, project management usually degenerates into a chaotic activity, leading to excessive pressure to meet task deadlines and frequent use of project management processes. The tried-and-true method of concentrating on job completion doesn't seem to work well in too many situations, and there are a number of reasons for this. As a result, in relation the research study, the Theory of Constraints serves as a foundation for understanding and recommending which project management practices should be responsive and adaptable, what they should be changed to, and how to make the changes in order to improve students housing construction projects performance.

2.6 Conceptual Framework

It is important to state that project performance is the measurable outcome of the involvement of a couple of factors and components of project management information systems as one of the crucial drivers of a project. Therefore, in this study the independent variables are components of PMIS that are utilized during project implementation. A dependent variable, on the other hand, is one whose outcome depends on the manipulation of the independent variables. For this research, the dependent variable is the performance of student housing construction project. The framework shown in the figure below shows how performance of student housing construction projects as the dependent variable is affected by a number of independent variables such as Indicator Tracking System (ITS), Disbursement Planning and Tracking System (DPTS), Procurement Activity Tracking System (PATS) and Project Schedule Tracking System (PSTS). The notion has been conceptualized in the manner described below (fig. 2.2). The project manager's attitude regarding technological systems as a tool for decision-making and project management while using project management information systems is an intervening variable.

Figure 2.2 Conceptual Framework for Study Variables



Source: Author's Conceptualization (2022)

2.7 Summary of Empirical Literature and Knowledge Gaps

Table 2.1 Summary of Empirical Literature and Knowledge Gaps

Variable	Author (year)	Title	Findings	Knowledge gaps
Performance of Students Housing Construction Projects	Taniguchi, A., & Onosato, M. (2018).	The influence that persistently improving the reporting quality of the project management information system has on the accomplishment of project management goals	Ongoing improvements in reporting quality were found to improve the quality of information supplied by project management information systems to benefit managers in decision making, planning, coordination, and management. As an added bonus, it aids in accomplishing the objectives of project management in terms of time, money, and output quality.	Generalized the projects. Did not specifically address students housing construction projects
Indicator Tracking System	Kerzner, H. (2017)	A guide on measuring and monitoring project success with the use of metrics, key performance indicators, and dashboards for project management.	The methods that project managers used in the past won't work for many of the projects that are being managed right now or for projects that will be handled in the future. It's possible that metric-driven project management may become the standard in the future of project management.	Focused mainly in the KPIs. Did not capture ISs as factors of performance of project management
Disbursement Planning and Tracking System	Luvuga, L. L., & Ngari, C. (2019).	Determinants of Successful Completion of Housing Projects at National Housing Corporation in Kenya.	The findings pointed to a favorable relationship between the acquisition of project funding and the progression of real estate development.	Does not dwell in students housing. Focused mainly on the overall real estate

Procurement Activity Tracking System	Barngetuny, D.C. & Kimutai, G. (2015)	The Impact of Electronic Procurement on the Efficiency of Supply Chain Management in the Country of Elgeyo-Marakwet	According to the findings of this research, the appropriate procurement framework needs to have standards that are set for the contractors to ensure their success.	No findings on other procurement strategies apart from computerized software systems
Project Schedule Tracking System	Drouin, N. & Besner, C. (2012)	Adding more rungs to the ladder of comprehension in regards to project management and its connection to the organization	Methodical scheduling acts as the roadmap of the entire project from the start to its end, which is vital since the project managers can assess the project and detect any possible threats	No findings done on the matrix and measurement of performance of different scheduling procedures

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter generally examines the research design, target population, sample size, and sampling techniques, research instruments, data collection procedure, data analysis techniques, ethical considerations and operationalization of the variables.

3.2 Research design

In this study, descriptive survey approach was used in gathering data, summarizing, presenting, and deciphering it with the aim of clarification of the study. Research design is the overarching approach for group action of the numerous elements of the study in a logical and coherent manner to effectively address the research problem as described by Creswell and Creswell (2003). This method was also chosen considering the survey looks for personal perspectives, opinions, attitudes, and perceptions on the PMIS factors that influence students housing construction project performance.

3.3 Target Population

Essentially, the population sampled represents individuals, cases, or entities with various standard common features. Zhao & Wei (2013) noted that the objective of the population is to get the general characteristic of distinct participants or objects in the study. This study's target population shall mainly comprise representatives from the technical, management, and supplier teams to construct the Qwetu student housing projects. Respondents sought after are namely; directors, managers, site engineers, sub-contractors, quantity surveyors, architects, civil, mechanical and electrical engineers, and technical staff, such as plant operators, artisans, technicians, and subcontractors; an approximate total of 105 target population as shown in the table 3.1.

Table 3.2 Target Population

Category Unit	Respondents	Population No.
Managerial Unit	Managing Directors	2
	Finance Management	2
	Accounts Management	2
	Procurement	3
	ICT Support & Managements	2
	Human Resource Managements	2
	Logistics & Supply Chain Managements	2
Consultancy/ Design Unit	Project Managers	2
	Architect & Interior Designer	3
	Quantity Surveyor	5
	Civil & Structural Engineer	5
	Mechanical & Electrical Engineer	5
Construction Site Technical Team Unit	Site Managers/ Site Agents & Site Engineers	5
	Foremen	5
	Plant Operators	5
	Artisans	10
	Technicians	20
Suppliers & sub-contractors	Construction material suppliers	10
	Lift sub-contractors	5
	Builders works sub-contractor	5
	Electrical works sub-contractor	5
	Plumbing works sub-contractor	5
	Civil works sub-contractor	5
TOTAL		105

3.4 Sample Size and Sampling Procedures

Gentles & McKibbon (2015) define sampling as selecting a given number of subjects from a defined population as representative of that population. Sampling is the procedure of choosing specific individuals or characters of significant interest from a population in order to analyze and relatively simplify a common characteristic of results of the overall population within which they were selected when conducting the fieldwork study (Taherdoost, 2016). This defined population

is referred to as a sampling frame. Majority of research projects need sample sizes that are between 30 and 500, with 30 being the minimum acceptable level. According to Taherdoost (2016), sampling makes it possible to conduct in-depth interviews, extensive research, heightened oversight, and a procedure that is more comprehensive when it comes to studying a population.

3.4.1 Sample Size

The sample size is a limited part of a statistical populace which helps gather characteristic data about the whole population. The sample size is an essential aspect of any investigation in which the goal is to conclude a well deduced data and information about a population characteristic or understanding. Gentles & McKibbon (2015) noted that the correct sample size in a study is dependent on factors such as the nature of the population to be studied, the purpose of the study, the number of variables in the study, the type of research design, the method of data analysis and the size of the accessible population. Selecting a subset of a cluster's population in this way allows you to better understand the characteristics held in common by the whole cluster. The study used a cumulative sample size of 82 respondents from the selected sub-units as calculated below.

With a 95% degree of confidence, the equation is presumed to be correct. Sample size s , population size n , P is the population proportion assumed to be 0.5, and d is the degree of precision represented in percentage (0.05).

Formula for determining sample size as derived by Krejcie and Morgan (1970):

$$s = \frac{X^2NP(1-P)}{d^2(N-1) + X^2P(1-P)}$$

Where:

s = required sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size

P = the population proportion

d = the degree of accuracy expressed as proportion (0.05)

Source: Krejcie & Morgan, 1970

When data is entered into the formula with a 95% confidence level and a 10% error tolerance, the following results are produced:

$$s = \frac{3.841 (105) (0.5) (1-0.5)}{0.05^2 (105-1) + 3.841 (0.5) (1-0.5)}$$

s = 82 Responses

As a result, the bare minimum number of replies required to maintain a 95% confidence level and a 10% margin of error is eighty-two.

3.4.2 Sampling Procedure

This study shall adopt a stratified random sampling technique in conducting the fieldwork research. This research study shall use stratified sampling technique because of practical regards to time and costs of conducting the study, invariably resulting in selection of limited sampled respondents. It is an inexpensive technique and advantageous because it will increase the applied statistical efficiency of samples, yet sanction complete analysis of ways and procedures in varied clusters in a population (Gentles & McKibbon, 2015). On the other hand, making inferences about the population necessitates the void of errors in the sample selection. The sampled respondents shall represent sub-units of the entire population to demonstrate a cross-sectional assessment of the total. Therefore, the stratified random sampling technique used was to select representatives from each unit of the construction project team for their feedback in informing the research study.

The sample size formula indicates the number of responses required for the study. It is advisable to add 10% to the sample size to compensate for persons the research cannot contact. 30% is mainly added to the sample size to compensate for nonresponse. Therefore, the above information

indicates that the number of hand delivered surveys or planned interviews were more significant than the required number for a desired level of confidence and precision.

Table 3.3 Sampling Procedures

Category Unit	Target Population	Sample Size	Percentage
Managerial Unit	15	10	12
Consultancy/ Design Unit	20	15	18
Construction Site Technical Team Unit	45	32	39
Suppliers & sub-contractors	35	25	31
TOTAL	105	82	100

3.5 Research Instruments

The use of questionnaires proved to be the most effective approach of data collection in this study. Kirakowski (2000) defines a questionnaire as a technique of eliciting data which have close-ended questions that collects quantitative data. Open-ended questions are used for coherent analysis whereby the researchers give their personal information. The questionnaire design was divided into several sections with section A capturing the respondents' demographic information, section B: Indicator Tracking Systems, section C: Disbursement Planning and Tracking System, section D: Procurement Activity Tracking System, section E: Project Scheduling System, section F: Performance of Students Housing Construction Projects.

