

**PROJECT MANAGEMENT DYNAMICS AND PERFORMANCE OF
KENYA ELECTRICITY GENERATING COMPANY PROJECTS**

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**A RESEARCH PROJECT REPORT SUBMITTED TO THE SCHOOL OF
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DECLARATION.

This project report is my original work and has not been presented for a degree in any other university.

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The support from my family also cannot go unnoticed.

TABLE OF CONTENTS

DECLARATION.....	II
ACKNOWLEDGEMENT	III
ACRONYMS AND ABBREVIATIONS.....	IX
OPERATIONAL DEFINITIONS OF TERMS.....	X
ABSTRACT	XII
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the study	1
1.1.1 Project Performance.....	4
1.1.2 Project Management Dynamics	6
1.1.3 Kenya Electricity Generating Company Projects	10
1.2 Statement of the problem	12
1.3 Objectives of the study.....	15
1.3.1 General Objectives of the study	15
1.3.2 Specific Objectives.....	15
1.3.3 Research Questions	15
1.4 Significance of the study.....	16
1.5 Scope of the study.....	17
1.6 Limitations of the study	18
1.7 Organization of the study.....	18
CHAPTER TWO: LITERATURE REVIEW.....	20
2.1 Introduction.....	20
2.2 Theoretical review.....	20
2.2.1 Theory of Constraints.....	21
2.2.2 System Theory	24
2.2.3 Competence Theory of Project Management.....	26
2.3 Empirical Literature Review	28
2.3.1 Finance Dynamics and Project Performance.....	28

2.3.2	Project-Procurement Dynamics and Project Performance	32
2.3.3	Organizational Dynamics and Project Performance.....	37
2.3.4	Individual Dynamics and Project Performance	44
2.3.5	Stakeholder Management Dynamics and Project Performance.....	48
2.4	Summary of Literature Review and Research Gaps	54
2.5	Conceptual Framework.....	67
CHAPTER THREE: RESEARCH METHODOLOGY.....		69
3.1	Introduction.....	69
3.2	Operationalization and Measurement of Variables.....	69
3.3	Research Design.....	70
3.3.1.	Empirical Model.....	70
3.4	Target Population.....	71
3.5	Sampling Design.....	72
3.6	Data Collection Instrument	73
3.6.1	Pilot Study.....	73
3.6.2	Validity of Research Instrument	74
3.6.3	Reliability of Research Instrument.....	75
3.7	Data Collection Procedure	77
3.8	Data Analysis and Presentation.....	77
3.9	Ethical Considerations	79
CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION		81
4.1	Overview	81
4.2	Participants Response.....	81
4.3	Demographic Information.....	82
4.3.1	Gender	82
4.3.2	Years of Experience in Employment.....	82
4.3.3	Respondents Classification by Number of Years.....	83
4.3.4	Project Type Experience.....	84
4.4	Descriptive Statistics and Qualitative Data Analysis.....	86
4.5 1.	Performance of Electricity Generation Projects.....	86
4.5 2.	Finance and Performance of Electricity Generation Projects	88

4.5 3.	Project Procurement Dynamics and Performance of Electricity.....	
	Generation Projects.....	90
4.5 4.	Organizational Dynamics and Performance of Electricity	
	Generation Projects.....	92
4.5 5.	Individual dynamics and performance of electricity generation projects .95	
4.5 6.	Stakeholder Management Dynamics and Performance of	
	Electricity generation projects.....	97
4.5	Inferential Statistics for Study Variables	100
4.6 1.	Diagnostic Tests	100
4.6.1. 1.	Multicollinearity Test	100
4.6.1. 2.	Heteroskedasticity test.....	101
4.6 2.	Correlation Analysis.....	102
4.6 3.	Regression Analysis	105
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ..		112
5.1	Overview	112
5.2	Summary of the study	112
5.3	Conclusion.....	115
5.4	Recommendations:.....	116
5.5	Suggestions for Further Research	117
REFERENCES.....		118
Appendix I:	QUESTIONNAIRE	131
Appendix II:	INTRODUCTORY LETTER.....	138
Appendix III:	KENYATTA UNIVERSITY RESEARCH	
	APPROVAL LETTER.....	139
Appendix IV:	KENYATTA UNIVERITY RESEARCH	
	AUTHORIZATION	140
Appendix V:	NACOSTI RESEARCH PERMIT	141

LIST OF FIGURES

Figure 2.1: Illustration On Theory Of Constraints	23
Figure 2.2: Illustration Of System Theory Of Management	25
Figure 2.3: Conceptual Framework	67
Figure 4.2: Years In Employment	83
Figure 4.3: Respondents Age.....	84
Figure 4.4: Project Type Experience	85

LIST OF TABLES

Table 2.1: Summary of Research Gaps	55
Table 3.1: Measurement of Variables.....	69
Table 3.2: KenGen Project Staff Population	72
Table 3.3: Reliability Test Results	76
Table 4.1: Respondents' Response Rate.....	81
Table 4.2: Project Performance	87
Table 4.3: Finance Dynamics and Project Performance.....	88
Table 4.4: Rating on Project Procurement Dynamics	90
Table 4.5: Organizational Dynamics and Performance of Electricity Generation Projects	93
Table 4.6: Individual Dynamics and Performance of Electricity Generation Projects	95
Table 4.7: Stakeholder Management Dynamics and Performance of Electricity Generation Projects.....	97
Table 4.8: Multicollinearity Test Results	100
Table 4.9: Output Coefficient on Glejser Test	101
Table 4.10: Correlation Coefficient Between Performance of Electricity Generation Projects and Project Dynamics.....	103
Table 4.11: Model Summary	106
Table 4.12: Anova	107
Table 4.13: Regression Coefficient	108

ACRONYMS AND ABBREVIATIONS

KenGen- Kenya Electricity Generating Company Plc

KPLC- Kenya Power and Lighting Company Plc

Kwa- Kilowatt hours

PIT- Project implementation team

PMBOK- Project management body of knowledge

PMI- Project management Institute

PPA- Power Purchase agreement

PPP- Public Private Partnership

WBS- Work breakdown structure

MW- Megawatts

MWh- Megawatt hours

TOC- Take over certificate.

OPERATIONAL DEFINITIONS OF TERMS

Individual Dynamics – The human aspects of the implementers of a project such as academic background, social behaviour and skills as well as competence and experience in project management.

Stakeholders Management- Measures employed by the project implementors in dealing with players in the community where electricity generation project is under implementation such as the local community and the county government.

Projects Management Dynamics- Varied and interacting project aspects that influence project accomplishment. They include project finance dynamics, project procurement dynamics, organizational dynamics, individual dynamics and project stakeholder management dynamics.

Project Financing Dynamics- This entails the type of financing used to fund the project such as internal financing, government guaranteed loans, venture capital, public private partnership or foreign direct investment. The behaviour of the financing organization in disbursing finances, including budgeting, is also involved since it determines supplier relations and project cashflow.

Project Performance: This implies the ability of a business to attain quality deliverables and results at the scheduled time and budget and meet expectation of stakeholders consistent with project management institute definition of project management.

Project Organization Dynamics- Institutional governance structures and leadership approaches. Organization dynamics also relate to aspects such on decision making capacity, documented procedures and processes as well as organization culture.

Project Procurement Dynamics- This entails the type of procurement applied to source for goods and services to run the project such as direct procurement, restricted tendering or open tendering. Procurement dynamics also include the formulation of project procurement plan.

ABSTRACT

Kenya continues to face challenges regarding actualization and timely implementation of electricity generation projects aimed at increasing electricity capacity required in the quest for attaining industrialization status by year 2030. Out of the projected flagship electricity generation projects, less than 20 percent of the projects had been translated into the national grid by the end of year 2022. For instance, out of the 105 Mega watts exploited geothermal steam potential in Menengai fields and three earmarked and awarded generation projects targeted for completion by year 2019, no electricity generation project had been initiated and connected to the national grid by end of year 2022. Such trends calls for an in-depth study of project dynamics that determine the performance of electricity generation projects. To research the problem, focus was given to Kenya Electricity Generation Company (KenGen) Plc which is a state-owned electricity generation company accounting for 60 percent of electricity generation market share in Kenya. The purpose of the study was to determine the project management dynamics that determine performance of electricity generation projects. Specifically, the study sought to evaluate the influence of project financing, project procurement, organization dynamics, individual dynamics and stakeholder management dynamics on performance electricity generation projects in KenGen. The study was anchored on system theory, constraints theory, and competence theory of project management. The earmarked population was 10 electricity generation projects implemented by sixty-eight employees who had formal project management appointment in the power plant construction projects , that ranged from hydroelectric, geothermal, thermal and wind generation modes. Due to the limited size of the population, census survey method was proposed targeting the sixty eight respondents. Sixty four participants responded to the survey. Information collection was through questionnaires administered to the respondents. Descriptive and inferential statistics were used to analyse the data. Multiple regression analysis was used to determine the relationship between the variables. The study established that all the independent variables had positive regression coefficient, indicating that unit rise for each independent variable facilitated a consequent rise in the dependent variable. However, only finance dynamics revealed statistically significant effect ($\beta = 0.532$, $p = -0.001$ and less than 0.05), indicating that project finance dynamics had a significant effect on performance of electricity generation projects. The study recommended that priority should be given to finance dynamics while scoping the electricity projects, above other project dynamics. Financial analysis of the project financier's capacity to ensure uninterrupted project milestones financing was identified as an aspect requiring consideration in project financing. This outcome will be helpful to stakeholders in energy sector, academicians and electricity projects financiers. Suggestions were made for further studies on other financial dynamics not accounted in the study as well as non- financial dynamics that were not established to bear significant effect on generation projects.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Electricity generation projects are capital intensive projects that call for in-depth performance review owing to their capital complexity and capital-intensive nature. For instance, Republic of China has elaborate project pipeline and utilizes state enterprises to construct Power Plants. Analysis of the China's coal generation projects have been cited to be lacking in efficient financial analysis when a comparison is made between short time gains and long-term sustainability as a result of carbon pricing (Clark et al., 2022). Renewable energy projects in United States of America long time maintenance declines when the Wind generation projects exceed tax credit period. This is indicative of a practice of aligning the project to profitability than plant efficiency by the government contracted private enterprises (Hamilton et al., 2020). In the African region, power projects performance is influenced by factors such as government regulatory framework and project financing which has led to limited power availability for industrialization (The World Bank, 2021).

Locally, electricity generation plays a critical role in economic development through provision of electric power for domestic and commercial use in Kenya. Due to the sensitive

nature of the energy sector, the government of Kenya since 1950 has been a major shareholder in power plant projects with the aim of achieving reliable and cost-effective energy. However, despite the long history of power production and government involvement, the pace of completion of power production plants continues to lag behind scheduled project completion time. A report by KenGen Plc observed that construction risks associated with energy generation projects include delays in completion and commissioning. Cost overruns and project delays were also cited as likely to occur due to factors outside the control of the companies and contractors. (Kenya Electricity Generating Company PLC, 2022)

As a result, the power generation projects produce electricity at inconsistent levels and below optimum capacity leading to minimal production levels in the economy. In effort to address these limitations several legal and structural efforts have been put in place for instance in year 1997, the energy act was reviewed to separate power generation with power distribution leading to formation of KenGen- (Generation Scope) and KPLC (Distribution scope) as a power distributing company. It was expected that the restructuring would enhance optimal project management and performance due to reduced management span of control. However, despite these efforts, management of power generation projects has not adhered to project completion timelines for construction of power plants projects, as well as cost and quality optimization. The aspiration of full access of power by the entire Kenyan population was projected to be achieved by year 2022 (International Energy

Agency, 2019). However, this has not been the case because as per KPLC annual report as at 30th June 2021, the households' connectivity level was at 70 percent (Kenya Power, 2021). The lack of attainment of targeted universal connectivity target by year 2022 is an outcome that require to be explored from all fronts including contributing factors arising from electricity generation project management dynamics.

A report by Power Africa (2021) while acknowledging success in the power sector, also analysed project management challenges relating to project dynamics such as project financing, procurement and project stakeholders. The report observed that success for Kenya Electricity generation project for the year under review was attributable to foreign direct investment private and Private Public Partnership financing approach. (Power Africa, 2021). The power Africa report gave indication and emphasis on need to embrace non-conventional financing strategies for electricity generation projects.

Therefore, it can be established that there exists a need to study electricity generation sector and determine project management dynamics that require to be optimally applied in power generation projects to address the country's electricity generation challenges. The project management dynamics are varied and include project financing, project procurement dynamics, organizational dynamics, individual dynamics and stakeholder management.

1.1.1 Project Performance

Performance of a project relates to establishment and closure for a project within time, set resources and standard (Project Management Institute, 2017). Similarly, successful project performance has been described as meeting project objectives within schedule, budget, desired performance, and technical level while employing the allotted resources effectively and efficiently to the satisfaction of the customer (Kerzner H. , 2017). In this study performance of electricity generation energy project has been investigated in the context of timely attainment, implementation within budget and serving the intended electricity generation output to the satisfaction of stakeholders.