The questionnaires as an instrument were pretested to detect any weakness in the research design by administering them to 10 percent of the population. The respondents were requested to raise issues of duplication or ambiguity in the questions. The final version of the questionnaire was distributed to respondents in the sample size, omitting those who participated in the trial phase. The research adopted the use of Likert scales to order the questions to show the presence or absence characteristics of the measure values (Mugenda & Mugenda, 2003).

Gilham (2008) recommends using questionnaires because they enable reaching out to large populations, are time efficient, offer privacy and confidentiality, and enable the respondents to

provide detailed information. Therefore, the researcher chose the questionnaire instrument because it is quick and cost-effective.

3.5.1 Pilot Testing of Instruments

To determine how effectively the questionnaire would function in actual use, the researcher conducted a pilot test. According to Connelly (2008), the current body of research shows that the sample size of a pilot study should be equal to 10% of the sample size that is anticipated for the more comprehensive parent study. Therefore, 9 participants in the pilot study accounts for 10% of the total of 82 participants for this study. As a result, participants in this research completed nine questionnaires, one for each of the target population's sub-units. The researcher was then able to recognize and fix any issues that were found with the questions' length, duplication, ambiguity, language, structure, code, and instructions. Although the participants in the pilot survey gave insightful input, they were not included in the responses of the final analysis because the researcher wanted to ensure the data's accuracy. The research instruments' validity and reliability was the improved and evaluated using the results of the pilot testing.

3.5.2 Validity of the Research Instrument

The extent to which a research tool accurately assesses the study result is what we call its validity. Content validity and construct validity were the primary types of validity used to validate the research instruments. The goal of determining content validity was to establish how well the test's questions reflect the subject area as a whole. However, construct validity was looking for evidence that the measure was done with proper construction of the questionnaires' grammar and flowing sentences. Optimized and verified validity means more reliable and high-quality results which are generalizable (Leung, 2015). A pilot test validates the instrument. This preceded the actual study on the population of the study. Some corrections occurred to the questionnaires' wording based on the pilot study's outcome. The testing phase also helped ensure that no discriminating or insensitive questions were asked to the responders.

3.5.3 Reliability of the Research Instrument

Reliability defines the level to which a study's results are consistent and precise over time. Joppe (2000) argues that the reliability of an instrument is measured by its replicable result under similar research. For this particular study, it adopted the test-rest method in determining the reliability of the questionnaires to reveal unclear questions, thus giving room for review. The pilot testing sample consisted of nine respondents who were randomly selected from the subunits of the population. The questionnaire was then administered to the pilot group twice in one week. The correlation coefficient values between information in the two intervals were computed and deciphered. A correlation coefficient of $r < 0.825$ was obtained using Cronbach's alpha method which was considered desirable. A generally accepted rule is that $\alpha(\alpha)$ of $\geq 0.8 < 0.9$ indicates an acceptable reliability level (Leung, 2015).

3.6 Data Collection Procedures

Data collection procedures are the actions taken to gather proof for a given argument. Primary data were collected through anonymous questionnaires for this study. Even the unstructured questions, which enable the respondents to reply in detail based on their interpretation in exposing any information, were utilized. Self-administered structured questionnaires were employed due to time and financial considerations and to assist easier analysis as they were in the useable form. Bauer & Aarts (2000) argue that structured questionnaires are more straightforward and more direct because they are in the immediate form.

A letter of introduction from the University of Nairobi was obtained by the researcher before the process of data gathering began as well as research permit from NACOSTI. Permission was granted from the unit managers of Acorn Holdings Limited before data collection to affirm to the subordinates that the research practice was academic. The researcher then hand-delivered and distributed the questionnaires to the respondents. The researcher gave them time and space for privacy purposes, then they were later collected. Each respondent was given as much time as they need to fill the questionnaire with an assurance of anonymity and confidentiality. Data collection took about two weeks, with the researcher targeting lunch (12:30 pm -2:30 pm) and evening hours

(5:00 pm to 7:30 pm), which had a high chance of respondents being free from their work. The target was approximately 10 to 15 respondents in a day.

3.7 Data Analysis Techniques

The data that is collected straight from the field is known as the raw data, and it might be difficult to comprehend this data. Because of this, the raw data was entered and processed using MS Excel and SPSS version 28 for interpretation (Mugenda & Mugenda, 2003). In order to assess the degree of correlation that exists between the independent and dependent variables, it was necessary to do statistical analysis on the raw data using both descriptive and inferential statistics. The highlighted facts provide more explanation for the study outcomes. The significance level was less than 0.5, which was suitable for this scientific study (Lehmann, 1958).

3.7.1 Descriptive statistics

The analysis of quantitative data made use of descriptive statistics like frequency and percentages, as well as mean, median, and standard deviation, composite mean, and composite standard deviation. This provided summaries of the sample and described the characteristics of the data that the study collected. The data presented was examined by classifying recurring patterns of attitudes and perceptions which contribute to the answers of the research questions.

3.7.2 Inferential statistics

Two forms of inferential statistics which were employed Pearson correlation analysis and simple linear regression analysis. These techniques were used to test the study's hypotheses. Correlation analysis was used to assess the degree of association between the independent and dependent variables (Gogtay & Thatte, 2017). This model computes the association between the two sets of data while also determining the degree to which they differ from one another. A high correlation between two variables denotes a robust relationship between them, while a low correlation denotes a relatively weak connection between the two. The relationship between the independent and dependent variables may be positive, negative, or nonexistent (Freund & Sa, 2006). The simple linear regression analysis model was used to test the strength of the relationship between independent and dependent variables. The data sets were plotted on a chart where the dependent

variable (in this case, the performance of students' housing construction projects) was plotted on the y-axis. Thereafter, the independent variable (Components of PMIS) was plotted on the x-axis. Once the data was plotted, an inference of the relationship between the variables was observed.

The regression model adopted to test the hypotheses of the study was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Y = Performance of students housing construction projects

β_0 = Constant

β_1 to β_4 = Coefficient of independent variables

X_1 = Indicator Tracking System

X_2 = Disbursement Planning and Tracking System

X_3 = Procurement Activity Tracking System

X_4 = Project Schedule Tracking System

ϵ = Error term

3.8 Ethical Considerations

Ethical considerations outline certain standards of conduct that researchers should uphold throughout the course of their work (Mugenda and Mugenda, 2003). The ethical concerns which arise from bearing personal information and data from the respondents was addressed with high confidentiality levels. It was also vital to explain the aim or the purpose of the research data to the respondents before the research to avoid doubt and improve the accuracy of the research. All data and information in the study were limited to the description of public information.

3.9 Operationalization of Study Variables

Table 3.4 Operationalization of study variables

Objective	Variable	Indicators	Measuring scales	Type of analysis	Tools of analysis
The purpose of this study is to determine the impact that ITS has on the performance of student housing construction projects.	Indicator Tracking System	<ul style="list-style-type: none"> • No. of tasks completed • Cost monitoring • Productivity of workforce • Performance Reviews • Quality and Standards 	Ordinal Interval	Descriptive statistics, Inferential statistics	Frequencies Percentages Mean and S.D Composite mean Composite S.D Correlation analysis Simple linear regression analysis
To assess to what extent DPTS influences the Performance of Students Housing Construction Projects	Disbursement Planning and Tracking System	<ul style="list-style-type: none"> • Resource planning and scheduling • Payment processing • Transparency and Accountability • Financial Autonomy and Decision making 	Ordinal Interval	Descriptive statistics, Inferential statistics	Frequencies Percentages Mean and S.D Composite mean Composite S.D Correlation analysis Simple linear regression analysis
To evaluate the influence of PATS to the Performance of Students Housing Construction Projects	Procurement Activity Tracking System	<ul style="list-style-type: none"> • Procurement cycle systems • Vendor performance reviews • Cost savings and value engineering • Standardization of Quality specifications 	Ordinal Interval	Descriptive statistics, Inferential statistics	Frequencies Percentages Mean and S.D Composite mean Composite S.D Correlation analysis Simple linear regression analysis
To establish to what extent the PSTS influences the Performance of Students Housing Construction Projects	Project Schedule Tracking System	<ul style="list-style-type: none"> • Project scoping and breakdown into realistic and achievable goals • Milestones and timelines • Forecasting risks and mitigations 	Ordinal Interval	Descriptive statistics, Inferential statistics	Frequencies Percentages Mean and S.D Composite mean Composite S.D Correlation analysis

		<ul style="list-style-type: none"> • Quality of processes and deliverables 			Simple linear regression analysis
To evaluate the Performance of Students Housing Construction projects	Project Performance	<ul style="list-style-type: none"> • Meeting the projects' objectives (Budget and timelines) • Quality and Standards • Client satisfaction in product and services offered • Project Impact and Profitability • Compliance on safety and environmental standards 	Ordinal Interval	Descriptive statistics, Inferential statistics	Frequencies Percentages Mean and S.D Composite mean Composite S.D Correlation analysis Simple linear regression analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The data analysis, presentation, and interpretation are presented in this chapter. It covers questionnaire return rate, demographic characteristics of the respondents, as well as descriptive and inferential statistics.

4.2 Questionnaire Return Rate

In order to gather information, 82 questionnaires were sent to the field for data collection. The questionnaires were sent to respondents, who were then requested to fill them out and return them for processing. Of the total of 82 surveys sent out, 63 were properly filled out and returned, indicating a response rate of 76.83%. The data is tabulated below. Because of this, we may conclude that the study's response rate was sufficient.