A review of electricity generation projects globally has shown that projects may not meet all these elements of project performance. An electricity generation project is a long-term project that lasts for around 25 years and therefore is a major capital investment project requiring special focus. Ability to get all the performance elements right is therefore very critical. A project performance review of the largest electricity generation project in the world-Three Gorges hydroelectric power station in China a 22,500 Mega Watts (Mw) plant, is indicative that performance element of a project may not be met as per projection. The project costed a total of us \$ 29 billion and took nineteen years, from year 1993 to year 2012, to complete all the project milestones. The project finally met its output of 22,500 Mw. and was completed within the projected time in year 2012 (Duduu, 2013). However, the project was faced with myriad of project performance challenges ranging from complaints from some key stakeholders over ecological effects on farming and fishing due

to siltation. Displacement of 1.4 million people raised human rights concerns. Project quality was affected through corruption allegations where some contractors won tenders through bribery and unethical savings and made through supply of substandard machinery and materials. (Hufstutter, 2020). Though the mega project met the quality output of 22,500 Megawatts, the project was implemented at a higher cost due to the cited challenges with some stakeholders. Similar project performance challenges relating to stakeholder management have been encountered in regional electricity generation projects as well as in the country. The upcoming largest hydroelectric project named 5000 Megawatts Grand Ethiopian Renaissance Dam (GERD) started in year 2010 and expected to be commissioned in year 2022, has since not received regional acceptance because of ongoing disputes over the risk of water loss downstream in Sudan and Egypt and a year 1959 treaty signed between Sudan and Egypt over utilization of Nile waters. The project performance issues relating to timely completion and regional stakeholder management has affected the project indirect cost such that an analysis of Ethiopia- Kenya electricity grid connection revealed that Ethiopia was a net electricity exporter for Kenya in the entire year 2022 with a smaller margin compared to Uganda, for instance in December, imports from Ethiopia accounted for 1.79 Giga Watts hours while Uganda was a net exporter for Kenya in December with export balance of 24.15 Giga Watts hours , according to data summed from Kenya Bureau of Statistics (Kenya National Bureau of Statistics, 2023, p. 31).

The Kenyan experience has shown that there are varied Project performance attributes at play in Kenya according to Presidential Taskforce on Power Purchase Agreement (Presidential Taskforce on Power Purchase Agreement, 2021). The report observed that

besides the high cost of putting up power plants passed through the electricity consumers in form of electricity tariff, there are other project performance dynamics of concern relating to: extended duration in completing projects and their financial consequences on the tariff; constant breakdown of existing powerplants raising issues on power projects quality in addition to subjecting the country to use more diesel powerplants in place of cost effective renewable energy plants and dissatisfied customer due to lack of reliable and cost effective electric power.

1.1.2 Project Management Dynamics

Project management dynamics is looked at as a collection involving management processes including laid systems a company utilizes geared towards completing projects effectively. The dynamics range from financial to non-financial factors. Some of the non-financial project dynamics cited in the past in power projects include stakeholder management, project planning, monitoring and evaluation (Ocharo & Kimutai, 2018). Therefore, project management dynamics found to influence infrastructure projects in Kenya range from finance dynamics and varied management aspects not directly linked to finance. Research involving categorization of project management dynamic identified variety of dynamics and prioritized the most critical factors that project managers should focus on (Mavi & Standing, 2018). Using Fuzzy logic analysis, dynamics related to senior executive support, project financier support, stakeholder aspirations focus on project beneficiaries' requirements were identified to be the weightier project factors that should be prioritized by project managers. Understanding of the most critical dynamics was found to be essential

in enabling project implementers determine where to place more focus in project management to achieve successful outcome. Project financing in the study was a major factor. However, it was not the only factor because project management dynamics not arising from project finance and are related to social dynamics such as the cited senior executive support, project financier support, stakeholder aspirations and focus on project beneficiaries, also were found to play a key role.

A county-based study was also conducted where project dynamics ranged from financing dynamics, management dynamics and social aspects in the study which involved project dynamics and performance of agricultural projects (Simiyu et al, 2018). The results explained that all aspects relating to project scheduling, project execution, tracking & appraisal and project messaging impacted project targets. The link between project management methods and project performance was found to be influenced by environmental enablers as a moderating variable. An observation by the study was that to attain envisaged outcome, a recommendation was made to the effect that a well-defined scheduling, execution, tracking & appraisal and messaging procedures need to be activated. The report also suggested that agricultural project management at the county level should include stakeholders such as farmers and local leaders, rather than being limited to office planning. The study harnessed a variety of project management dynamics that also include dimension involving social factors according to the weight placed on stakeholder engagement recommendation.

Energy projects management dynamics are similar to aspects applied in the above infrastructure projects. Some of the aspects requiring to be subjected to investigation include finance and non-finance dynamics such as project procurement, organizational, individual and project stakeholder management aspects. Analysis of global, regional and local projects have indicated that the above dynamics influence the project performance (The World Bank, 2021). Dhanjal (2021) affirmed the above position in an energy sector study on project risks affecting electricity connectivity project in Murang'a. It was established that political as well as sociocultural dynamics greatly affected projects.

Because of the scale of energy projects especially the high cost and the long duration of contract with the off taker (KPLC) that takes approximately 25 years, attracting financing for the generation projects poses a challenge. A study by Power Africa indicated that KenGen's balance sheet status would not place the company in a position that it can attract loans to expand its project line-up. The report further indicated that effort at the time to enhance statement of financial position and working efficiency was far off the financial health target (Power Africa, 2016). While progressing successful outcome in project financing, non-balance sheet dependent financing approach was showcased in a coted Power Africa supported project in Kenya named Kipeto wind Power Project whose financing approach was Public Private partnership (PPP). The approach led to timely project execution of the making the project to be the second largest wind power project in Africa (Power Africa, 2021).

Related to project financing dynamics is project procurement dynamics. The lean finance funds for generation projects, necessitates all efforts to be made for the funds to be optimally utilized and thus ensure that project duration is adhered. Adhering to project schedule has a financial implication where contractual oriented penalties are avoided. To utilize funds in KenGen, project procurement should adhere to Public Procurement and assets Disposal Act of year 2015 which at times might slow down procurement because of procedural rigor. A study on project implementation limitations for large projects in South Africa cited procurement law and processes rigor as significant factors affecting timely and cost effective implementation of large infrastructure projects. (Simushi & Wium, 2020). Dhanjal (2021) observed that timely procurement can alienate inflationary risk that come with increase in prices as a result of lack of advance procurement. Project procurement risks have been managed in diverse ways locally and internationally. For instance, during construction of Three-Gorges Hydro station project, the Chinese government engaged six suppliers to manage the projects supply risk of having one or few suppliers (Hufstutter, 2020). Project procurement innovation as well as knowledge on project procurement approaches in Kenya is therefore an area requiring in depth study. Dhanjal (2021) observed that political and social cultural dynamics were the greatest concerns in project risk in electricity connectivity sector. This study therefore informs the need to consider such other project dynamics besides project financing and procurement. These aspects include individual dynamics, organizational dynamics and stakeholder management dynamics. These dynamics come in handy because the of structure of KenGen, is a government state corporation. The corporation further require applying principles of corporate governance

to successfully deliver project by embracing the necessary project management dynamics. Further to this, the company require to relook at individual dynamics that can influence performance of projects. Such dynamics requiring extra determination in the public sector, include aspects such as competency of project teams and project implementation team skill mix that was explored in this study. Management of both the internal stakeholders as well as external stakeholders such as financiers and county government also deserve in depth study going by experience faced by some generation projects that had sufficient funding but stalled as a result of stakeholder concerns. One of the past major projects that had financing arrangement but could not proceed because of environmental concerns, social impact analysis and stakeholder management plan is Lake Turkana Wind Project transmission line. Midway project implementation a government Partial risk guarantee was required to safeguard financing by ensuring that the nonfinancial project dynamics relating to social and environmental factors were addressed (Cormack & Kurewa, 2018)

1.1.3 Kenya Electricity Generating Company Projects

KenGen Plc operate electricity generation projects relating to production through varied modes from geothermal, thermal, wind, solar and hydro projects.

The major electricity generation plants are complex projects that are capital intensive, have complex quality requirement and take considerable amount of time to construct. A geothermal plant takes a minimum of seven years from drilling well to commissioning (Kenya Electricity Generating Company PLC, 2022). Once constructed, a power purchase agreement (PPA) of around 25 years is signed between the company and its power off-

taker who in this case is KPLC within a monopoly setup. The stringent PPA has penalties when KenGen is unable to generate according to declared capacity. The inadequate generation also has effect on reliability of the national grid and in turn in the economy for sectors and industries that are dependent on electricity. A presidential taskforce on Power sector observed that a PPA end outcome must strike a balance between the buyer's and seller's financial needs. If any partner suffers a severe disadvantage, the PPA's long-term viability is jeopardized (Presidential Taskforce on Power Purchase Agreement, 2021). This necessitates the need to ensure that the project phase involving construction of the power plant meets the highest quality. Efficient project management at this phase require to be studied because the construction project outcome has a bearing on the 20-30 years operation phase of the project as cited in the report.

Taking stock of two electricity generation projects projections done in year 2014 for projects that were targeted to be completed by year 2016. Only one project had been completed. The completed project is Olkaria V whose completion time was in November 2019 against the stated initial project projection in year 2016. During project implementation time review, KenGen had targeted to complete the project in September 2019 as published in year 2018 Annual report (KenGen Plc, 2018). Despite the targeted completion date, there was a four months delay. Within the same report, the plan for commissioning of the second project dubbed Olkaria 1 Unit 6, an 83 Mw project was stated to be January 2021. Similarly, the latter project was also not commissioned as planned in year 2021 but moved to year 2022 (Kenya Electricity Generating Company PLC, 2022)

Besides the delayed project during construction phase, there were other anticipated projects whose construction had not begun at the time when the project was supposed to be commissioned. Such projects include 85 Mw Phase 1 Meru wind project and 10 Mw Ngong wind project. The projections were documented in year 2016 (Kenya Electricity Generating Company, 2016). A comparison of the project progress report contained in year 2022 financial report indicate 85 Mw project having been dropped in the project pipeline and Ngong Wind project as a project still under project scoping (Kenya Electricity Generating Company PLC, 2022). An in-depth look into project dynamics and performance of electricity generation projects is therefore a matter of project management study in Kenya.

1.2 Statement of the problem

A comparison of cost of tariff in Kenya versus developed countries reveal that cost of power is higher in Kenya. As the country expand access to power through generation projects, focus on all project cost aspects that address affordability should also be attended to. It had been cited that the cost of power is higher in Kenya than in United states -Appx US\$0.43 versus US\$0.12 respectively (Kojima & Trimble, 2016). Project Management institute cite performance of projects to the satisfaction of customers as a key aspect of project performance (Project Management Institute, 2017).

At regional level, it is observable that electricity generation projects in Kenya have not met the national demand for instance, in December 2022, analysis of power consumption on Kenya-Ethiopia and Kenya- Uganda electricity grid connection revealed that Ethiopia was a net electricity exporter for Kenya in the entire year 2022 with a smaller margin compared

to Uganda, for instance in December, imports from Ethiopia and Uganda were 27.73 Giga Watts hours while export was a meagre 1.79 Giga Watts hours making Kenya a net importer of electricity (Kenya National Bureau of Statistics, 2023, p. 31). This is despite the country's aspiration to play a leading role in electricity generation in the East African region. This calls for an enquiry into ability of generation projects to meet national electricity demand as well as attain reserve for export in the regional market.

In as much as there is a long history of implementing electricity generation projects, performance of the project has continued to attract dismal results. In year 2021, the government of Kenya observed wanting performance of the electricity generating sector and commissioned a taskforce to review power purchase projects in the country. The review was occasioned by high cost of power arising from the consumer having to compensate for high cost of constructing power plants, frequent power outages, electricity project implementation delays among other factors (Presidential Taskforce on Power Purchase Agreement, 2021). Project performance is rated based on completion within time, budget, quality and satisfaction of customers (Project Management Institute, 2017). The absence of the above project performance attributes occasioned formation of the taskforce.

Despite improved percentage population access of power at 70 percent in Kenya against the average sub-Saharan average of 46 percent (The World Bank, 2021), the cost of electricity in Kenya has remained prohibitive hindering the economic growth of the country. Inability of the electricity generation project to meet the expectation of customers on affordable and reliable power is an aspect that require an in-depth study to identify the

project management dynamics that determine performance of the electricity generation projects.