Table 5.1 Questionnaire Return Rate

Response	No. of Questionnaires	Percentage
Returned	63	76.83%
Not Returned	19	23.17%
Total	82	100%

Source: Survey Data (2022)

The fact that the surveys were self-administered and that respondents were assured of the confidentiality of their comments might explain the very high response rate of 76.83 percent. The research of Mugenda & Mugenda (2003) indicates that a response rate of 50 percent is regarded sufficient, 60 percent is good, and 70 percent or more is remarkable. As a result, we have a high response rate in this research.

4.3 Demographic Characteristics of the Respondents

The study was interested in demographic information like respondents' ages, education levels, field of specialization, designation, computer use frequency and level of skill.

4.3.1 Distribution of Respondents by Gender

In order to get insight into the gender representation of the study's population, the study's authors collected data on the sex composition of respondents and displayed the findings in Table 4.2.

Table 6.2 Distribution of Respondents by Gender

Gender	No. of Questionnaires	Percentage
Male	52	82.54%
Female	11	17.46%
Total	63	100%

Source: Survey Data (2022)

Data showed that males accounted for 82.54 percent of respondents, while females made up 17.46 percent. As a result, we can assume that men made up the vast majority of respondents. Hence, the results imply that the findings of the study may be biased towards male's standpoints.

4.3.2 Distribution of Respondents by Age

The respondents' ages were collected so that researchers could gauge the respondents' capacity in answering the questions with regards to the objectives of the study. Table 4.3 shows the outcomes.

Table 7.3 Distribution of Respondents by Age

Age Group	Frequency	Percentage
18-29 years	24	38.09%
30-39 years	19	30.16%
40-49 years	12	19.05%
Above 50 years	8	12.70%
Total	63	100%

Source: Survey Data (2022)

Results showed that 38.09 percent of respondents were in the 18-30 age range, with 30.16 percent in the 31-40 age range. The lowest number was respondents above the age of 50 years at 12.70%. This deduces that the largest number of the Qwetu students housing staff are of a younger

generation. Hence, most of the respondents ranging between 18-39 years of age demonstrates that they were mature enough to respond to the questionnaires of the study.

4.3.3 Distribution of Respondents by Years of Work Experience

The respondents were asked to indicate their work experience to determine the respondents' length of service in the industry. Table 4.4 displays the findings.

Table 8.4 Distribution of Respondents by Years of Work Experience

Work Experience	Frequency	Percentage	Cumulative Percentage
20 years and above	8	12.70%	12.70%
11-20 years	10	15.87%	28.57%
6-10 years	24	38.09%	66.66%
1-5 years	12	19.05%	85.71%
Less than 1 year	9	14.29%	100%
Total	63	100%	

Source: Survey Data (2022)

At 38.09 percent, those with 6-10 years' experience in the workforce were the majority, followed by those with 1-5 years' experience, at 19.05 percent. Those with more than 20 years of work experience represent the lowest number of respondents, while those less than 1 year of work experience represent 14.29% of the respondents. However, from the cumulative percentage 85.71% of the respondents had substantial years of work experience as above 5 years. Hence, the results imply that most of the respondents were well experienced in their field of work to respond to the questionnaires of the study.

4.3.4 Distribution Respondents by Level of Education

The study sought to establish the level of education of the respondents to determine how much formal education the respondents had. Table 4.5 displays the results.

Table 9.5 Distribution Respondents by Level of Education

Education Level	Frequency	Percentage
Primary	6	9.52%
Secondary	10	15.87%
Certificate	13	20.64%
Diploma	15	23.81%
University	19	30.16%
Total	63	100%

Source: Survey Data (2022)

Majority of the respondents had attained university education at 30.16%, followed by those who had attained a diploma 23.81% at and a certificate at 20.64%. Respondents who had attained only primary school education represented the lowest percentage of respondents at 9.52% and secondary school education at 15.87%. Hence the results imply that most of the respondents are fairly educated and qualified to respond to the questionnaires of the study.

4.3.5 Distribution of Respondents by Designation in the Firm

The study sought to establish the designation of the respondents in the firm to understand the distribution of skilled and non-skilled staff as shown in table 4.6.

Table 10.6 Distribution of Respondents by Designation in the Firm

Designation	Frequency	Percentage
Managerial	13	20.63%
Technical	19	30.16%
Non-Technical	25	39.68%
Trainee	6	9.52%
Total	63	100%

Source: Survey Data (2022)

Majority of the respondents were non-technical staff at 39.68%, followed by the technical staff at 30.16%, then managerial staff with 20.63% and those who are trainees as 9.52% of the

respondents. Hence, the cumulative percentage of technical and managerial staff forms the larger majority who are the targeted staff for this study.

4.3.6 Distribution of Respondents by Level of Skills in Computer Applications

The study sought to establish the level of skill of the respondents when it comes to use of computer applications in project status reporting and project analysis. The findings are as shown in table 4.7.

Table 11.7 Distribution of Respondents by Level of Skills in Computer Applications

Skill Level	Frequency	Percentage
No Skills	12	19.05%
Low Level	23	36.51%
Medium Level	17	26.98%
Highly Skilled	11	17.46%
Total	63	100%

Source: Survey Data (2022)

Majority of the respondents stand at 36.51% are low level skilled in the use of computer applications when project reporting. Those with no skills represent 19.05%. This is attributed to the fact that most of them are non-technical staff. However, those with computer skills form a cumulative majority, with those who have low level and medium level skills as 36.51% and 26.98% of the respondents respectively. The highly skilled users standing at 17.46% of the respondents. Hence, the results imply that most of the respondents had sufficient level of skills in use of computer applications as a focus of the study.

4.4 Indicators Tracking Systems and Performance of Students Housing Construction Projects

The following paragraphs include assertions about the impact of Indicators Tracking Systems features on the success of student housing development projects in Kenya, and respondents were asked to rate their level of agreement with these claims. The level of agreement with the statements was measured by utilizing a five-point Likert scale to quantify the replies. The values were allotted in the following manner; where strongly disagree = 1, disagree = 2, uncertain = 3, agree = 4,

strongly agree = 5. The mean scores as well as the S.D were calculated for each of the statements, and the results are reported in table 4.8.

Table 12.8 Indicators Tracking Systems and Performance of Students Housing Construction Projects

Statements	n	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean	Std. Dev.
		F (%)	F (%)	F (%)	F (%)	F (%)		
1. Use of ITS results to a higher number of tasks completed on time	63	40 (63.5%)	19 (30.2%)	3 (4.8%)	1 (1.6%)	0 (0.0%)	4.56	1.052
2. ITS improves cost monitoring and budgetary control	63	19 (30.2%)	35 (55.6%)	4 (6.3%)	4 (6.3%)	1 (1.6%)	4.06	0.965
3. ITS enhances productivity of the workforce	63	20 (31.7%)	24 (38.1%)	10 (15.9%)	6 (9.5%)	3 (4.8%)	3.83	0.923
4. ITS facilitates easy channels for performance review	63	23 (36.5%)	31 (49.2%)	4 (6.3%)	4 (6.3%)	1 (1.6%)	4.13	0.851
5. Use of ITS results to higher quality and standards in project output	63	21 (33.3%)	33 (52.4%)	4 (6.3%)	3 (4.8%)	2 (3.2%)	4.08	0.917
Composite		39%	45%	8%	6%	2%	4.13	0.942

Most of the respondents agree with the assertions made about the Indicators Tracking System and the impact it has on the success of student housing building projects. However, among the ITS variables that affect the success of student housing building projects, the attainment of a greater number of activities done on time and the facilitation of convenient channels for performance assessment were scored highest, with mean scores of 4.56 (SD=1.052) and 4.13 (SD=0.851), respectively. The improvement of cost monitoring and budgetary control as well as achievement of high quality and standards in project output and enhancement of productivity of the workforce statements were in agreement by respondents in how these ITS factors influence performance of students housing construction projects was rated third, fourth and fifth with a score of 4.08 (SD=0.917), 4.06 (SD=0.965) and 3.83 (SD=0.923) respectively. The findings show that a

cumulative of 84% of the participants agree that ITS factors all work together to have a significant impact on the success of the student housing projects they evaluated, with an overall composite mean of 4.13 and a composite standard deviation of 0.942.

From the analysis, it was found that cumulatively 39% of respondents strongly agree, while 45% agree that consideration of Indicator Tracking Systems in students housing construction projects improves the performance of the projects by giving construction firms strong competitive advantages. Therefore, a good implementation of ITS can help monitor and improve the performance of students housing construction projects.

4.5 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects

Responses were also solicited about how respondents felt Disbursement Planning and Tracking Systems impacted the success of student housing building initiatives in Kenya. The rating was based on how much respondents agreed with each of the following statements. All statements were accompanied by a 5-point Likert scale for respondents to indicate how much they agreed or disagreed with each. The mean scores and standard deviation were calculated for each question and the data can be seen in table 4.9.

Table 13.9 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects

Statements	n	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean	Std. Dev.
		F (%)	F (%)	F (%)	F (%)	F (%)		
1. Use of DPTS improves planning and budgeting of resources	63	36 (57.1%)	21 (33.3%)	3 (4.8%)	2 (3.2%)	1 (1.6%)	4.41	1.017
2. DPTS improves monitoring of payment processes	63	23 (36.5%)	31 (49.2%)	4 (6.3%)	3 (4.8%)	2 (3.2%)	4.11	1.025
3. DPTS increases transparency and accountability in cost management	63	19 (30.2%)	35 (55.6%)	4 (6.3%)	4 (6.3%)	1 (1.6%)	4.06	0.917

4. DPTS enhances financial autonomy and cost effective decision making	63	18 (28.6%)	36 (57.1%)	4 (6.3%)	3 (4.8%)	2 (3.2%)	4.03	0.884
Composite		38%	49%	6%	5%	2%	4.16	0.961

Most survey respondents appeared to agree with the statements about the Disbursement Planning and Tracking System's effect on the success of student housing building projects. However, the use of DPTS to improve planning and budgeting of resources and tracking of payment processes were rated as the highest of the DPTS factors that influence performance of students housing construction projects with mean scores of 4.41 (SD=1.017) and 4.11 (SD=1.025) respectively. The respondents were also in agreement with how DPTS factors such as the increase in transparency, accountability and enhancement of financial autonomy as well as cost effective decision making were rated third and fourth with a score of 4.06 (SD=0.917) and 4.03 (SD=0.884) respectively, in how they influence performance of students housing construction projects. Cumulatively, according to 87% of the respondents, they agree that the overall performance of student housing construction projects was significantly impacted by a combination of DPTS factors, with a composite mean of 4.16 and a composite standard deviation of 0.961.

In interpreting the analysis above, it was found that cumulatively most respondents agree (38% of respondents strongly agree, while 49% agree) that consideration of Disbursement Planning and Tracking Systems in students housing construction projects improves the performance of the projects by giving construction firms strong competitive advantages. Therefore, a good implementation of DPTS can help plan and monitor resources expenditure thus improve the performance of students housing construction projects.

4.6 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects

The study also aimed to gauge the extent to which respondents agreed with statements about the influence of procurement activity tracking system-related factors on the success of Kenyan student housing construction projects. The statements were as follows, and responses were scored on a five point Likert scale reflecting the extent to which respondents agreed with the statements. The mean scores and standard deviation were calculated for each question as in table 4.10.

Table 14.10 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects

Statements	n	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean	Std. Dev.
		F (%)	F (%)	F (%)	F (%)	F (%)		
1. PATS enhance monitoring of procurement expenditures throughout the time cycle	63	34 (54.0%)	23 (36.5%)	3 (4.8%)	2 (3.2%)	1 (1.6%)	4.38	1.018
2. PATS improves monitoring of vendor performance	63	13 (20.6%)	40 (63.5%)	5 (7.9%)	3 (4.8%)	2 (3.2%)	3.94	0.913
3. Use of PATS helps in value engineering and cost savings	63	19 (30.2%)	35 (55.6%)	4 (6.3%)	3 (4.8%)	2 (3.2%)	4.05	0.862
4. PATS enhances the standardization of quality specifications	63	19 (30.2%)	40 (63.5%)	2 (3.2%)	2 (3.2%)	0 (0.0%)	4.21	1.091
Composite		34%	55%	6%	4%	2%	4.14	0.971

Most respondents seemed to agree with claims that implementing the Procurement Activity Tracking System will improve the effectiveness of student housing building projects. However, the enhancement of monitoring of procurement expenditures throughout the time cycle and the standardization of quality specifications were rated as the highest of the PATS factors that influence performance of students housing construction projects with mean scores of 4.38 (SD=1.018) and 4.21 (SD=1.091) respectively. The improvement of tracking and monitoring of vendor performance and its assistance in value engineering and cost savings statements were in agreement by respondents in how PATS factors influence performance of students housing construction projects was rated third and fourth with a score of 3.94 (SD=0.913) and 4.05 (SD=0.862) respectively. Cumulatively, according to 89% of the respondents, they agree that a combination of the PATS factors greatly influenced performance of students housing construction projects achieving a composite mean of 4.14 and a composite standard deviation of 0.971.

In interpreting the analysis above, it was found that cumulatively most respondents agree (34% of respondents strongly agree, while 55% agree) that consideration of Procurement Activity Tracking Systems in students housing construction projects improves the performance of the projects by giving construction firms strong competitive advantages. Therefore, a good implementation of PATS can help plan and monitor procurement activities thus improve the performance of students housing construction projects.

4.7 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects

Furthermore, respondents were asked to evaluate the factors related to Project Schedule Tracking Systems and how they affect the performance of student housing construction projects in Kenya. The level of agreement with the following statements by the respondents was used to get this ranking. There was a 5-point Likert scale for respondents to indicate how much they agreed with each statement. The mean scores and standard deviation for each statement are shown in table 4.11.

Table 15.11 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects

Statements	n	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean	Std. Dev.
		F (%)	F (%)	F (%)	F (%)	F (%)		
1. PSTS breaks down the scope of work in realistic and achievable goals	63	38 (60.3%)	21 (33.3%)	2 (3.2%)	1 (1.6%)	1 (1.6%)	4.49	1.021
2. PSTS improves monitoring of key milestones and timelines	63	17 (27.0%)	36 (57.1%)	6 (9.5%)	2 (3.2%)	2 (3.2%)	4.02	0.972
3. PSTS forecasts risks and mitigation strategies	63	18 (28.6%)	41 (65.1%)	3 (4.8%)	2 (3.2%)	1 (1.6%)	4.25	0.958
4. PSTS enhances quality of project deliverables and processes	63	20 (31.7%)	25 (39.7%)	10 (15.9%)	6 (9.5%)	2 (3.2%)	3.87	0.895
Composite		37%	49%	8%	4%	2%	4.16	0.962

Majority of respondents seemed to agree with the claims made about the Project Schedule Tracking System and the impact it has on the success of student housing building projects. However, the use of PSTS to improve break down of the scope of work into realistic and achievable goals as well as forecasting risks and mitigation strategies were rated as the highest of the PSTS factors that influence performance of students housing construction projects with mean scores of 4.49 (SD=1.021) and 4.25 (SD=0.958) respectively. The respondents were also in agreement with how PSS factors such as the monitoring of key milestones and timelines as well as enhancement of quality of project deliverables and processes were rated third and fourth with a score of 4.02 (SD=0.972) and 3.87 (SD=0.895) respectively, in how they influence performance of students housing construction projects. Overall the respondents gave the PSTS components a composite mean score of 4.16 and a composite standard deviation of 0.962, and a cumulative 86% of the respondents agreeing that PSTS have a substantial impact on the success of student housing construction projects.

In interpreting the analysis above, it was found that cumulatively most respondents agree (37% of respondents strongly agree, while 49% agree) that consideration of Project Schedule Tracking Systems in students housing construction projects improves the performance of the projects by giving construction firms strong competitive advantages. Therefore, a good implementation of PSTS can help monitor achievable milestones and timelines thus improve the performance of students housing construction projects.

4.8 Performance of Students Housing Construction Projects

The study also sought to gauge participant agreement with the following statements concerning factors contributing to the success of student housing building projects in Kenya. A five-point Likert scale was used to rate how much each respondent agreed with each assertion. The mean scores and standard deviation were calculated for each question, and the data may be seen in table 4.12.

Table 16.12 Performance of Students Housing Construction Projects

Statements	n	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean	Std. Dev.
		F (%)	F (%)	F (%)	F (%)	F (%)		
1. Students housing construction projects operating within the limits of the construction budget and timelines indicate good performance	63	19 (30.2%)	34 (54.0%)	5 (7.9%)	5 (7.9%)	2 (3.2%)	4.10	0.968
2. Well performing students housing construction projects are delivered with high quality and few defects	63	19 (30.2%)	38 (60.3%)	6 (9.5%)	2 (3.2%)	0 (0.0%)	4.27	1.074
3. Client satisfaction in output and services rendered are qualities of a well performing of students housing construction projects	63	35 (55.6%)	21 (33.3%)	3 (4.8%)	3 (4.8%)	1 (1.6%)	4.37	1.023
4. Effective performance of students housing construction projects has a high impact and profitability	63	19 (30.2%)	35 (55.6%)	6 (9.5%)	3 (4.8%)	1 (1.6%)	4.13	0.928
5. Compliance to safety and environmental standards points to good performance of students housing construction projects	63	16 (25.4%)	28 (44.4%)	10 (15.9%)	6 (9.5%)	3 (4.8%)	3.76	0.875
Composite		34%	50%	10%	6%	2%	4.12	0.974

In terms of the success of student housing development projects in Kenya, the vast majority of respondents agreed with the comments. However, the client's satisfaction in output and services rendered as well as quality delivery with few defects were rated as the highest qualities of a well performing of students housing construction projects, achieving mean scores of 4.37 (SD=1.023) and 4.27 (SD=1.074) respectively. Achievement of high impact and profitability of the projects,

operating within the limits of the construction budget and timelines as well as compliance to safety and environmental standards had respondents' agreement in how they indicate good performance of students housing construction projects by rated third, fourth and fifth with a score of 4.10 (SD=0.968), 4.13 (SD=0.928) and 3.76 (SD=0.875) respectively. Students housing construction projects that included these characteristics were deemed successful by 84% respondents cumulatively, with a composite mean score of 4.13 and a composite standard deviation of 0.974.

In interpreting the analysis above, it was found that most respondents agree (34% of respondents strongly agree, while 50% agree) that consideration and subscription of factors improving performance of students housing construction projects gives construction firms strong competitive advantages.

4.9 Inferential Statistics

4.9.1 Correlation Analysis

The study sought to determine the coefficient of correlation by establishing the strength of relationship between the independent variables and dependent variable. The larger the correlation value the stronger the association between the two variables. In the study, components of PMIS are the independent variables (ITS, DPTS, PSTS and PATS) and the dependent variable is students housing construction project performance. To calculate the correlation strength between the study variables and the findings of the Survey Data, the study used the Karl Pearson's coefficient of correlation (r). The findings were presented in table 4.13.