Most of the research on energy sector project management dynamics has focused on electricity distribution at the customer end without focusing on the project dynamics at electricity generation end. For instance, a report by Netherlands enterprise Agency cited that Kenyan businesses lose almost 10 percent of their output due to power interruptions and variations. The report further explained that as a result, domestic energy that is sustainable, affordable, and reliable for all citizens has been recognized a priority factor in national policy (Mokveld & Von, 2018). This in-depth analysis focused on electricity output at the consumer end and did not explore contributing factors resultant from project dynamics at the source of electricity or generation phase. A study on Project attainment uncertainties and accomplishment of KPLC Last-mile connection venture also veered off power generation project aspects and focused on project risks during distribution (Dhanjal, 2021). Similarly, a power sector study on management dynamics and accomplishment of upcountry powering projects identified that tracking and assessment, uncertainty mitigation, and capital sourcing all had significant bearing on project accomplishment. The studied project management processes were nevertheless focused on electricity distribution projects (Kathongo, 2021). The above studies have focused on project management dynamics related to electricity distribution projects- which form tail end of the electric power system and did not focus on projects dynamics at electricity generation phase which forms the foundation of electricity sector projects. This research aspires to meet this study gap.

1.3 Objectives of the study

1.3.1 General Objectives of the study

The general objective regarding the research was geared towards examining project-management dynamics and project-performance of Kenya Electricity Generation Company projects.

1.3.2 Specific Objectives

The study sought to:

- (i) Examine the influence of project finance dynamics on project performance of Kenya Electricity Generating Company projects.
- (ii) Establish the extent that project procurement dynamics determine performance of Kenya Electricity Generating Company projects.
- (iii) Ascertain influence of organization dynamics on project performance of Kenya Electricity Generating Company projects
- (iv) Assess the how individual dynamics affects project performance of Kenya Electricity Generating Company projects.
- (v) Evaluate the effect of stakeholder management on performance of Kenya Electricity Generating Company projects.

1.3.3 Research Questions

The research pursued sought for evidence to address the following questions:

- (i) How do project finance dynamics determine performance of Kenya Electricity Generating Company projects?
- (ii) What influence do project procurement dynamics have on performance of Kenya Electricity Generating Company projects?
- (iii) How do organization dynamics determine performance of projects in Kenya Electricity Generating Company?
- (iv) To what extent do individual dynamics determine performance of Kenya Electricity Generating company projects?
- (v) What influence do stakeholder management dynamics make on performance of Kenya Electricity Generating company projects?

1.4 Significance of the study.

The energy sector is a critical determinant of social economic and political development of Kenya as envisaged in the country's vision 2030. In this regard, this research is helpful in informing the energy stakeholders about aspects that determine optimal and sustainable electricity energy projects in Kenya. The stakeholders in the electricity sector are varied. They include the public who depend on electricity for lighting, industries who depend on electrical energy for production, shareholders who expect dividend and capital gain from optimal performance of power plants, the Energy Regulatory Commission whose mandate it to develop policy guidelines on energy, Kenya Power co Ltd who is the sole power off taker and power distributor and who has

an obligation to ensure steady electric power supply to consumers the government which is charged with ensuring affordable & reliable power supply to citizens, financiers and private investors who fund projects and expect the project to be a going concern in order to be assured that the financial covenants will be honoured. The study will further enhance energy project aspects knowledge to academicians as well as act as a basis for further research in energy sector projects within the East African Region and the entire Africa.

1.5 Scope of the study.

This research centered on dynamics that determine performance of electricity generation projects within Kenya Electricity Generating Company. Project performance has been adopted as timely completion of project, cost optimization and project quality to the expectation of project stakeholders and profit to the investing company. The project performance aspects under focus were project financing dynamics, project procurement dynamics, project management dynamics, organization dynamics, individual dynamics, and stakeholder management.

The scope of this study was power generating state corporations, but the focus was power plants projects in Kenya Electricity Generating Company Plc. This research focused on projects implemented in KenGen business areas within five main business regions in Kenya i.e., Geothermal projects in Olkaria, Thermal project in Kipevu and Garissa, Hydro generation project within 7 forks as well as Upper Tana and Wind Power project in Ngong.

1.6 Limitations of the study

The respondents were distributed in various parts of the country. As a result, the use of self-filled questionnaires was established to be the most suitable data collection instrument to address the respondents drawn from a wide geographical span. However, use of self-filled questionnaire instrument can lead to limitations such as response rate levels and varied understanding of the instrument (Kothari & Garg, 2019). To address the challenge, piloting was done to address validity and reliability issues and ensure that the instrument would be understandable to the respondents.

Secondly, it is notable that all the electricity generation projects were not implemented at the same time. Some respondents who had taken long after implementing an electricity generation project for more than four years were likely to have forgotten on some aspects of project management experience. The respondents were nevertheless reassured to respond based on their experience and comprehension. Use of a census survey was instrumental in ensuring the entire population is involved thus harnessing recollections of the entire population. Census survey method further ensured that all the respondents with contemporary project management experience were involved.

1.7 Organization of the study

This research entails five chapters as outlined below. Chapter one addressed introduction of the research, problem statement, study purpose, research objectives & questions, research significance, limitations and delimitations, research assumptions, explanations of terminologies and an outline of the structure of the research. The second chapter explored,

and examined literature drawn around information from other studies. Third chapter described the method used to conduct the study. The fourth section gave perspectives of data examination, the discoveries as well as explanations of the research. Finally, the fifth chapter finalized this report with summary, inferences and suggestions.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Introduction

This section offers recent studies assessment regarding concept and Project Performance theory, which forms the study's dependent variable. It also goes through the independent variables forming the objective of the study, such as project financing, project procurement, organizational dynamics, individual dynamics and project stakeholder management. The study's conceptual framework is also given, as well as a synopsis of the literature and research gaps.

2.2 Theoretical review

Performance of electricity generation project was perceived by the researcher as a project that involve interaction of many players right from financiers, organization leadership, contractors and project implementation teams. The application of system theory is necessitated to explain interaction of the various players. The various human, business and environmental constraints involved called for application of theory of constraints in determining how the projects circumvent the various performance obstacles to attain optimal performance. The specialized and complex nature of the electricity generation projects also calls for need to explore the competencies required to achieve successful projects. Competence theory of management was explored to explain project managers competencies and their effect on performance of electricity generation projects.

2.2.1 Theory of Constraints

The theory was initially postulated by Eliyahu Moshe Goldratt (31st March 1947 – 11th June 2011) in a book titled *The Goal* (Goldratt, 1984). The theory suggests a methodology applied in business and organizations to single out constraints or bottlenecks standing out as an obstacle in achieving organizational goals. In addition, focus is given to improving the constraint to make it a reduced obstacle. Specifically, the obstacle is improved to a state that it no longer would present as constraint. Within manufacturing, a constraint is severally termed as a bottleneck. The theory of constraint holds that in each process there exists a constraint. It is crucial for the organizations in their applicable processes to adjust the constraints to improve their output. The theory further holds that if the constraints are not adjusted, the organizations entire process cannot be improved. Proponents of TOC advanced the theory of constraint by emphasizing that like in the case of 80-20 Pareto rule, there are few things to be done relating to the process amidst many things that do not have direct impact on the process (Cox & Schleier, 2010). The presumption was used to emphasise that there is need for organizations to determine critical processes that guide in keeping focus in any process endeavor, including a project. In explaining the criticality of focus, the writers stated that focus is doing what should be done. They went ahead to assert that focusing on everything is akin to not paying focusing on anything.

A study on theory of constraints in project management (Dostatni & Trojanowska, 2017) explained that the initial step is to identify the system component that is interfering with its overall performance. According to TOC, adjustments must begin with such a weak link

because enhancing other aspects of the system and improving local efficiency will have little effect on the system's overall performance. Each system has at least one restriction, which must be identified for proper management. The difference influencer should get enough capacity feasibly possible on the limiting aspect in the second stage, which is exploitation of the limitation. Each minute lost because of the constraint's failure is a loss that cannot be recovered. As a result, in this stage, the change agent should take the appropriate steps to assure the constraint's continuous operation to maximize the system constraint's capability. The third stage entails subordinating all possibilities and aligning to direction made, i.e., adjusting rate of work of other system elements to the constraint's rate of work. Otherwise, as other system elements produce quicker or more, the cost of production rises, owing to an increase in work-in-progress inventory, among other things. Dostatni & Trojanowska further stressed that steps 2 and 3 are critical in the TOC since they add to the system's structure. There are many more methods to improve the system and increase throughput. TOC provides for investments that contribute to enhancing the efficiency of the overall system by reinforcing the constraint in the fourth phase, referred to as raising the constraint's productivity. If the constraint is removed, which should happen because of step 4's ongoing performance improvement, it is important to identify another component that limits the production system's capability. Appropriate constraint identification opens several chances for business improvement and has a beneficial impact on performance measures. It is important to note that TOC was created as a tool for controlling restrictions, not for continual liquidation. It is vital to purposely leave the

constraint in the company at the appropriate time, and then control the bottleneck of the production system through proper management.

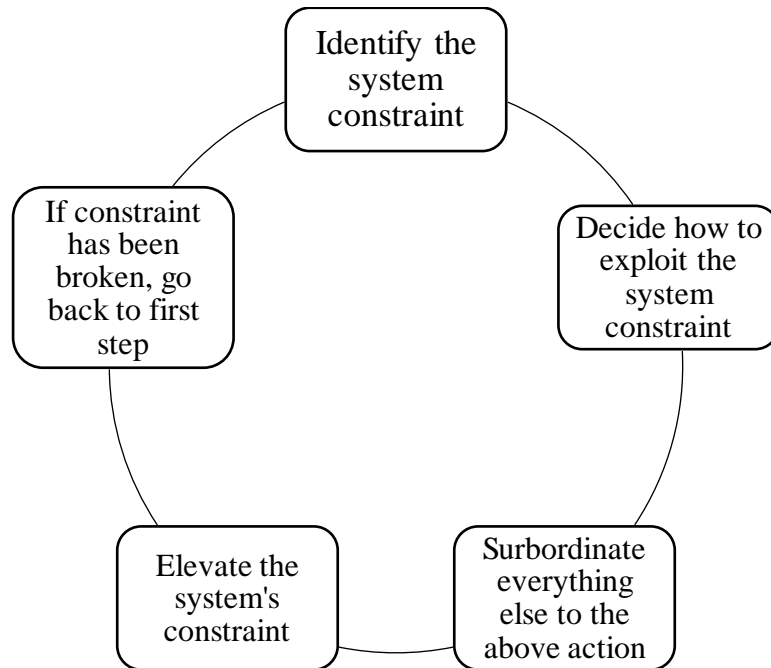


Figure 2.1: Illustration on theory of constraints

Source (Dostatni & Trojanowska, 2017)

Constraints theory is applicable to electricity generation projects. KenGen as a government owned company must overcome government bureaucracies which can be cited as bottlenecks. For instance, the company must adhere to public procurement and assets disposal acts to procure consultants and equipment. The procurement act provides for a minimum time that procurement must be done for instance a minimum of 30 days after advertisement even though an equipment might be required to hasten project implementation. Procurement timelines can be referred to as project time constraints for

KenGen. The electricity generation projects are capital intensive projects that in many instances are funded by development partners such as world Bank and Africa development Bank. The financiers place stringent conditions that can be cited as bottlenecks such as requirement to ensure benefits are transferred to communities and maintaining agreed profitability and efficiency ratios. For KenGen projects to succeed, focus on constraints that can prevent project financing and sustainability is a critical concern.

2.2.2 System Theory

System theory is rooted in science where there exists a need to focus on interaction of different attributes to achieve a function. Organizational management systems are made up of a number of internal subsystems that must always be in sync. As a company grows, more sophisticated subsystems emerge that must communicate with one another in order to convert inputs into outputs (McShane & Glinow, 2003). These interdependencies can quickly become so complex that a minor mishap in one subsystem might have far-reaching unintended consequences across the entire business. Every successful company does not live in a vacuum. It is well-known for its reliance on the outside world – which is part of a larger system that comprises the industry to which it belongs, the economic system, and society (Wehrich, Cannice, & Koontz, 2014). According to them, the organization receives inputs, converts them, and then distributes the results to the setting.