Table 17.13 Correlation Analysis

Indicators	Correlation	Performance of Students Housing Construction Projects	Indicator Tracking System	Disbursement Planning and Tracking System	Procurement Activity Tracking System	Project Schedule Tracking System
Performance of Students Housing Construction Projects	Pearson Correlation Sig. (2-tailed) N	1 63	.725** .000 63	.811** .000 63	.767** .000 63	.852** .000 63
Indicator Tracking System	Pearson Correlation Sig. (2-tailed) N	.725** .000 63	1 63	.693** .000 64	.642** .000 63	.704** .000 63

Disbursement Planning and Tracking System	Pearson Correlation Sig. (2-tailed) N	.811** .000 63	.693** .000 63	1 63	.729** .000 63	.637** .000 63
Procurement Activity Tracking System	Pearson Correlation Sig. (2-tailed) N	.767** .000 63	.642** .000 63	.729** .000 63	1 63	.611** .000 63
Project Schedule Tracking System	Pearson Correlation Sig. (2-tailed) N	.852** .000 63	.704** .000 63	.637** .000 63	.611** .000 63	1 63

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

The Pearson's coefficient of correlation is given as: $-1 < r < +1$; where 0 to 0.29 is considered weak positive correlation; 0.3 to 0.49 is moderately positive correlation; and 0.5 to 1 corresponds to strong positive correlation. Conversely, 0 to -0.29 is considered weak negative correlation; -0.3 to -0.49 is moderately negative correlation; and -0.5 to -1 corresponds to strong negative correlation.

Indicator Tracking System, Disbursement Planning and Tracking System, Procurement Activity Tracking System and Project Schedule Tracking System all had a strong positive correlation with performance of student housing construction projects, as shown in table 4.13, with figures of 0.725, 0.811, 0.767, and 0.852, respectively. The results in general imply that better practice of components of project management information systems improves performance of students housing construction projects. The observation is further reinforced by the independent variables' p-values of 0.000, which is less than the statistically acceptable significant level, at an alpha of 0.01 ($p < 0.01$).

4.9.2 Regression Analysis

To investigate the connections between the factors, a multiple linear regression analysis was carried out. The data for the multiple regressions were entered, the findings were coded, and the results were calculated with the help of Statistical Package for Social Sciences (SPSS) application. This was essential in determining the magnitude of the influence of the independent variables on the results of the student housing projects, which served as the dependent variable.

Table 18.14 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.732 ^a	.647	.546	.652

a. Predictors: (Constant), Indicator Tracking System, Disbursement Planning and Tracking System, Procurement Activity Tracking System, Project Schedule Tracking System

Adjusted R square is coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable. From the findings in Table 4.14 the value of adjusted r squared was 0.546 (54.6%), an indication that there was variation of 54.6 percent of the variations in performance of students housing construction projects can be explained by the project management information systems as a practice at 95 percent confidence interval. Additionally, this therefore means that factors not studied in this research contribute 45.4 percent of the performance of students housing construction projects and further research should be conducted to investigate the other factors that contribute to this gap.

Table 19.15 ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.396	3	3.769	4.883	.000 ^a
	Residual	14.873	48	.318		
	Total	23.269	51			

a. Predictors: (Constant), Indicator Tracking System, Disbursement Planning and Tracking System, Procurement Activity Tracking System, Project Schedule Tracking System

b. Performance of students housing construction projects

The results of the ANOVA show that the whole model was significant with a probability of 0.000 ($p < 0.01$), which is much lower than the traditional probability of 0.05 significance threshold. An F statistic of 4.883 at a 95% level of confidence provided further support for this assertion. Thus, with F calculated (=4.883) being greater than F critical, indicates that the model was generally statistically significant. As a consequence of this, the findings of the ANOVA model show that the independent variables are strong joint predictors of the performance of student housing construction projects in order to provide improved outcomes.

Table 20.16 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		β	Std. Error	Beta		
1	(Constant)	.846	.171		5.678	.000
	Indicator Tracking System	.431	.043	.041	4.314	.002
	Disbursement Planning and Tracking System	.118	.134	.015	.064	.017
	Procurement Activity Tracking System	.189	.091	.162	.269	.014
	Project Schedule Tracking System	.412	.082	.617	4.938	.006

a. Dependent Variable: Performance of students housing construction projects

The regression model was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Y = Performance of students housing construction projects

β_0 = Constant

β_1 to β_4 = Coefficient of independent variables

X_1 = Indicator Tracking System

X_2 = Disbursement Planning and Tracking System

X_3 = Procurement Activity Tracking System

X_4 = Project Schedule Tracking System

ϵ = Error term

As per the SPSS generated table 4.16, the equation becomes:

$$Y = 0.846 + 0.431X_1 + 0.118X_2 + 0.189X_3 + 0.412X_4$$

The regression model provided statistical control through which the study established the influence of each independent variable. Holding all variables at zero will result in a positive performance of students housing construction project equal to 0.846. In a similar way, reducing all other independent variables to zero, a unit change in Indicator Tracking System will result in 0.431 increments in positive performance of students housing construction projects, inducing a positive and significant effect as indicated by t-values ($t= 4.314, p < 0.05$).

The findings also indicate 0.118 increments in Disbursement Planning and Tracking System when all other independent variables are reduced to zero leads to favorable performance of students housing construction projects, compelling a positive and significant effect as indicated by t-values ($t= 0.064, p < 0.05$). Additionally, a unit increase in Procurement Activity Tracking System while holding the rest of independent variables constant would lead to a 0.189 increments in favorable performance of students housing construction projects, inducing a positive and significant effect as indicated by t-values ($t= 0.269, p < 0.05$). Finally, a unit change in Project Schedule Tracking System will yield 0.412 increments in performance of students housing construction projects when all other predictor variables are held constant at zero, causing a positive and significant effect as indicated by t-values ($t= 4.938, p < 0.05$). The results also show that the coefficients for each variable are non-zero. Therefore, this means that all the independent variables influence the dependent variable. Hence, since the p-values for Indicator Tracking System, Disbursement Planning and Tracking System, Procurement Activity Tracking System and Project Schedule Tracking System are all strong significant predictors of performance of students housing construction projects with a p value of less than 0.05.

4.9.2 Summary of Hypotheses Testing

The results of the hypotheses testing are as follows:

1. H_{01} : There is no significant relationship between indicator tracking systems and performance of students housing construction projects in Kenya. Table 4.16 shows the result on indicator tracking systems as $p=0.002$ thus $p<0.05$. Hence, the study rejected H_{01} and accepted the alternative.

2. H_{02} : There is no significant relationship between disbursement and tracking systems and performance of students housing construction projects in Kenya. Table 4.16 shows the result on disbursement and tracking systems as $p=0.017$ thus $p<0.05$. Hence, H_{02} was rejected and alternative was accepted.
3. H_{03} : There is no significant relationship between procurement activity tracking systems and performance of students housing construction projects in Kenya. Table 4.16 shows the result on procurement activity tracking systems as $p=0.014$ thus $p<0.05$. Hence, H_{03} was rejected and alternative was accepted.
4. H_{04} : There is no significant relationship between project schedule tracking systems and performance of students housing construction projects in Kenya. Table 4.16 shows the result on project schedule tracking systems as $p=0.006$ thus $p<0.05$. Hence, H_{04} was rejected and alternative was accepted.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, discussions, conclusions and recommendations of the research. The chapter also covers suggestions of related studies that may be carried out in the future.

5.2 Summary of Findings

This section presents summary of findings of the research from the investigation of the influence of project management systems on performance of students housing construction projects in Kenya. The demographic data of the respondents was collected in order to understand the characteristic of the population and its pattern. In terms of gender, the study found that the majority of respondents were male represented by 82.54% showing the industry as male dominated. Despite the largest group of respondents being youthful in the bracket of 18-39 years of age, those with ultimately more years of experience and also in senior managerial positions were the minority at 20.63%. When it comes to education, majority of respondents are educated beyond the O-level with those with certificate, diploma and university degree forming 20.64%, 23.81% and 30.16% respectively. Therefore, this points out that the respondents had adequate knowledge, skill and experience to understand the concept of project management information systems and practices in students housing construction projects.

5.2.1 Indicator Tracking Systems and Performance of Students Housing Construction Projects

The study established that Indicator Tracking System has a major influence on performance of students housing construction projects as it is considered to have substantial influence on the number of tasks completed on time and provides easy channels for performance review, thus improving performance of the construction project. The study further established that aspects of Indicator Tracking System also improve performance through systems put in place for cost

monitoring and budgetary control as well as productivity of the workforce and improving the quality and standards in project output. This in turn makes ITS to have a huge influence on performance of students housing construction projects. Hence, the study rejected H_{01} and accepted the alternative which established that implementation of Indicator Tracking System gives a competitive advantage to performance of students housing construction projects ($\beta=0.431$, $p=0.002<0.05$).

5.2.2 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects

The study also established that Disbursement Planning and Tracking System has a major influence on performance of students housing construction projects. DPTS roles which were rated as the highest leans towards the improvement of planning and budgeting of resources and tracking of payment processes. The study established that the respondents were also in agreement with how other DPTS roles such as the increase in transparency, accountability and enhancement of financial autonomy as well as cost effective decision making get to influence performance of students housing construction projects. Hence, the study rejected H_{02} and accepted the alternative which established that consideration of Disbursement Planning and Tracking Systems can help plan and monitor resources expenditure of students housing construction projects thus improves the performance of the projects by giving construction firms strong competitive advantages ($\beta=0.118$, $p=0.017<0.05$).

5.2.3 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects

Generally, the study has shown that Procurement Activity Tracking System has a significant influence on performance of students housing construction projects. PATS roles which were rated as the highest inclines towards, the enhancement of monitoring of procurement expenditures and standardization of quality specifications. Other PATS roles such as the improvement of monitoring of vendor performance as well as assistance in value engineering and cost savings also had great influence on performance of students housing construction projects. Hence, the study rejected H_{03} and accepted the alternative which established that consideration of Procurement Activity

Tracking Systems in students housing construction projects improves the performance of the projects by giving construction firms strong competitive advantages since in general it helps plan and monitor procurement activities ($\beta=0.189$, $p=0.014<0.05$).