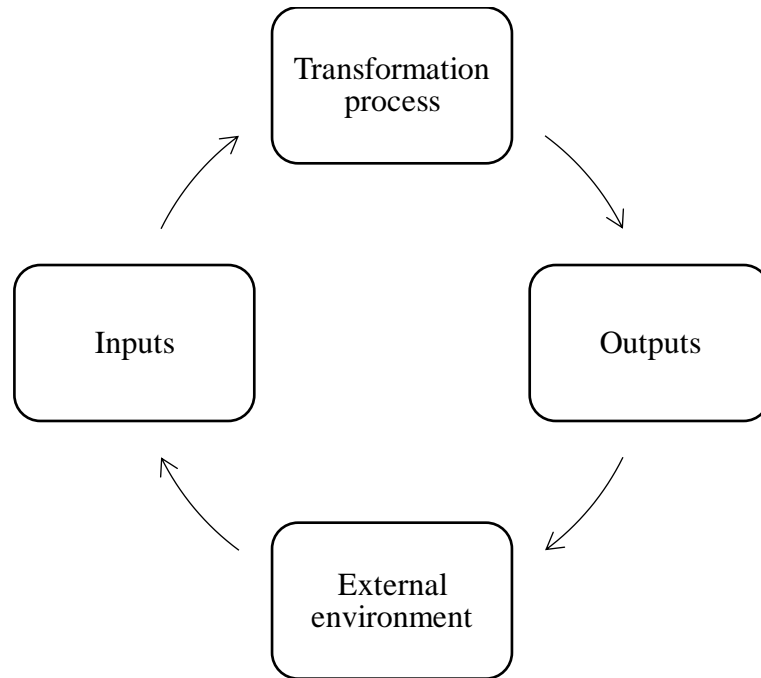


Figure 0.2: Illustration of system theory of management

Source: Wehrich et al (2014)

In a study on application of system theory in modern day, a conclusion was postulated that Systems Theory is a conceptual framework that includes a very empirical and investigative kind of management science (Chikere & Nwoka , 2015). It was also indicated that dominance of management in contemporary society had an evolutionary reason. The theory was described as one that clarified the role of complex organizations in modern society and predicted that organizational complexity, and thus management's role, is poised to increase – as long as the need to invest in management efficiency enhance greater organizational output.

System theory has a critical implication in electricity generation projects in Kenya electricity generating company projects. For a generation project to be successfully implemented varied stakeholders are activated. For instance, an environmental and social impact assessment has to be conducted involving environmental agencies and community. Project funding requires liaison with financiers. To guarantee project profitability, the off taker -KPLC must be engaged to arrive at a profitable power purchase agreement, The government through Energy and Petroleum Regulatory Authority must ensure that the agreed tariff is affordable to consumers and manufacturers. There are therefore varied inputs and outputs that make electricity projects to inevitably apply system theory of management to guarantee project success.

2.2.3 Competence Theory of Project Management

The competence theory was developed by McClelland & McBer, (1980). The authors defined competency as an individual's critical innate aspect that translate to enhanced performance of a process within an organization. The work by the authors led to expanded competence models for instance an extensive analysis by Rezende and Blackwell (2019), explained that the project management competence profile has 81 competencies grouped into 11 dimensions: persuading, interaction, affective, situational, administration, mental abilities, expertise, knowledge, understanding and experience, project management knowledge, conceptualization and individual abilities and qualities., according to an analysis of project management competency. In total, 48 PM abilities were found to be

associated with project success, the majority of which were connected to leadership, emotional competence, teamwork, and project management expertise.

People and companies may gain from using the stated constructs to assess project management expertise. Implementing an assessment instrument based on a comprehensive range of abilities could be a critical step toward gaining a deeper grasp of a professional's complexities and nuances. Furthermore, by using the Project management competency framework (PMCF), organizations and instruments can use assessment tools to single out skill shortages, gain more assets by instructing workers on relevant skills, enhance training schedules and onboarding steps, analyse the effect of discharging or transferring across work divisions and efficiently control strengths within the institution, amongst several other benefits. (Rezende & Blackwell, 2019)

Within performance of electricity generation projects in Kenya, competence theory has a lot of applicable lessons to project management especially regarding competencies to look for or develop among project implementation teams. Skills such as conceptual skills come in handy in ensuring project managers align the project to the corporate strategic objectives. Emotional intelligence is also a key factor in dealing with constant project implementation hurdles such as process approval delays and interferences by project stakeholders including local politicians and communities with varied interests. Project implementation teams also require competencies to be able to meet senior management objectives as they deal with day-to-day project demands.

2.3 Empirical Literature Review

2.3.1 Finance Dynamics and Project Performance

Maendo et al, (2018), carried out research to examine the outcome resultant from resource optimization on the accomplishment of road development projects in Kenya's Lake's block carried out through county-based enterprises. From the study's response, it was observed that local enterprises were unable to raise sufficient funds for roads. This assertion was rated by 74.8 percent of the study participants.

This points towards wanting accomplishment of the infrastructure projects built by national companies operating within the bloc. According to that report, the biggest percentage of national businesses in the area could not raise monetary, material and technological means for the assignments. Roads projects are infrastructure intensive civil engineering projects of the same nature as power generation projects. Nevertheless, the study did not extend further to consider categories of financing models such as direct foreign investment and Public private Partnership, and their impact on the projects. Further studies on effect of varied financing models would shed more light on infrastructure projects financing.

Ondara, et al (2017) conducted a study on threat mitigation approaches and implementation of building firms in sampled regions within Kenya, from a population of 2414 construction projects sample size of ninety-seven respondents. The initial purpose was to see how resource uncertainty mitigation processes affected construction company accomplishment. According to the findings, the most significant perceived influence on firm

accomplishment was presence of mobilization equipment, thereby reducing time constraint, ensuring an adequate supply of building supplies, thereby minimizing the chances of time and cost overruns, and maintaining proper standard of building implements through an efficient procurement, therefore reducing uncertainty of defective products. Furthermore, data revealed that stabilizing material costs using forward contracts, so minimizing the risk of cost overruns while also lowering price volatility, had the least positive impact on company performance. The degree of relationship was established in regard to resource management relationship to execution of the construction companies. Essential findings have been made on project finance risks and need replication in the current study in a setup where the ratio of researched companies versus the number of respondents is lower compared to the research under review.

A study on venture capital sourcing and growth of small-scale firms involving 79 SMEs sheds light on innovating financing of projects (Apuoyo, 2020). The study discovered that venture capital financing accounted for 48.4 percent of the difference in SMEs' development. An adaptive association was established for the capital and adaptive change for SMEs'. This was attributable to venture capital sourcing having a component of capacity building in administrative and technological capacity building, and customer concentration approach. These additives also influence the rate of growth of SMEs. The research in addition discovered a link between that mode of financing and business growth.

The study presented an important dimension on use of non-conventional financing method on growth. However, this targeted SMEs. Replicating the studies in large-scale, capital-intensive projects such as electricity generation projects would shed more light on generalization of venture capital approach in such projects. In project financing studies on large scale projects, other financing approaches such as Private Public Partnership need to be studied and compared with venture capital financing approach.

A study on project financing approaches and Shareholder Value Creation of listed companies excluding financial sector companies in Kenya shed important light on attracting project financing (Kariuki, 2019). The research used a non-experimental explanatory design. The census design was employed because there were only forty companies that were not classified in finance sector during the period of the investigation. Annual financial statements, income statements, and related remarks were acquired from NSE handbooks and CMA publications. Using Ordinary Least Square regression analysis, the impact of various funding model parameters on earnings quality was explored. The moderating influence of GDP growth rate was investigated using a stepwise regression technique. According to the findings, capital structure, debt funding, operational raising capital, and dividend financing all had a strong positive impact on Return on invested capital. The study went on to look at variances in companies listed on the NSE based on their industry. The findings demonstrated significant relative impact of investment decision on the production of shareholder value across various industries. The research showed a

significant positive mediating association with funding decisions on shareholder wealth and Economic growth. This study provided important information on shareholder value creation and attractiveness of firms in attracting capital. However, the findings are based on an average to included companies within the NSE. Expanding the studies to obtain more information on value creation and capacity to attract project financing besides investing for better share value went a long way in creating additional knowledge on Economic value and project financing.

A study on Macroeconomic effect on achievement of development partners financed health sector projects in the country was helpful in harnessing knowledge on extra organizational dynamics affecting project financing (Mobegi, 2020). From 2008 to 2018, the study looked at roughly seventy development partners who financed healthcare ventures. The findings revealed that the social-cultural, socioeconomic, and political settings all influenced the success of the sponsor financed ventures. Senior leadership backing impacted relation between both global factors and development partners financed healthcare project achievement, as per the investigation. Subsequently, the report suggested that Kenya's government implement measures and guidelines to mitigate those adverse effects of the market situation while maximizing the positive benefits relating to socio-political dimensions affecting success for the charity financed medical programs. Like in the case of major health sector projects, there are energy sector projects are funded by donors through grants and low interest loans. Replication of macro-economic issues relating to top management support and determining effect of macroeconomic risks within the energy

sector was helpful in establishing whether energy sector projects are affected in the same pattern as the health sector donor funded projects.

Gar (2015) in a study ranked tools and techniques that contribute to success of the dam projects based on their relative importance. The study was done among Myanmar dam, from a sample involving fifty project managers, the research established that the first two significant components were cost-related features, such as project cost estimation and budget determination, whereas the last two factors were scheduling tools i.e., well defined project management plan and work breakdown structure. Cost control and budget performance were identified as a critical success factor scoring a relative importance index of 0.95 and 0.93 respectively. The studies were done in an Asian context and there is need to replicate the studies in African context to verify whether the findings placing finance over project scheduling are universal. The researcher did not differentiate the relative importance for the five projects based on the source of funds for the dam project e.g., compare projects funded through company internal funds generation versus foreign direct investment projects. If data was available based on funding, it would be possible to make a general inference that financing dynamics were more critical than project scheduling dynamics.

2.3.2 Project-Procurement Dynamics and Project Performance

Procurement is considered a critical factor by PMBOK as well as by local studies on project management. A study by Adek, (2016) on factors leading to effective projects achievement of infrastructure projects in devolved government, with focus on Mombasa; Kenya, rated

procurement as a key project management factor for success of the project. When asked why governance is important in the implementation of the county's infrastructure projects, 80 percent of interviewees said politicians were very important in supply chain, capital allocation, rallying people, and many other actions for personal gain. The study by Adek is relevant to the case of electricity generation project because the KenGen's projects are infrastructure projects in the same way as the study in the county focused on infrastructure projects. The two entities also procure within a legal framework of Public Procurement and Assets Disposal Act of 2015. Nevertheless, the studies by Adek assume that all projects are procured by procuring entity i.e. The Mombasa County government. Projects where the procurement entities are less engaged in procurement include turnkey projects or Engineer, Procure and construct (EPC) projects where the contractor conducts all the procurement, and the procuring entity has little or no control of procurement logistics. A further study on procurement attributes on projects other than projects procured by the public procurement entities was helpful in identifying procurement technicalities in EPC projects.

An analysis of performance of Independent Power Producers in Africa by Eberhard et al, (2016), revealed that weak links between planning and procurement, inadequate or incomplete legislation, and the lack of a procurement authority all contribute to the problem and was examined further. It is worth noting that even if there are solid standards and standards in place, without enforcement, procurement is unlikely to go smoothly. In the Kenyan case, a procurement authority has been in place since year 2015 i.e., Public

Procurement Regulatory Authority. A review of its effectiveness in enforcement of procurement in electricity generation projects require further evaluation.

There is need to study the most efficient procurement methods e.g., direct procurement or single sourcing versus restricted and open tender methods. Procurement of transactional advisor in electricity generation projects as well as the role and efficiency of subcontracted project supervisor in procurement is an area with limited or no sufficient published studies.

Akira & Simba (2017) conducted a study involving Kenya Ports Authority (Port of Mombasa) on factors impacting project performance, the project management procurement process was established to be bearing a major impact on project performance. They noted that, like any other public organization, the Port of Mombasa's project procurement processes are governed by the Public-Procurement & Asset-Disposal statute, 2015 (PPADA). According to the findings, due to the system's bureaucracy, PPADA had a greater impact on project delays. The study found that timely implementation of internal systems, supply chain planning, obtaining authorization, project scope creation, tender request to suppliers, Tender Opening, Tender Analysis, and Contract Award, as well as contract management in the Port of Mombasa, are all critical to project success. According to the research, if the processes involved are performed swiftly, project delivery time will be shortened (Schedule). Customer feedback was found to be crucial in the development of the project requirement (Scope), since this added knowledge in determining the quality of the finished product and consequently client satisfaction. According to the report, inaccuracies in project scope led to delays, budget overruns, and unsatisfied enterprise customers. The survey further found out that projects are rarely procured within the

approved budget, which leads to cost overruns. This is due to cost variances caused by frequent changes in project scopes and padding estimations during project planning. The legal red tape prescribed by the act may not be surmountable for public institutions. Focus by the institutions should be placed on efficiency in project scheduling and resourcing an aspect that was investigated in this study.

Significant determinants affecting project procurement in the projects have been highlighted, as shown in a study on optimum dynamics that optimize step in the process cost and schedule performance in complex construction projects (Safapour, 2022). The research was carried out on 44 projects in North America and Asia with the purpose of carrying out a detailed study and examining various techniques to determining the most beneficial and effective best dynamism in managing challenging stepwise projects. The poll included forty-four project managers, sixty percent of them had between twenty-one and forty years of experience and were project directors or project managers, and more than ninety percent of them were project managers or project leaders. When construction projects face fiscal planning challenges and issues, the analysis revealed that integration of alignment can drastically enhance design and/or procurement cost and schedule achievement, and that prompt and effective application of front-end planning and collaborating can help avoid construction cost overruns caused by legal disputes and problems. According to the findings, alignment and legal difficulties, as well as conflicts, must be addressed in order to procure a complicated project. This study was conducted in the Asian and American contexts, and it is necessary to determine how a project team with

legal knowledge and project planning affects electricity production complex projects in Kenya.

A study by Theuri (2012) on analysis of procurement delays in KenGen found out that the company was faced with challenges ranging from red tape in procurement in regard to specific products used in electricity generation, delays during taxation determination during imports of generation equipment and spares as well as having to go through rigorous government procurement processes. It was also observed that the public procurement act also placed restriction against use of brand names in specifications hence putting a restriction from obtaining some products directly from the original equipment manufacturers. The above study is helpful in analysing the legal and structural project procurement limitation in electricity generation by state corporations. Understanding of the limitation is helpful to project managers in putting in efficient and timely advance planning to cater for the anticipated project procurement delays.

Chepkemoi (2020) examined the impact of procurement management skills on project delivery in research that examined the impact relating to skills in projects and road-projects accomplishment standards within Machakos county. The purchasing skills coefficient was found to be 0.97 after regression analysis. In addition, the coefficient had a positive value. The favourable outcome revealed that purchasing management skills and road construction project success were linked. The coefficient was not only favourable but also statistically

meaningful, with a t-statistic value of 11.89. Procurement abilities were also determined to be the most important factor in the success of road construction projects. The studies provide valuable insights in infrastructure projects procurement and need to be extended from transport to the energy sector.

2.3.3 Organizational Dynamics and Project Performance

Akira & Simba, (2017) looked at the factors that influence the Kenya Port Authority's project performance. The study discovered that the mediating variable of organizational structure had an affirmative mediating influence on the connection with the components and performance. Within the analysis it was established organizational structures provided a foundation for project initiation and implementation. The structures also reduced project management ambiguity and confusion, according to the study. To collect data, the researchers employed a descriptive research approach as well as questionnaires with structured and semi structured questions. Communication, decision-making, and specified roles and duties were employed as markers of organization structure in the research, which employed both illustrative and illustrative study styles. The study established important contribution of organizational structure in project management within Oil and gas sector. Replication of the study in the energy sector was helpful in establishing generalization of extent of organizational structure in project performance in another sector that is closely related but different from oil and gas sector.

A review of projects implemented across different institutions indicate that performance of similar projects differs based on the specific institution's governance structures and leadership. After review of several projects, an observation was made that political risk leading to opposition of a project may arise out of internal or external personal and institutional sources (Mitchel & Klastorin, 2021). The analysis further revealed that projects may fail due to project managers inefficiency in managing political risks that might include internal opposition to project goals or approach and secondly, majority political wave opposition or activism. The analysis Mitchel and Klastorin reviewed companies that were not from Africa hence the study could not be generalized for Africa.

Kenya was rated highly in research on African Independent Power Producers when compared to other countries in the region (Eberhard et al 2016). The study cited that: Kenya's investment climate is superior to that of its neighbours Tanzania and Uganda, as well as Nigeria, and it has been able to attract private investment at a cheaper cost. Its energy industry has been de-bundled, it has an independent regulator, and the Kenya Power and Lighting Corporation (KPLC), the T&D company, used to have a clear power-planning procedure and competent procurement competence. The KPLC has been reasonably creditworthy, and the regulator has assisted in moving tariffs to cost-effective levels, resulting in a series of competitive procurements with increasingly better price outcomes. This points out the need for further study to determine whether the high rating for IPPs investment is the same for state owned generating company investment.

A study by in automotive industry in Brazil revealed that creative institutional culture, managing change & executive backing were aspects which had the most impact on the project's success (Zabela, Barriga, Jugend, Cauchick, & Paulo, 2019). The findings also revealed that a flexible culture and an environment that encourages innovation had a beneficial impact on project performance. As a result, our findings imply that in the context of project management, companies should focus on employee human-capital development, enablement, and team spirit. Conducting a similar analysis in Kenyan context and specifically within government entities such as KenGen is important since corporate governance culture might be hampered by not only the regional differences but also by matters related to government majority shareholding or control.

Kathongo (2021) within research conducted in Kitui, which established impact of management dynamics against efficacy of a rural electrification project, studied the effect of organization structure. The research examined three characteristics of organizational structure: decision-making, communication, and clearly defined roles and duties. The organization was discovered to have aided in the identification of management levels and roles for all categories. In this study, the average organization structure scoring of 3.51. The score was rounded down to four on the used Likert scale, and the results showed that the respondents agreed that organizational structure had a substantial impact on project accomplishment. A modest standard deviation suggested the respondents bore little

variation. The following indicators were used to assess organizational structure: Availability of set goals scored an average of 3.06 (moderate extent); decision making scored an average of 3.4 (moderate extent); communication scored an average of 3.5286 (great extent) after rounding off; and communication scored an average of 3.52 (great extent) after rounding off. Among the indicators, communication had the highest mean (great extent), indicating that it had a substantial impact on project performance. The standard deviations for all three variables were modest, implying that the respondents had similar viewpoints. Stretching the study in other energy sector companies and other regions would be helpful in obtaining wide range generalization.

Omollo (2015) in a study on aspects affecting accomplishment of government funded project in a Pipeline Company, studied project organization dynamics relating to leadership influence and style. The study which involved 238 Kenya Pipeline company employees established the following. Regarding leadership influence, the interviewees were required to indicate if leadership influences execution on project management. This analysis indicates that 65.1 percent of the respondents indicated that leadership influences the implementation of project management while, 34.9 percent of indicated that leadership does not influence the implementation of project management. The findings can be interpreted to mean that leadership influences project management. Regarding leadership style, 35.3 percent of the respondents indicated their project managers apply participative leadership. 27.3 percent of the respondents indicated their project managers apply transactional leadership. 24.4 percent of the respondents indicated their project managers

apply situational leadership, whereas 13 percent of the respondents indicated their project managers apply 63 percent transformational leadership. A positive relationship was established in the study. The study further established that the respondents were in favour of participatory leadership style. The preferred style was voted by 63 per cent of the respondents.

A study that investigated how governance affects project resilience networks for Agricultural Innovation Platforms in the Central and the Southwestern parts of Uganda (Magarura, 2021), established social-cultural trait, structural status, and managerial behaviour all have a significant influence regarding long-term viability of project links. Effects of management techniques were looked at, focusing on network links and social-cultural characteristics. In addition, the research established how network interactions mediate the relationship between governance and project network resilience across Agricultural Innovation Platforms, as well as how policy framework moderates the relationship between governance and project network resilience. The null hypothesis stated that network composition had no effect on network resilience across agricultural innovation platforms in Central and Southwestern Uganda when investigating team makeup of project teams. The coefficient for network composition was positive, according to regression coefficient. This suggests that if management dynamics and cultural characteristics remained unchanged as network composition expanded, project network resilience would grow as well. Additionally, the network composition coefficient had a P- value – 0.02, This turned to be larger compared against the 0.05 significance level, demonstrating that network composition was important in predicting project network resilience.

The study also investigated the impact of cultural attributes on network resilience among agricultural innovation platforms in Central and Southwestern Uganda, with the null hypothesis being that cultural traits have no effect on network resilience. With a significance level of 0.01, the coefficient for cultural traits was positive. This suggests that if all other elements remained constant and cultural qualities rose, project network resilience would grow as well. The results of this study are important in informing team composition in regard to having team of different ages, experience and multidisciplinary teams. The study also informed that workplace culture has an effect on organization performance and therefore was helpful in giving special focus on understanding and influencing organizational culture in project environment. However, the studies were done in agricultural sector and in Uganda where cultural context is different from Kenya. Conducting the studies in Kenyan context is needed.

A study on the role of management in the implementation of infrastructure projects in Mombasa County, Kenya by Adek, (2016), led to the following findings: Management has no influence on project delivery, according to 15.4 percent of respondents, while the rest 84.6 percent believe it did. The findings in Mombasa County reveals with great strength that management is a critical determinant of success in county projects. Assessment of the variable in projects not funded by the county government such as energy sector is critical considering the fact that electricity generation projects are projects of greater financial scale attracting funding from national government, compared to projects at the county level.

Project control, according to Mubarak (2019), is a consistent process that includes tracking project status, comparing advancement to the benchmark budget and schedule, finding deviations, deciding where they are and the extent of the deviations, and analyzing them to investigate the pattern; and making adjustments whenever and wherever necessary to get the project on schedule and within budget. Aspects of this definition have been studied in other construction projects for instance a study on aspects influencing attainment of projects among firms in Malaysia by Sundarassen identified project control factor of project scheduling as a critical success factor after organization culture and leadership (Sundarassen, 2013). Scheduling was defined as an aspect relating to tracking project time, milestones, project staff, project cost such that the fallback position or replanning is getting back on track. In the study that involved fifty participants involved in project management. The order of importance critical success factors according to the study was organization culture, leadership, project control-scheduling, organization technical capacity and office politics respectively. It would have been preferable to obtain a larger sample of respondents than a sample of fifty respondents involved in the study, an issue that was also acknowledged as a limitation by the researcher. Nevertheless, the above studies indicate the critical role played by organizational culture, leadership and project control. However, the studies were conducted in Malaysia and the United Kingdom where contextual differences may vary from Kenyan context.

2.3.4 Individual Dynamics and Project Performance

A study of risk uncertainty mitigation techniques and performance of construction enterprises in Kenya's selected counties found that project dedication, expertise, and engagement all play a role (Ondara et al., 2017). A total of ninety seven people participated in the study, which looked at 2414 construction activities. In order to determine the impact of human uncertainty mitigation strategies on the performance of construction enterprises in Kenya's selected counties. The findings revealed that the greatest perceived influence on firm performance was a wide availability of qualified labor, which lowers the threat of non-attainment of expected standard in building projects, information sharing between construction stakeholders, which lowers the probability of implementation duration and project standard breaches. Thorough project workforce control was established to lower the risk of time overruns. The study further proved that human factors such as project implementation team dedication had a reasonable effect on success of the project. Despite the fact that the number of respondents is less than the number of construction businesses analysed (97 vs. 2414), the studies reveal vital information about project manpower issues. Extending human factors studies to different areas might help to broaden knowledge.

Akira and Simba (2017) discovered that program management competency had a positive insignificant effect on project performance in a study of factors influencing project performance in Kenya Ports Authority (Port of Mombasa), though they acknowledged that if project management knowledge and project leadership skills are improved, project

performance will be significantly improved. This would assist the port in avoiding delays, cost overruns, improved customer satisfaction, and a higher return on investment. The research also reveals that project management certification is an important component in improving project performance at the Port of Mombasa. The research also revealed that not all members of the project team were goal-oriented, which has a substantial impact on project performance. This problem affects project timelines and, to a large extent, project expenses. The study enlisted the participation of 10 percent of the organization's senior management. A baseline poll of senior management may not reflect their depth of project management experience. For more reliable results, a study targeting senior management staff with project management experience is recommended.

Individual dynamics, along with project management dynamics and organization dynamics, were identified as key variables for project performance by Sundarasan (2013) in a study on factors influencing project success in Malaysian organizations. Leadership, tenure of implementers, and project team certification were the human factors that were investigated. Project strategy management and leadership, as well as the application of technical skills, are all identified as contributing to project management success, according to the findings. Because Malaysia is a developing country, it must be compared to Kenya in terms of human elements.

Omollo (2015) conducted research to see if project management training for project teams a critical step is toward developing individual project management competency. The researcher evaluated 238 respondents to assess their perceptions on capacity building and the public sector projects in Kenya Pipeline Company. Outcome of the inquiry was that 50 percent favoured presumption that project management training should be provided on a regular basis to human resources. Omollo (2015) further investigated whether project management training for project teams is a necessary step in improving individual project management competency. From the study, 50 percent of the participants felt that project management training for human resources should be delivered on a regular basis.

In European research to evaluate the competences required in construction projects, four project competency clusters were identified (Krzysztof, 2017). A survey of members of the Polish Construction Industry Chamber yielded the results. The survey's purpose was to create a competency model for Polish construction project managers. The information was gathered from 781 project participants from 12 building initiatives between January and December 2015. Respondents were asked to rate their project manager's and general competency in managing construction projects on a Likert scale. The information was used to build a model and investigate the impact of individual project manager characteristics on overall project management ability. The Mann-Whitney test was employed to determine the differences in responses between project managers and team members because not all respondents were project managers. According to the test results, there are no substantial differences between the responses of construction project managers and project team

members. The features that determine the competency of construction project managers are basic managerial skills, interactional talents that support managing skills, emotional intelligence, and formal skill. The research provides a solid foundation for identifying project implementation team competencies. However, the study was conducted in Europe where there could be contextual difference in project management culture and competencies compared to African context. There is need to replicate the studies and establish whether project team members appointed as project managers and those who have not rate the competencies in a similar manner in Kenya.