5.2.4 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects

The study has established that Project Schedule Tracking System has a great influence on performance of students housing construction projects. The use of PSTS to break down the scope of work into realistic and achievable goals as well as forecasting risks and mitigation strategies were rated as the highest. Students' housing construction projects benefited greatly from other PSTS's functions, such as the monitoring of key milestones and timelines, and the improvement of the quality of project deliverables and processes. Hence, the study rejected H_{04} and accepted the alternative which established that consideration of Project Schedule Tracking System significantly influences performance of students housing construction projects by giving construction firms strong competitive advantages ($\beta=0.421$, $p=0.006<0.05$).

5.2.5 Performance of Students Housing Construction Projects

The study has also established the pointers of performance of students housing construction projects in Kenya. Client's satisfaction in output and services rendered as well as quality delivery with few defects were rated as the highest qualities of a well performing of students housing construction projects. Additionally, projects which achieve high impact and profitability, and also operates within the limits of the construction budget and timelines are also considered well performing. Well performing projects as found out by the study are also compliant to safety and environmental standards. Hence, a combination of these factors improves on performance of students housing construction projects.

5.3 Discussion of Findings

This section of the report provides a detailed discussion of the findings and makes comparisons between those findings and the literature discussed in chapter two.

5.3.1 Indicator Tracking Systems and Performance of Students Housing Construction Projects

As this research has demonstrated, ITS plays a significant role in PMIS, which in turn has a significant impact on the success of student housing construction projects. According to the data collected, as many as 84% of participants believed that ITS had an impact on the success of student housing development initiatives. ITS has a significant impact on the success of student housing construction projects due to its impact on issues like the number of tasks completed on time, the provision of easy channels for reviewing performance, cost monitoring and budgetary control, worker productivity, and the improvement of quality and standards in project output. This is in agreement with scholars who have thrown their literature behind the role of project management information systems and its influence on performance in students housing construction projects. Kabirifar & Mojtahedi (2019) suggested that by using the ITS management tools, the project managers would be able to plan and execute their construction projects to maximize the project's chances of success. Then, the variables in project management include adequate communication, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure, plan and schedule followed, and related previous management experience, Kerzner (2017). Taniguchi & Onosato (2018) recommended the need for focused effort using KPI by project managers and the larger construction industry associations to establish organizational objectives and manage improvements via efficient and effective monitoring, measuring methods for efficient project management and performance.

5.3.2 Disbursement Planning and Tracking Systems and Performance of Students Housing Construction Projects

The study has shown that there was a great influence between the performance of students housing construction projects and the DPTS as a component of PMIS during construction. The research indicated that up to 87% of the respondents felt that DPTS affect the performance of students housing construction projects. Issues like improvement of planning and budgeting of resources and tracking of payment processes, increase in transparency, accountability and enhancement of financial autonomy as well as cost effective decision making makes DPTS to have a huge influence

on performance of students housing construction projects. This was in agreement with scholars who have thrown their literature behind the role of project management information systems in projects. According Oyeyipo et al. (2016) the resource dependency idea, organizations are dependent on the resources present in their surrounding contexts. However, allocating resources necessitates cost management and resource planning, which requires proper judgment and decision making (Samson et al., 2002). The developers of the project have faith in the implemented project once there is proper management of funds ensuring the project's success. Lack of a suitable system to plan for funds will lead to mishandling of funds, which slows the process of project implementation, and the whole project's performance drops Luvuga & Ngari (2019). It is apparent that consideration of Disbursement Planning and Tracking Systems as a component of PMIS, can help plan and monitor resources expenditure thus in students housing construction projects thus improves the performance of the projects by giving construction firms strong competitive advantages.

5.3.3 Procurement Activity Tracking Systems and Performance of Students Housing Construction Projects

The information contained in the results related to whether PATS during tendering influences the performance of construction projects indicates that over 89% of the respondents agreed and strongly agreed with the indicators surrounding competition. This is in line with the views of Salome (2018) who remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Barngetuny & Kimutai, (2015) noted that competitive bidding can adversely affect the outcome of major projects and the number of separate contracts in a project is related to the successful project performance. During the parlous economic conditions, it has been quite common for many contractors to be involved in a tender. The lowest tender price, most of the time, will be selected and the contractor, in fact, has pulled down their profit margin in order to meet the lowest price criteria. Indirectly, they will suffer higher risk of making lost money when it comes to the construction stage. Thus they need to properly plan and control the project procurement process, to avoid any mistakes which will incur additional cost to the project Cerpa & Verner (2019).

According to Salome (2018), most procurement activities occur when a project is being implemented, such as contacting suppliers to provide price quotations. A proper system is required for projects to handle such procurement matters. The system should keep track of procurement orders and deliveries made, which may also help pay the suppliers on time. There are fundamental reasons why organizations like the construction industry should have procurement software. One of the reasons is that there are reduced errors. Using PMIS to help track procurement activities will lead to quality data processing, hence fewer errors and project delays, unlike depending on human processed works, Matunga & Okibo (2013). The PATS comes in handy since it helps track this activity and provides reports for decision making and review. Hence use of PATS shall help in improving the performance of students housing construction projects.

5.3.4 Project Schedule Tracking Systems and Performance of Students Housing Construction Projects

The study has shown that there is a great influence between the performance of students housing construction projects and the PSTS as a component of PMIS during construction. The research indicated that up to 86% of the respondents felt that PSTS affect the performance of students housing construction projects. Issues like breaking down the scope of work into realistic and achievable goals as well as forecasting risks and mitigation strategies, monitoring of key milestones and timelines as well as enhancement of quality of project deliverables and processes makes Project Schedule Tracking System to have a great influence on performance of students housing construction projects. This is in agreement with scholars who have thrown their literature behind the role of project management information systems in projects. According to Kerzner (2013), it is vital to define the scope to determine the appropriate methods for project management. Project schedule tracking helps in creating and keeping the project plan in place while taking consideration of any impending issues of concern such as time and cost. Having the project schedule tracking systems helps create an efficient plan, thus as well as performance of the task. Scheduling procedures and the project devising strategies will ensure they keep track of the project's activities and tackle them with the planned time and budget (Park & Park, 2020). A project with project schedule tracking system has a high chance of being successful in terms of the

project's performance due to possession of better scheduling and monitoring tools necessary for achievement of set targets.

5.3.5 Performance of Students Housing Construction Projects

The information from the research shows that over 84% of the respondents agreed that performance of students housing construction projects is determined by client's satisfaction in output and services rendered as well as quality delivery with few defects. Also achievement of high impact and profitability, and operation within the limits of the construction budget and timelines are also considered as indicators of well performing students housing construction projects, in addition to compliance to safety and environmental standards. According to Liberatore & Pollack (2003), project management action in selection of a software as a tool of implementation is a key for project success. PMIS has been lauded as a tool that supports the core business of the student housing construction industry in conducting projects to build new and renovate existing structures for a range of student customers ranging from of low cost, differentiation and focus markets. According to Kariuki & Nzioki (2018), student housing construction project success or failure has been tied to the cost, time, technology, economic resources and performance pillars. Nevertheless, the building industry can only grow and prosper if construction projects use modern technology such as PMIS to achieve competitive advantages.

Therefore, as deduced from various studies and this research, PMIS has been acclaimed to improve the performance of construction projects. Hence, PMIS should be used by stakeholders in the students housing construction industry in the future to improve the effectiveness of project teams, streamline the project's process, accelerate the company's turnover and eliminate many of the project challenges experienced in this age.

5.4 Conclusions

From the research study, it was concluded that there is a positive relationship between project management information system and the performance of students housing construction projects. Hence, components of PMIS in this study show that they have great influence to the performance of these projects. From the research study, it was also concluded that Indicator Tracking Systems influences the performance of construction projects in Kenya. Both the analytical data and the

results from the tested hypothesis have indicated that proper implementation of ITS can help monitor and improve the performance of students housing construction projects.

The Disbursement Planning and Tracking Systems also positively influences the performance of students housing construction projects in Kenya. This was found to be of relative importance and was supported by a strong Karl Pearson's coefficient of correlation value of 0.811. Therefore, proper implementation of DPTS can help during planning and monitor resource expenditure thus improving the performance of students housing construction projects.

It was also found that Procurement Activity Tracking System influences the performance of students housing construction projects in Kenya. It supported by the regression coefficients calculation, which shows that a unit increase in Procurement Activity Tracking System while holding the rest of independent variables constant would lead to a 0.91 increments in favorable performance of students housing construction projects.

Project Schedule Tracking Systems also has a positive correlation with performance of students housing construction projects. Both the analytical data and the results from the tested hypothesis have indicated that a good implementation of PSTS can help breakdown achievable milestones and timelines. Therefore, it is apparent that consideration of PMIS and proper subscription to functions of its components gives students housing construction firms strong competitive advantages resulting to improved performance of students housing construction projects.

5.5 Recommendations

Based on the findings of the study, the researcher recommends use of PMIS because of the following points:

- i. Use of ITS in project management helps in improving the number of tasks completed on time, provision of easy channels for performance review, cost monitoring and budgetary control as well as productivity of the workforce and improvement of the quality and standards in project output. ITS positively influences the performance of students housing construction projects, making them competitive and relevant in the market today.

ii. Proper planning and budget allocation of resources aids in improving performance of students housing construction projects. Therefore, incorporation DPTS as a component of PMIS may enhance transparency and cost effective decision making in expenditure of resources during construction.

iii. Firms specializing in student housing development should be encouraged to use efficient PATS as a component of PMIS throughout the procurement process to boost their efficiency and quality. So, for instance, the best firm to be given the contract should be thoroughly investigated, and the bidding process should go through all of the required legal and procedural steps in order to get better vendor's performance.

iv. Breaking down the scope of work into realistic and achievable goals is one of the important steps for well performing students housing construction projects. This is enhanced through the use of PSTS as a component of PMIS. This may enable forecasting risks and installing proper mitigation strategies, improving the quality of project processes and the end product.

v. Finally, well-performing students housing construction projects are measured by the client's level of satisfaction in the end result. Projects with the right PMIS tools to lead/govern them may be within the set budget and timelines. This results to projects with high impact and profitability while also complying to safety and environmental standards improving the general performance of these projects.

5.6 Suggestions for Further Research

The study recommends that further research should be done to evaluate other important factors that influence performance of students housing construction projects in Kenya. It is also recommended that further studies should be done to evaluate students housing overall performance framework and modeling system.

REFERENCES

- Adisa, S., Simpeh, F., & Fapohunda, J. (2019). Evaluation of safety and security measures: preliminary findings of a university student housing facility in South Africa. In *Construction Industry Development Board Postgraduate Research Conference*. Springer, Cham.
- Akintoye, A., McIntosh, G. & Fitzgerald, E. (2012). A survey of supply chain collaboration and management in the UK construction industry. *European Journal of Purchasing and Supply Management*.
- Ali, A.S.B., and Money, W.H. (2008). *Impact of Organizational and Project Factors on Acceptance and Usage of Project Management Software and Perceived Project Success*. Project Management Journal.
- Baljkas, S. (2000). *Methods of project planning in Croatian environment*. Paper presented at 1st International Conference on Information Society and Information Technologies, ISIT 2009, Novo mesto, Slovenija.
- Barngetuny, D.C. & Kimutai, G. (2015). Effects of E-Procurement on Supply Chain Management Performance in Elgeyo-Marakwet Country. *International Journal of Research in Business Management*.
- Bauer, M. W., & Aarts, B. (2000). Corpus construction: A principle for qualitative data collection. *Qualitative researching with text, image and sound: A practical handbook*.
- Blackstone. (2010). *Theory of Constraints*. Retrieved from http://www.scholarpedia.org/article/Theory_of_Constraints. 2nd December, 2020.
- Bonner, T. & Gundlach M. (2013). *The Project Management Information System (PMIS) Described*. Retrieved from: <http://www.brighthubpm.com/project-planning/44058-the-project-management-information-system-pmis-described/>, Accessed on 9th November 2020.
- Boulding, K. E. (2004). General systems theory: The skeleton of science. *E: CO Special double*.
- Brandell, J. R. (2010) *Theory & Practice in Clinical Social work*. Thousand Oaks, CA: Sage.
- Caldwell, R. (2004). *Project Management Information System: Guidelines for Planning, Implementing, and Managing a DME Project Information System*, 1st edn, CARE, New York.

- Cerpa, N., & Verner, J. M. (2009). Why did your project fail? *Communications of the ACM*.
- Chavez Estela, K. A., & Sosa Loaiza, J. J. (2021). *Proposal for a Comprehensive Management Project for the Construction of a Sustainable Residence for University Students of the UPC in the district of Chorrillos*. Peruvian University of Applied Sciences (UPC)
- Cleland, D.I. (2004). "Project Management Information System" in *Project Management: Strategic Design and Implementation*, 5th edn, McGraw-Hill International Editions, Singapore.
- Connelly, L. M. (2008). Pilot studies. *Medsurg nursing*.
- Creswell, J. W., & Creswell, J. (2003). *Research design*. Thousand Oaks, CA: Sage publications.
- Donaldson, L. (2001). *The contingency theory of organizations*. Sage.
- Drouin, N. & Besner, C. (2012) Projects and Organization: Adding rungs to the ladder of understanding project management and its relationship with the organization. *International Journal of Managing Projects in Business*.
- Freund, R. J., Wilson, W. J., & Sa, P. (2006). *Regression analysis*. Elsevier.
- Fugar, F. D., & Agyakwah-Baah, A. B. (2010). Delays in Building Construction Projects in Ghana. *Construction Economics and Building*.
- Gentles, S. J., Charles, C., Ploeg, J., & McKibbin, K. A. (2015). Sampling in qualitative research: Insights from an overview of the methods literature. *The qualitative report*.
- Gillham, B. (2008). *Developing a questionnaire*. A&C Black.
- Globally, T. (2011). University Housing.
- Gogtay, N. J., & Thatte, U. M. (2017). Principles of correlation analysis. *Journal of the Association of Physicians of India*.
- Goldrat, E., (2007). Critical Chain, Great Barrington: The North River Press *Applying Multi-Methodology Systems Theory to Project Management*. Proceedings from the 53rd Annual Meeting of the International Society for the Systems Sciences, 2009, Brisbane, Australia.
- Haughey, D. (2010). A Brief History of Project Management. *Accounting Review Journal*, 6(1).
- Kabirifar, K., & Mojtahedi, M. (2019). The impact of Engineering, Procurement and Construction (EPC) phases on project performance: A case of large-scale residential construction project.
- Kaiser, M. G., & Ahlemann, F. (2010). Measuring Project Management Information Systems Success: Towards a Conceptual Model and Survey Instrument.

- Kariuki, C., & Nzioki, N. (2018). *Meeting the Housing Needs of University Students in Small Urban Areas in Kenya* (No. afres2018_132). African Real Estate Society (AfRES).
- Kartikeyan, M. G., Gholap, M. R., Katkar, M. R., Khune, M. P., & Bhosale, P. (2021). To Study Advanced Project Planning and Scheduling-Case Study. *International Journal*.
- Kerzner, H. (2017). *Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance*. John Wiley & Sons.
- Kirakowski, J. (2000). Questionnaires in usability engineering: a list of frequently asked questions. *Human Factors Research Group, Ireland*.
- Kiruru, N. J., & Ogola, R. T. (2020). Quality of private accommodation for undergraduate students in public universities in Kenya. *European Journal of Education Studies*.
- Kishore, V., Abraham, D.M., & Sinfield, J.V. (2011). Portfolio Cash Assessment Using Fuzzy Systems Theory. *Journal of Construction Engineering & Management*.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*.
- La Roche, C. R., Flanigan, M. A., & Copeland Jr, P. K. (2010). Student housing: Trends, preferences and needs. *Contemporary Issues in Education Research (CIER)*.
- Lederer, A. M., Hoban, M. T., Lipson, S. K., Zhou, S., & Eisenberg, D. (2021). *More than inconvenienced: The unique needs of US college students during the COVID-19 pandemic*. *Health Education & Behavior*.
- Lehmann, E. L. (1958). Significance level and power. *The Annals of Mathematical Statistics*.
- Lee, S. K., & Yu, J. H. (2011). Critical Success Factors for Project Management Information System in Construction. *KICEM Journal of Construction Engineering and Project Management* (2011) Online ISSN 2233-9582.
- Lester, A. (2014). *Project management, planning, and control: managing engineering, construction, and manufacturing projects to PMI, APM, and BSI standards*. Oxford: Butterworth-Heinemann.
- Leung, L. (2015). Validity, reliability, and generalizability in qualitative research. *Journal of family medicine and primary care*.

- Lewis-Faupel, S., Neggers, Y., Olken, B.A. & Pande, R. (2014). *Can Electronic Procurement Improve Infrastructure Provision? Evidence from Public Works in India and Indonesia*. Retrieved from <http://scholar.harvard.edu/>.
- Liberatore M. J and Pollack J, B. (2003), Factors influencing the usage and selection of project management software. *IEEE Trans Eng Manage*.
- Light M, Rosser B, Hayward S. (2005), *Realizing the benefits of projects and portfolio management*. Gartner, Research ID G00125673, 131.
- Love P.E.D and Irani Z. (2003). 'A project management quality cost information system for the construction industry'. *Information and Management*.
- Lusuli, A. L. & Rotich, G. (2014). Challenges affecting public procurement records management practice in public entities in Kenya: A case of the National Treasury. *International Journal of Social Sciences and Entrepreneurship*.
- Luvuga, L. L., & Ngari, C. (2019). Determinants of Successful Completion of Housing Projects at National Housing Corporation in Kenya. *International Journal of Entrepreneurship and Project Management*.
- Matunga, D. A. & Okibo, W. (2013). The Effect of E-Procurement Practices on Effective Procurement in Public Hospitals: A Case of Kisii Level 5 Hospital. *American International Journal of Contemporary Research*.
- Milosevic, D. (2003), *Project management toolbox: tools and techniques for the practicing project manager*, Hoboken, NJ: John Wiley and Sons.
- Mohammed, A. H., Altemini, M.S, & Yahya, Y. (2010). *Evaluating the performance of Information Technology on Strategic Planning*, *International Journal of Education and Development using ICT (IJEDICT)*.
- Mose, N. (2021). Determinants of regional economic growth in Kenya. *African Journal of Business Management*, 15(1), 1-12.
- Moses, K. B. (2019). *Micro and Macro Environments and Implementation of Public Private Partnership Infrastructure Development in Kenya* (Doctoral dissertation, University of Embu).
- Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and Qualitative Approaches*. Nairobi; African Centre for Technology Studies.