In a study on teamwork and projects accomplishment in Nigeria that involved 420 respondents drawn from infrastructure industry and spread along project clientele, outsourced project expatriates and builders (Adu, & Opawole, 2019). The study identified varied levels of rating on the teamwork dynamics from the above categories of respondents. Project clientele group rated interpersonal dynamics slightly above executive assistance with mean item score (MIS) of 4.59 and 4.56 respectively. Project expatriates on the other hand rated interpersonal dynamics above senior executive assistance, with mean item score of 4.42 and 4.35 respectively. This study makes a key contribution in individual dynamics touching on interpersonal dynamics and senior executive assistance. However, the study was conducted in Nigeria where there could be contextual difference. It is also observable that the expressed difference between interpersonal dynamics and senior executive assistance is not significant especially if rounded off. Replicating the individual dynamics

attributes in Kenyan projects would be of great help in comparative analysis of trends behavior between the two aspects in Nigeria and in Kenya's projects.

Only geopolitical and cultural risks have a significant impact on project performance, according to a study on project uncertainty mitigation and accomplishment of the Last Mile Project in Murang'a County (Dhanjal, 2021), whereas environmental and inflationary issues have little impact. Political, environmental, and inflationary risks were all rather high (means of 3.77, 4.22, and 3.97, respectively), whereas socio-cultural risks were relatively low (mean = 3.13). Following a correlation analysis of the data, the study discovered that only social-political and cultural risks bore a significant impact on project performance, whereas environ related and monetary value reduction concerns had minimal impact. After correlation analysis, a significant strong negative association between project performance and political risks ($r = -0.61$, $p = .00$) was identified. As a result, it was inferred that human factors greatly influenced project hazards than economic and environmental considerations. factors.

2.3.5 Stakeholder Management Dynamics and Project Performance

Seda, (2019) in a study on project management dynamics and success rated accomplishment of ICT systems programs focusing on small and medium income companies in Nairobi, it was established that 60.9 percent of the respondents created stakeholder register at the commencement of the of the project to keep track of stakeholder concerns. This is indicative on the key focus on stakeholders even by small and medium

enterprises. It is expected that major large-scale projects such as generating projects should have a more enhanced and structured way to manage project stakeholders.

Omollo, (2015) while investigating stakeholder participation established that the people with stakes in the project had an impact on project management implementation. A big number of study participants favoured inclusion of stakeholders indicating that stakeholders who are directly or indirectly affected by the project were included. Comparison on stakeholder involvement in this study shows a slightly lower response rate for public funded projects compared with the previous study by on small and medium enterprises 56.3 versus 60.9 percent. It would invite further study to establish whether the scale and type of projects have a direct bearing on stakeholder engagement.

In examining the role of stakeholder management, in a study on Myanmar dam projects, from a respondents number involving of 50 project managers, the research established that stakeholder engagement was rated as significant contributor to project success where 74 percent of the respondents strongly agreed with its importance (Gar, 2015).

In a study on dynamics affecting project accomplishment in Kenya Pipeline Company, Omollo (2015) asked respondents to rate their perceptions on overinvolvement of project stakeholders. In the study overinvolvement was found not to be aversive. A review of the question may seem to be seeking a very general response. A definition of extent of over involvement needs to be provided by allowing the respondents to determine the frequency

of meeting that would be termed as overinvolvement to enable enhanced rating by the respondent. A study which provides a defined frequency of meeting with stakeholders would guide respondents in making enhanced rating on stakeholder overinvolvement.

Muli et al (2016) established that projects with stakeholder management were five times more likely to succeed than initiatives without stakeholder management in a survey of 450 Constituency Development Fund (CDF) projects dispersed across eight constituencies in Machakoes county. The Pearson product-moment correlation coefficient was used to analyze the relationship between stakeholder involvement and accomplishment for projects funded by CDF, which revealed a positive connection ($r > 0.2$, $p < 0.001$). The association between stakeholder management and project performance funded by CDF moderately ($r = 0.361$). The projects funded by CDF are from small to medium scale up to financing of not more than \$25000.00 Consistency in the result need to be established by conducting similar study for projects in electricity generation plants whose cost is over \$100,000.00.

During a study on stakeholder engagement and execution of devolved marketplace projects, Stakeholder engagement involving the local community was identified as a contributor to project success (Maina S. , 2018). The research goal aimed at establishing how stakeholder participation influenced the performance of open-air upgrading projects in Nyeri County. The participants were required to rate the degree of involvement from

series of phrases in order to determine the level which stakeholder involvement affected performance of projects in Nyeri County's open air upgrading projects. Involvement in project selection, workforce participation, project sustenance activities, and enjoyment of project rewards were among statements to which respondents were required to respond. The majority of respondents believed that the projects' advantages were shared by all locals to a great level (average of 4.69 out of 5.0). The participants opinion distribution was around the mean. Participants were also questioned about whether or not their community helped with the project's implementation. Most of the participants (Average of 4.33 out of 5,0) agreed with the statement on labour provision. Largest number of participants forming an average of 3.7 out of 5.0, attested to involvement in maintenance of the project. The project was either directly or indirectly maintained. The respondents were therefore participants in project's maintenance tasks. The respondents indirectly took part in project's maintenance through county cess payment. Such payments are employed in maintenance of such and similar county market projects. In response to the question about community involvement in project selection, a large number of the respondent supported the assertion (Average of 3.80 out of 5.0). Deviation towards the mean of 1.063 implied that opinions were convergent towards the mean. The study's findings show that involving the community in the project identification fosters sense geared to stakeholders' ownership, that in turn improves stakeholder management. The studies conducted in the construction of open-air market provides a good view on studies conducted within community settlements. Replicating the studies in electricity generating projects which are also implemented mainly in settlement areas was necessary for comparative studies.

A study aimed at examining effect of stakeholders' engagement and accomplishment of road development programs within Kilifi, sought views from 128 road construction stakeholders on stakeholder management aspects in the construction industry (Omondi & Kinoti, 2020). Project managers, community leaders, county and national government officials were among those who replied to the survey. The goal of the research was to investigate various areas of stakeholder engagement in project selection and planning. In terms of project identification, the major stakeholders in Kilifi County's Road construction projects were undecided on whether the project's stakeholder liaison teams involved them in initial phases or considered holding opinions from them into account during project identification, with an average of 3.3 and 3.0 out of 5.0 in each case. Those participants also agreed that their participation during project conceptualization phase contributed to the project's success, and that their involvement in the project commencement stage contributed to the project's success, as evidenced by an average of 3.5 out of 5.0 and 3.7 out of 5.0 in that order. This shows that the road infrastructure programs incorporated stakeholder input sufficiently during the project conceptualization phase, thus enhancing project accomplishment. Stakeholder engagement in project planning was neutral or moderate, with respondents indicating that project implementors incorporated them in project initiation/project planning. In addition, strategic plans were established to scope program plans, as revealed by score of average of 2.89, 3.11, 3.06 and 2.8. This is indicative of stakeholders' involvement in the project scoping to a moderate extent. This improved project implementation efficiency, collaboration, and effectiveness. The study sheds

important light in infrastructure projects within the transport industry. Replication of the studies in the energy sector will help in determining whether stakeholder management aspects in transport sector are universal.

A study on Stakeholder involvement limitations in large infrastructure projects: key accomplishment indicators (Mashali, 2022), assessed the a relative important index analysis for 27 critical stakeholder management success factors grouped into five main sets: project type; decision-making; team type managing stakeholders throughout the entire project life cycle; influence of stakeholders' categories within project life cycle stages; and Stakeholder management support dynamics. A total of 400 project engineers were surveyed for the study. This analysis focused on large projects within Qatar. Nature of project management approach for mega project can have common dynamics in local mega project. However, since the operating environment is the same, the study results cannot be generalized in Kenyan context. Replication of the studies in Kenya will enable in obtaining locally relevant data on critical success factors in Kenya.

A study on effect of project governance on project sustenance involving youth empowerment projects in Makueni (Kaumbulu, 2021), revealed that Stakeholder management, governance structure, and project team diversity all led to affirmative and considerable impact relating to sustainability for youth empowerment initiatives at Makueni. A total adding up to 196 respondents were gathered from 28 youth empowerment projects for the study. Statements on a Richert scale will be used to see if respondents were

committed to the project, of which most respondents agreed to. The standard deviation of the replies to this statement was 0.56, implying little variance those feedbacks. A large number of study participants were agreeable with the assertion that the project's actions were made known to stakeholders. The majority sampled were agreeable to the statement that communities and youth were involved in the project's start and execution. The results were backed up by a mean of 4.35. The study emphasizes the need of encouraging stakeholder commitment and participation in project scoping and execution. That research however involved youth empowerment projects. There is need to replicate the research in electricity generation stakeholders to generalize the findings.

2.4 Summary of Literature Review and Research Gaps

Analysis involving several studies revealed that although research on project performance existed, there has been minimal research on management dynamics and performance of Kenya. Electricity generating Company projects. The review involving evaluated studies and the study disparities are tabulated below.

Table 2.1: Summary of Research Gaps

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
Maendo et al, (2018),	Funds mobilization and the accomplishment of road development ventures by county-based enterprises in Nyanza bloc within Kenya	The study observed that local enterprises were unable to raise sufficient funds for roads. This assertion was rated by 74.8 percent of the study participants.	The study did not extend further to categories of financing models such as direct foreign investment and Public private Partnership, and their impact on the projects.	Include in the data collection instrument other financing models and their effect on project financing.
Ondara et al. (2017)	Establishing how resource uncertainty mitigation measures affected accomplishment of infrastructure companies.	The most significant perceived influence on firm performance was availability of project inputs. Data revealed that stabilizing material costs using forward contracts, so minimizing the risk of cost overruns while also lowering price volatility, had the least positive impact on company performance.	The ratio of researched companies versus the number of respondents had a big variance.	Measure project finance risk dynamics in the current study by obtaining data from entire population
Apuoyo (2020)	A study of seventy-nine small and micro enterprises in Nairobi that	Study discovered that the benevolent funding accounted for 48.4 percent	The study however focused on SMEs and not Large-Scale Project limiting generalization	Replication of the studies in large-scale,

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
	received major funding assistance and grew.	of the difference in SMEs' development.	of venture capital approach in such projects.	capital-intensive project in electricity generation
Kariuki, (2019).	A study conducted on NSE included firms on Financing Decisions and Shareholder Value Creation of Non-Financial Firms, shed crucial information on project financing.	According to the data, all types of financing influenced Economic Value Add. Resourcing decisions were established to affect equity for NSE listed firms	This study provided important information on shareholder value creation and attractiveness of firms in attracting capital. However, the findings are based on an average to all the NSE listed firms per industry.	Obtaining KenGen specific analysis in place of analysis based on energy sector industry.
Mobegi (2020)	A study of the macroeconomic impact of 69 charity financed healthcare projects in Kenya	Project success was affected by social political factors and senior leadership affirmation. According to the study. influence between major economy factors and the progress of sponsored medical facility projects was found to have a partly moderating effect on project risk management.	The results were obtained within the health sector projects and cannot be generalized for all sectors including energy sector where there could be a contextual difference.	Replication of macro-economic issues relating to top management support and determining effect of macroeconomic risks within the energy sector will be helpful in establishing whether energy sector projects are affected in the same pattern as the health sector donor funded projects.
Mitchel and Klastorin (2021)	Analysis of Effect of consistent project financing in 8320	Only 16.2 percent of the projects were implimented	Studies were conducted in developed world where project implementation efficiency	Test the trend of project implementation within budget in the survey

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
	information communication technology projects conducted by Standish group between year 2004 and year 2014	on budget and design goals.	could be high. The result cannot be generalized with certainty in Kenyan context	
Irina & Kidomo, (2017)	Investigate the aspects determining accomplishment of road construction programs in Embu County's Manyatta constituency.	Project financing is one factor that contributes to adequate activity utilization. The findings in this area revealed that the amount of subsidizing was a major determinant of project execution.	The geographical coverage was nevertheless limited considering the fact that samples were taken from one constituency out of the four constituencies. To confirm whether the results can be generalized for 47 counties in Kenya as well as in other sectors, replication is necessary in the other sectors.	Test project financing finance factor in generation projects
Adek, (2016).	Public procurement challenges in Mombasa County	Within the legal framework of public procurement and the Assets Disposal law of 2015, there are obstacles and delays in the procurement process.	Study biased on setup where the procuring entity is the primary procuring agent ignoring procurement models such as Engineer, Procure and construct (EPC) where procurement is the responsibility of a private contractor	Expanded study that covers both PPADA, limited public procurement as well as flexible models such as EPC

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
Eberhard et al, (2016)	An analysis of performance of Independent Power Producers in Africa	Weak links between planning and procurement, inadequate or incomplete legislation, and the lack of a procurement authority all contribute to the problem in procurement.	There is need to study the most efficient procurement methods e.g., direct procurement or single sourcing versus restricted and open tender methods. Procurement of transactional advisor in electricity generation projects as well as the role and efficiency of subcontracted project supervisor in procurement is an area with limited or no sufficient published studies	Investigative study on the most efficient procurement method for infrastructure projects
Akira & Simba (2017)	Study involving Kenya Ports Authority (Port of Mombasa) on factors impacting project performance in relation to the project management procurement	project management procurement process was established to be bearing a major impact on project performance. They noted that, like any other public organization, the Port of Mombasa's project procurement processes are governed by the Public Procurement and Asset Disposition Act of 2015	The legal red tape prescribed by the act may not be surmountable for public institutions. Focus by the institutions should be placed on efficiency in project scheduling and resourcing	Place special focus on attributes that can enhance procurement Leadtime despite the bureaucratic delays.

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
		(PPADA) which occasions bureaucratic delays.		
Chepkemoi (2020)	In the Machakos County Roads Project, the impact of procurement management skills on project performance	The favourable outcome revealed that procurement management skills and road construction project success were linked.	The infrastructure projects procurement focused on road projects.	Extended the inquiry on procurement dynamics effect from transport to the electricity generation projects.
Safapour (2022)	According to a study on Phase-Based Cost and Schedule Performances in Complex Construction Projects, top optimum dynamics that boost Phase-Based Cost and Schedule Performances in Complex Construction Projects	The research was carried out on 44 projects in North America and Asia with the purpose of conducting a comprehensive study and analysing various techniques to determining the most beneficial and effective best dynamics in managing challenging phased projects. The study found that early implementation of alignment can significantly improve design and/or procurement cost and schedule performance.	This study was conducted in the Asian and American contexts with varied legal, finance and procurement dynamics.	Assess finance and procurement trends from respondents in African jurisdiction at Kenya electricity generation projects

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
Akira and Simba (2017)	Factors that influence the Kenya Port Authority's project performance with reference to organization structure.	The connection between the components and performance was mediated by organizational structure in a beneficial way. Organizational structures were found to provide a framework for project start and implementation, according to the research. Project management ambiguity and uncertainty were also decreased by the arrangements.	Investigate additional organization dynamics such as internal and external interference	Review of additional organizational dynamics including political interference in public institutions
Mitchel & Klastorin, (2021)	Effect of institution's governance structures and leadership on project performance	Performance of similar projects differs based on the specific institution's governance structures and leadership. Managing political influences was also established to affect project progress.	Reviewed studies did not cover African projects.	Incorporate institutional governance and leadership aspects in the current study
Adek, (2016)	Executive role and actualization of infrastructure programs in Mombasa region.,	Management had no influence on project delivery, according to 15.4 percent of respondents,	Study was focused on county government projects. Assessment of the variable in other projects in the county not	Include a survey item measuring the attitude towards the role of management in projects

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
		while the rest 84.6 percent believe it did. The findings in Mombasa County reveals with great strength that management is a critical determinant of success in county projects.	funded by the county the energy sector is critical because electricity generation projects are projects of greater financial scale compared to projects at the county level.	not funded by county government, focusing on electricity generation projects
Magarura (2021)	Investigation on how governance affects project resilience networks for Agricultural Innovation Platforms in the Central and the Southwestern parts of Uganda. The study considered cultural aspects and team composition and their effects on project resilience.	The study established that cultural trait, network structure, and management activities all have a significant impact on the long-term viability of project networks.	However, the studies were done in agricultural sector and in Uganda where cultural context is different from Kenya.	Replicating team composition and cultural dynamics items under organization dynamics in this study.
Ondara et al. (2017)	Human resource uncertainty mitigation measures and performance of construction firms in some of Kenyan counties.	Positive influence of project team competency and communication as well as discovery that people risk management measures had a statistically	The number of respondents is lower than the number of construction firms studied i.e., 97 versus 2414. Extending the studies on human dynamics on infrastructure project in other	Availability of labour and commitment of team members to be incorporated in the current study

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
		significant impact on the performance of the construction industry.	sectors would serve to expand the knowledge.	
Safapour (2022)	Selection of Best Dynamics that Enhance Phase-Based Cost and Schedule Performances in Complex Construction Projects	Individual characteristics contribute to best dynamics in managing phased and complex projects, according to research of best dynamics comprising forty-four projects spanning the United States and Asia.	The statistics included corporations from the United States and Asia, which may have different contexts in Kenya.	Assessment of teamwork capacity and change management in the Kenyan environment.
Krzysztof , (2017)	European study to determine the competencies required in building projects	A poll of members of the Polish Construction Industry Chamber yielded the results. According to the test results, the factors that determine the competency of construction project managers include basic managerial abilities, interpersonal talents that support managing skills, emotional intelligence, and formal skill.	The studies present an important basis in identifying competencies required by project implementation team. However, the study was conducted in Europe where there could be contextual difference in project management culture and competencies compared to African context.	Replication of the study aspects in Kenyan context through assessing relevance of the four identified competencies in Kenya.

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
Omollo (2015)	Project management training for project teams	Training in aspects such as human capital growth is a key step toward increasing individual competence to manage project. A 50 percent of the respondents voted in favour of this premise.	Type of project management training for project teams not spelt out.	Expound on specific training preferred by project teams in generation projects
Adu & Apawole (2018)	Analysis of teamwork aspects relating to interpersonal dynamics and senior executive assistance and their bearing on projects accomplishment in Nigeria infrastructure industry clientele, outsourced project expatriates and builders	There were varied preferences on teamwork factors relating to interpersonal dynamics and senior executive assistance. Project clientele group rated interpersonal dynamics slightly above executive assistance. Project expatriates on the other hand rated interpersonal dynamics above senior executive assistance.	The study was conducted in Nigeria where there could be contextual difference. It is also observable that the expressed difference between interpersonal dynamics and senior executive assistance is not significant especially if rounded off.	Replicating the individual dynamics attributes in Kenyan projects to assist in comparative analysis of trends in behaviour between Nigeria and Kenya's projects.
Seda (2019)	Aspects influencing successful execution of information systems ventures focusing on	Study revealed that 60.9 percent of the respondents created stakeholder register at the	This is indicative on the key focus on stakeholders even by small and medium enterprises. It is expected that major large-	Test the rating of stakeholder management in generation project, which are projects of

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
	small and medium-sized businesses	commencement of the of the project to keep track of stakeholder concerns	scale projects such as generating projects should have a more enhanced and structured way to manage project stakeholders.	greater scales and varied stakeholders than SME projects.
Muli et al (2016)	A survey of 450 Constituency Development Fund (CDF) projects scattered over eight constituencies in Machakoes county found a link between stakeholder management and project performance sponsored by CDF.	Projects with stakeholder management were five times more likely to succeed than projects without stakeholder management.	The projects funded by CDF are from small to medium scale up to financing of not more than \$25000.00.	Consistency in the result need to be established by conducting similar study for projects in electricity generation plants whose cost is over \$100,000.00
Maina (2018)	Persons and communities of interest and effect of marketplace ventures by Nyeri devolved projects initiatives. Participants were asked to reply to statements about their engagement in project selection, labour provision, project maintenance, and	The majority of respondents stated that the benefits of the initiatives were widely shared by all residents. The study's findings show that involving the community in the project selection process fosters a sense of ownership, which	The studies conducted success the construction of open-air market provides a good view on studies conducted within community settlements. The studies were conducted in a project whose final users are the community and therefore cannot be generalized in other sectors where projects final	Replicating the studies in electricity generating projects which are also implemented mainly in settlement areas, but the final users are electricity generating companies

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
	enjoyment of project benefits.	improves stakeholder management.	users are not the community but government agencies.	
Omondi & Kinoti, (2020).	Research in Kilifi County aiming at assessing the impact of persons and communities of interest in construction. Study solicited input from 128 road construction stakeholders on stakeholder management issues.	Stakeholder participation in project identification, project planning, project implementation, and project monitoring was found to have a significant impact on the performance of road construction projects in Kenya's Kilifi County.	The study sheds important light in infrastructure projects within the transport industry. However, due to focus in only the transport sector, the studies cannot be generalized to the energy sector.	Replication of the studies in the energy sector will go a long way in determining whether the stakeholder management aspects in transport sector are universal.
Mashali, (2022),	Critical success dynamics in big building projects in Qatar: stakeholder management problems	Twenty-seven (27) critical stakeholder management success dynamics for mega construction projects are grouped into five main sets: project type; decision-making; team type managing stakeholders throughout the entire project life cycle; influence of stakeholders' categories within project life cycle stages; and Stakeholder	The study focused on mega projects in Qatar. The nature of project management approach for mega project can have common factors in local mega project. However, since the operating environment is the same, the study results cannot be generalized in Kenyan context.	Analysis of the critical success dynamics in project stakeholder management in the current study will enable in obtaining locally relevant data on critical success factors in Kenya

Scholar	Core emphasis	Discoveries	Suggested improvement/Study void	Current Study improvement
		management support factors.		
Kaumbulu, (2021),	The impact of project governance on the long-term viability of youth empowerment projects in Kenya's Makueni County	Stakeholder management, governance structure, and project team diversity impacted sustainability of youth empowerment programs in Makueni devolved unit, according to the findings of the study. The study underlined the importance of fostering stakeholder engagement and participation in project planning and execution.	The study however was conducted in youth empowerment projects and therefore cannot be generalized in electricity generation projects due to multiple categories and ages of stakeholders.	Replication of the research items on stakeholder management, within the electricity generation sector to generalize the findings.

Source: Author, 2022

2.5 Conceptual Framework

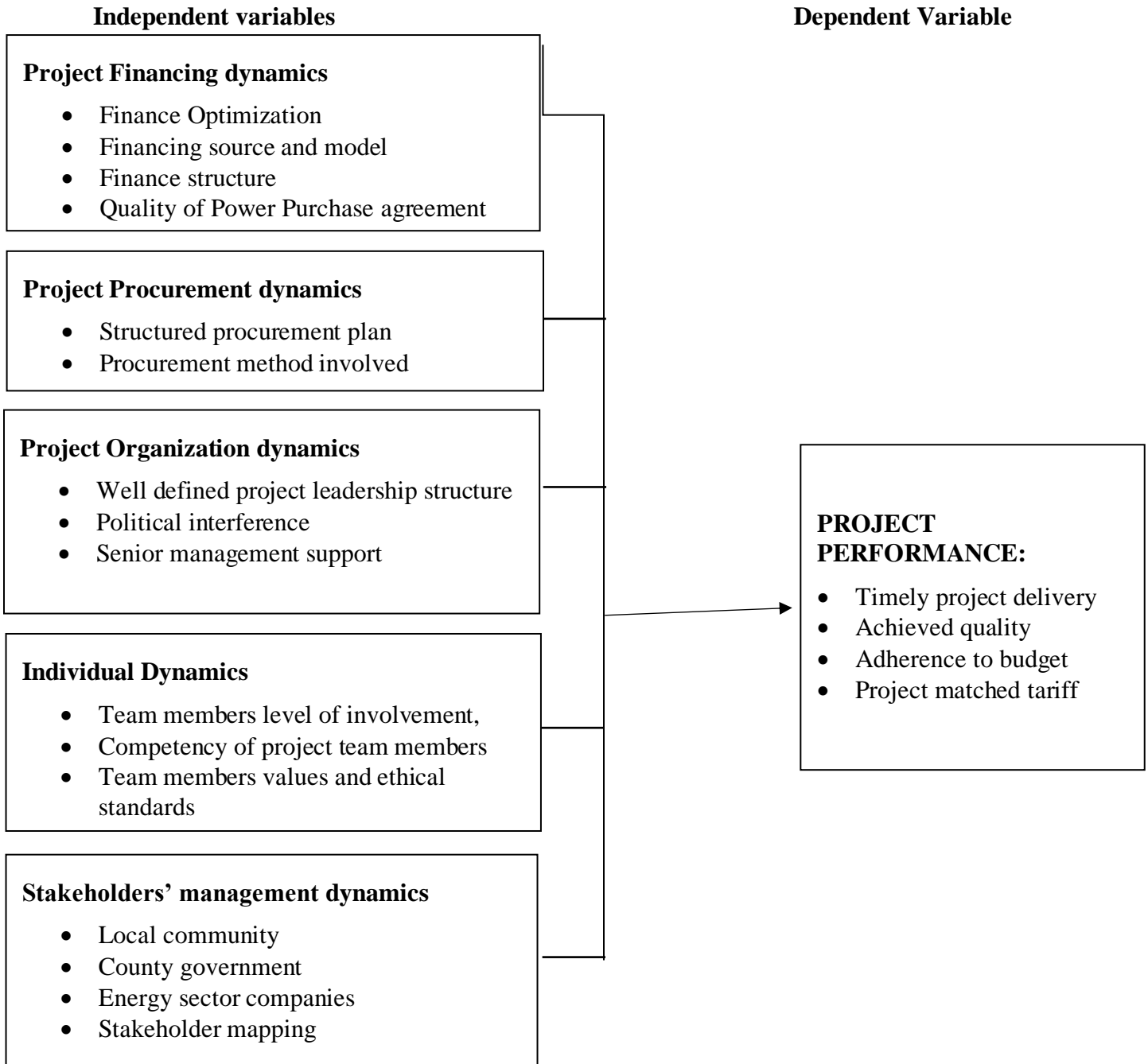


Figure 2.3: Conceptual framework

Source: Author (2022)

The dependent variable is project performance whose outcome is affected by various independent variables: project finance factor, project procurement factor, Organization dynamics, Project management dynamics and individual dynamics and stakeholder management during the project period as illustrated in the above diagram.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter mainly focuses on the research design, target population, sample design, and data analysis technique. It also has sections on the data collection instrument, the pilot study, validity, reliability, critical information gathering and assessment as well as dealing with matters related to ethics.