- Navon R. (2005), Automated project performance control of construction projects, *Automation in Construction*, Vol. 14.
- Oluoch, K., Ndunge, M. M., & Musuya, A. W. (2019). The Influence of Availability of College Hostel Accommodation Facilities On Students' academic Performance in Kenya Medical Training Colleges in Western Kenya Region. *African Journal of Education and Practice*.
- Opiyo, W. O. (2019). *Innovations in Student Accommodation in Kenya* (Doctoral dissertation, University of Nairobi).
- Onyango, M. O., & Olima, W. H. (2015). Housing transformations in Nairobi, Kenya: A strategy towards sustainable urban development.
- Owolabi, B. O. (2015). The effects of students' housing on academic performance at the University of Ibadan in Nigerian. *International Journal of Scientific & Engineering Research*.
- Oyeyipo, O. O., Odusami, K. T., Ojelabi, R. A., & Afolabi, A. O. (2016). Factors affecting contractors' bidding decisions for construction projects in Nigeria. *Journal of Construction in Developing Countries*.
- Park, E. S., & Park, M. S. (2020). Factors of the Technology Acceptance Model for Construction IT. *Applied Sciences*.
- Powell, T.C., & Dent-Micallef, A. (1997). *Information technology as competitive advantage: The role of human, business, and technology resources*. Strategic Management Journal.
- Quesada, G., González, M.E., Mueller, J. & Mueller, R. (2010). Impact of e-procurement on procurement practices and performance. *Benchmarking: An International Journal*.
- Rand, G.K. (2000). Critical Chain: The Theory of Constraints Applied to Project Management. *International Journal of Project Management*.
- Raymond, L. & Bergeron F. (2007). *Project management information systems: An empirical study of their impact on project managers and project success*. International Journal of Project Management.
- Republic of Kenya (2007), Kenya Vision 2030, Nairobi, Government Printer.
- Ross Ashby, W. (1956): An introduction to cybernetics, First edition, Chapman and Hall: London, Uk.

- Salome, O. L. (2018). *Contract Management Practices and Performance of Housing Construction Projects In Nairobi City County, Kenya: A Case of National Construction Authority* (Doctoral dissertation, Doctoral Dissertation, Kenyatta University).
- Samson, M. and Lema, N. M, (2002), Development of construction contractors' performance measurement framework, 1st International Conference of Creating a Sustainable.
- Shehu, Z., Endut, I. R., Akintoye, A., & Holt, G. D. (2014). Cost overrun in the Malaysian construction industry projects: A deeper insight. *International journal of project management*.
- Smart, A.F. (2010). E-procurement and its impact on supply management – evidence from industrial case studies. *International Journal of Logistics Research and Applications*.
- Taherdoost, H. (2016). Sampling methods in research methodology; how to choose a sampling technique for research. *How to choose a sampling technique for research (April 10, 2016)*
- Taniguchi, A., & Onosato, M. (2018). Effect of continuous improvement on the reporting quality of project management information system for project management success. *International Journal of Information Technology and Computer Science*.
- Zhao, L., Tian, L., Cai, T., Claggett, B., & Wei, L. J. (2013). Effectively selecting a target population for a future comparative study. *Journal of the American Statistical Association*.

APPENDICES

Appendix I: Letter of Transmittal

Dear Respondent,

RE: REQUEST FOR RESEARCH DATA

Introduction

The person conducting the interview is currently enrolled at the University of Nairobi. He is doing a survey research on a case of Qwetu students housing construction projects by Acorn Holdings Limited in order to investigate the influence that project management information systems have on the performance of students housing construction projects. All of the information and data that is gathered will be kept strictly secret, and it will only be used for academic reasons. You were randomly selected, among many of the staff who work for Acorn Holdings Limited (AHL), as key informants who can provide useful and reliable information. All information you submit will be held in the strictest confidence. Thank you in advance for helping out in the study.

Yours Sincerely,



Kelvin Salasya W.

Research Student,

Masters in Project Planning and Management (MAPPM)

Faculty of Business and Management Sciences

University of Nairobi

Appendix II: Respondent's Questionnaire

Section A: Background Information

Tick the box on the appropriate response from the alternatives provided.

(I) Select your gender: Male Female

(II) Select your age bracket (in years)

- A. 18-30
- B. 31 - 40
- C. 41 - 50
- E. 50 and above

(III) Select your years of work experience:

- A. Less than 1 year
- B. 1-5 years
- C. 6-10 years
- E. 11-20 years
- F. 21 years and above

(IV) Select your highest level of education:

- (1) Primary
- (2) Secondary
- (3) Certificate
- (4) Diploma
- (5) University

(V) What is your designation in the firm?

- A. Managerial
- B. Technical
- C. Non-Technical
- D. Trainee

(VI) Rank your level of skill in use of computer applications in project reporting and analysis

- A. No skills
- B. Low level
- C. Medium level
- D. Highly skilled

Section B: INDICATORS TRACKING SYSTEM

Using a scale 1-5 tick the appropriate answer from the alternatives provided for each of the questions. 1. Strongly Disagree 2. Disagree 3. Uncertain 4. Agree 5. Strongly Agree

To what extent does procurement planning and monitoring systems influence student housing construction projects performance?

Statement	1	2	3	4	5
Use of ITS results to a higher number of tasks completed on time					
ITS improves cost monitoring and budgetary control					
ITS enhances productivity of the workforce					
ITS facilitates easy channels for performance review					
Use of ITS results to higher quality and standards in project output					

Section C: DISBURSEMENT PLANNING AND TRACKING SYSTEM.

Using a scale 1-5 tick the appropriate answer from the alternatives provided for each of the questions. 1. Strongly Disagree 2. Disagree 3. Uncertain 4. Agree 5. Strongly Agree

To what extent does disbursement planning and tracking systems influence student housing construction projects performance?

Statement	1	2	3	4	5
Use of DPTS improves planning and budgeting of resources					
DPTS improves monitoring of payment processes					
DPTS increases transparency and accountability in cost management					
DPTS enhances financial autonomy and cost effective decision making					

Section D: PROCUREMENT ACTIVITY TRACKING SYSTEM

Using a scale 1-5 tick the appropriate answer from the alternatives provided for each of the questions. 1. Strongly Disagree 2. Disagree 3. Uncertain 4. Agree 5. Strongly Agree

To what extent does procurement activity tracking systems influence student housing construction projects performance?

Statement	1	2	3	4	5
PATS enhance monitoring of procurement expenditures throughout the time cycle					
PATS improves monitoring of vendor performance					
Use of PATS helps in value engineering and cost savings					
PATS enhances the standardization of quality specifications					

Section E: PROJECT SCHEDULE TRACKING SYSTEM

Using a scale 1-5 tick the appropriate answer from the alternatives provided for each of the questions. 1. Strongly Disagree 2. Disagree 3. Uncertain 4. Agree 5. Strongly Agree

To what extent does project schedule tracking systems influence student housing construction projects performance?

Statement	1	2	3	4	5
PSTS breaks down the scope of work in realistic and achievable goals					
PSTS improves monitoring of key milestones and timelines					
PSTS forecasts risks and mitigation strategies					
PSTS enhances quality of project deliverables and processes					

Section F: PERFORMANCE OF STUDENTS HOUSING CONSTRUCTION PROJECTS

Using a scale 1-5 tick the appropriate answer from the alternatives provided for each of the questions. 1. Strongly Disagree 2. Disagree 3. Uncertain 4. Agree 5. Strongly Agree

What is the impact of improved performance of student housing construction projects?

Statement	1	2	3	4	5
Students housing construction projects operating within the limits of the construction budget and timelines indicate good performance					
Well performing students housing construction projects are delivered with high quality and few defects					
Client satisfaction in output and services rendered are qualities of a well performing of students housing construction projects					
Effective performance of students housing construction projects has a high impact and profitability					
Compliance to safety and environmental standards points to good performance of students housing construction projects					

Appendix III: Approval Letter from the University



UNIVERSITY OF NAIROBI
FACULTY OF BUSINESS AND MANAGEMENT SCIENCES
OFFICE OF THE DEAN

Telegrams: "Varsity",
Telephone: 020 491 0000
VOIP: 9007/9008
Mobile: 254-724-200311

P.O. Box 30197-00100, G.P.O.
Nairobi, Kenya
Email: fob-graduatestudents@uonbi.ac.ke
Website: business.uonbi.ac.ke

Our Ref: **L50/10215/2018**

September 28, 2022

National Commission for Science, Technology and Innovation
NACOSTI Headquarters
Upper Kabete, Off Waiyaki Way
P. O. Box 30623- 00100
NAIROBI.


RE: INTRODUCTION LETTER: KELVIN SALASYA WAKHULE

The above named is a registered Master of Project Planning and Management Student at the Faculty of Business and Management Sciences, University of Nairobi. He is conducting research on: "**Project Management Information System and Performance of Students Housing Construction Projects in Kenya; A Case of Qwetu Students Housing Projects**".

The purpose of this letter is to kindly request you to assist and facilitate the student with necessary data which forms an integral part of the Project.






The information and data required is needed for academic purposes only and will be treated in **Strict-Confidence**.

Your co-operation will be highly appreciated.


PHILIP MUKOLA (MR.)
FOR: ASSOCIATE DEAN,
FACULTY OF BUSINESS AND MANAGEMENT SCIENCES

PM/fmi

Appendix IV: NACOSTI Research Permit License

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 762360	Date of Issue: 17/October/2022
RESEARCH LICENSE	
	
This is to Certify that Mr.. Kelvin Salasya of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: Project Management Information System And Performance Of Students Housing Construction Projects In Kenya; A Case Of Qwetu Students Housing Projects for the period ending : 17/October/2023.	
License No: NACOSTI/P/22/20824	
762360 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.	
See overleaf for conditions	