3.2 Operationalization and Measurement of Variables

In order to obtain research data aspects of independent and dependent variables were indicated in measurable terms as tabulated below.

Table 3.1: Measurement of variables

Construct	Variable	Definition	Scale
Performance of electricity generation Projects	Dependent Variable	Accomplishment of project within projected time budget quality and profitability of the outcome	Interval scale (1-5)
Finance dynamics	Independent Variable	Measured by efficiency in accurate budget estimation and regular financing	Interval scale (1-5)
Project procurement dynamics	Independent Variable	Measured by procurement expertise in availing bid document and competency of the project team	Interval scale (1-5)
Organizational dynamics	Independent Variable	Measure the structure employed by organization in implementing and monitoring project implementation	Interval scale (1-5)
Individual dynamics	Independent Variable	Measured by leadership styles and competency of project teams.	Interval scale (1-5)
Stakeholder management dynamics	Independent Variable	Measured by stakeholder analysis and stakeholders' engagement methods	Interval scale (1-5)

Source (Author 2022)

3.3 Research Design

According to Kothari & Garg (2019), research design fits where a study problem can be organized in a way that there is a verifiable study of approach or blueprint strategy. In this study, there was a clear focus of study being performance of electricity generation projects with a need to explore the project dynamics at play. This study therefore adopted the descriptive research design and explanatory research design using a survey method, taking the form of an ex-post facto research because no manipulation was done on the independent or dependent variables. Ex post facto research focuses on manifestations that have already occurred and therefore during the conduct of this research, the researcher assessed the population of interest, which was KenGen members of staff engaged in project implementation and obtained data from them on their ordinary course of work relating to information on project management dynamics and performance of Kenya Electricity Generation Company projects. Explanatory research also allowed determination of linkages of the dynamics and behavior of power generation field ventures.

3.3.1. Empirical Model

The following is the model expressing link for regressed and regressor variables:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu$$

Where.

β_0 is the intercept; β_1 , β_2 , β_3 , β_4 , β_5 and β_6 represent regression-coefficients. Y represent Composite-Index relating to Performance of Electricity-Generation projects performance

X_1 represent composite-index on Project Financing dynamics.

X_2 represent composite- index on Project Procurement dynamics.

X_3 represent composite- index on Project Organization dynamics.

X_4 represent composite-index on Individual dynamics.

X_5 represent composite-index on Stakeholder Management dynamics while

μ represents error-term.

Composite-indices was calculated through establishing regressed variables mean-aggregate.

3.4 Target Population

The population of interest was 10 electricity generation projects implemented by KenGen and implemented by sixty-eight employees who had been appointed as project implementation team members in the various power generating projects countrywide. This target population is summarized in table 3.2.

Table 3.2: KenGen Project Staff Population

Project	Electricity Generation Project Type	Number of projects	Number of responders
Ngong Wind Phase II	Wind	1	4
Kindaruma 3rd Unit & Uprating Unit 1&2, Kamburu refurbishment project	Hydro	2	20
Wanjii refurbishment project	Hydro	1	7
Geothermal (Olkaria 3, Olkaria iv, Olkaria I AU, Olkaria 5.	Geothermal	4	30
Kipevu III, Kipevu 1 refurbishment	Thermal	2	7
Total		10	68

Source: KenGen, (2022)

3.5 Sampling Design

From the targeted respondents totaling to sixty-eight employees who had been engaged in project implementation, a lower sample was initially projected to be obtained using stratified random sampling for different electricity generation modes. However, owing to the limited and finite nature of the population, census survey for the population of sixty-eight employees who had managed the varied generation projects as Project Implementation Team Members was used as illustrated in the diagram below. According to Kothari & Garg, (2019) census survey design is the most reliable sampling method for

a finite population. Collection of data from the entire population will also serve to reduce sampling errors.

3.6 Data Collection Instrument

To gather information from respondents, semi-structured questionnaires were used as the baseline research instrument. The instrument contained both structured response and unstructured response. The research questions influenced the structure of the questionnaires. The questionnaire included a section on demographic information as well as five main sections, each of which covered one of the study's main objectives. The questionnaire was also created in google forms to aid in convenient and timely distribution in various counties where respondents are located countrywide as well as aid in consolidation by avoiding delays in posting by respondents.

Questionnaires, according to Kothari and Garg (2019), are effective in getting data from a wide range of participants at a minimal cost. Questionnaire method was more convenient because the respondents in this study were spread across wide geographical area in Kenya.

3.6.1 Pilot Study

According to Kothari and Garg (2019), pilot study assists the research in determining whether the instrument had limitations or other flaws before the study is conducted. In this study, Piloting was done by giving initial questionnaires to five respondents based in project department in Nairobi and Olkaria, who had experience in project management in electricity generation projects while working as project staff in project execution

department. The filled in questionnaires were reviewed to determine content validity and also remove errors. The piloting also assisted to gauge on the materials and time needed for the respondents to respond to the research instrument in addition to identifying and correcting items that required clarity.

3.6.2 Validity of Research Instrument

Validity is the most significant criterion, as it demonstrates how well an instrument measures what it promises to measure (Kothari & Garg, 2019). The authors went on to say that an instrument is dependable if the results are consistent. Five piloting respondents were used to test the study's content validity. They were each given a questionnaire and asked to score each item based on how well it measured the objectives. Because they were chosen among respondents with extensive project management expertise, the five respondents were deemed experts. The content validity index was used to evaluate whether the data collection instrument measured what it claims to measure. Following completion of the content validity tests, the research instrument was evaluated and adjusted. The results were also compared with the results of other comparable research in project performance to guarantee criterion validity. One of the research instruments on project performance related to the study since it researched on infrastructure projects was research by Maendo (2018) which looked into the impact of project actualization factors and implementation of roads projects actualized by local enterprises road development projects in western region.

3.6.3 Reliability of Research Instrument

When a measuring instrument produces consistent results, it is said to be reliable (Kothari & Garg, 2019). The study employed a four-step reliability assessment. First, aspects that had been reliability tested by other researchers in project management were used. Secondly, the instrument was administered to five intermittently picked respondents who share the study's demographics. This was critical in checking in case there were any issues with the prior responses. The questionnaire was also pre-tested to ensure that each question assessed what it was intended to measure, that all participants synthesized the instrument at the same level, and that options supplied deemed appropriate. Question diversity, meaning, difficulty answering questions, and participant interest and attentiveness were examined in the pilot study.

The response of respondents with similar backgrounds was compared to give indication of reliability or likelihood of the instrument to provide consistent results.

According to Kothari and Garg (2019), dependability aspect of reliability can be enhanced by standardizing the conditions under which the measurement is performed, i.e., ensure that extrinsic causes of variation such as boredom, exhaustion, and so on are eliminated to the extent possible. To achieve the dependability, the survey instrument was divided into semi structured questions to eliminate boredom and fatigue.

Cronbach Alpha, a type of internal consistency analysis, was used to see how much of questions were specific in measurement (Cronbach, 1951). Questions rating dependability grade 0.5 and higher were considered dependable in the analysis.

Analysis based on reliability test based on Cronbach’s alfa values expressed that project performance at 0.729, project procurement dynamics at 0.794, Organizational dynamics at 0.915, Individual dynamics at 0.868 and Stakeholder management dynamics at 0.934 attained alfa value of 0.70 which is indicative of strong reliability.

Table 3.3: Reliability test results

	Cronbach’s Alpha	No of Items
Project performance	0.729	4
Finance dynamics	0.651	8
Procurement dynamics	0.794	13
Organizational dynamics	0.915	14
Individual dynamics	0.868	10
Stakeholder management dynamics	0.934	14

Source (Pilot study data 2022)

Finance dynamics attained a Cronbach’s alfa value of 0.651 which is greater than 0.50 value that is indicative of good reliability. A minimum alpha coefficient of 0.50 is considered acceptable according (Kothari & Garg, 2019)

3.7 Data Collection Procedure

Application was made to the postgraduate regulating school at the university to provide a research approval letter. The issued approval letter was then submitted to research licensing Commission (NACOSTI), for issuance of study license. Data was collected via semi-structured questionnaires. Each responder received a questionnaire, an introductory letter, and document indicating study permission. Willful provision of information was requested from participants, and the confidentiality of the information provided was assured.

The standardized questionnaire was also delivered to selected respondents in KenGen project locations around the country to collect primary data. The questionnaires were also availed as online forms through google form. After respondents filled the form, google form online application would capture the responses and store the data which formed the basis of data analysis.

3.8 Data Analysis and Presentation

Collected dataset was checked for accuracy before being examined, after it had been collected. The information gathered in the field was coded according to the study's themes first. The biographical data was assessed based on the population's characteristics, such as age, years of experience, gender, level of education, and number of projects completed.

By calculating frequency, percentage, mean, and standard deviation, data relating to the assessment of independent and dependent variables was categorized according to measures of central tendency and dispersion.

All the variables were subjected to inferential analysis using multiple regression analysis. The study was carried out using the statistical program for social sciences (SPSS) version 29.

Prior to data processing using regression analysis, diagnostic tests for heteroscedasticity, multicollinearity, and normality were performed. A multi collinearity test was used in the study to assess if dual or higher number of predictor variables in the model were substantially linked. To check for multi-collinearity, the researcher employed tolerance and variance inflation factor (VIF) values for the predictors. VIF is the reverse of tolerance and reflects the percent of variation in the independent variable that cannot be explained by the other predictor variable.

In relation to normality, the assumption of normality is that the error term has a normal distribution with nil average with homogeneity of variance. With normally distributed data, a test of significance can be performed. According to Kothari and Garg (2019), removing outliers is a way of solving normality error. The Kolmogorov-Smirnov Test was used to determine whether the residuals were normal. Non-normality was reduced by removing outliers, restructuring data such that it had a nearly normal distribution, and utilizing other standard distributions as models.

Errors resultant from Heteroscedasticity were also examined in all the observations. Homoscedasticity assumes that dataset has the same variance. In the presence of heteroscedasticity, conclusions on variation would be skewed, also, the t & f statistics ends up improper, potentially leading to incorrect conclusions. For data to fit linear regression analysis, it was necessary to ensure that continued increase in values does not have a trend of increase in variance. This situation is called homoscedasticity. Glejser test was employed at significance level of $p > 0.05$ to establish whether there was a violation of homoskedasticity which is a status called heteroskedasticity. This enabled elimination of conclusion based on standard errors (Brooks, 2019).

In order to draw inferences and analyse the data, this study used content analysis to blend qualitative data from open-ended questions into related themes.

To illustrate descriptive data in the form of percentages, frequencies, mean scores, proportions, and standard deviation, tables, figures, bar graphs, and pie charts were used.

3.9 Ethical Considerations

Ethical considerations were examined before beginning data collection, as detailed below. The necessary authorities approvals were obtained, including the university research authorization letters, research licensing Commission (NACOSTI) and KenGen's human resource department. Respondents were further advised that participation in the study was entirely optional. As evidence of their willingness to engage in the study, each participant

completed and signed a consent form alongside the questionnaire. The participants were also informed that the study was conducted solely for educational purposes.

CHAPTER FOUR:

RESEARCH FINDINGS AND DISCUSSION

4.1 Overview

Study discoveries as well as outputs are discussed in this chapter starting with descriptive statistics followed by inferential statistics. A reference to the study described in the literature review was compared while explaining the results. At the start, an analysis of response rate, study participants biodata and background information was illustrated.

4.2 Participants Response

The study turn out by the respondents is as tabulated in table 4.1.

Table 4.1: Respondents' Response Rate

Questionnaire	Frequency	Percent
Response	64	94.18
No response	4	5.82
Total	68	100

Source (Survey data 2022)

Sixty eight participants were considered in the study. However, 64 responded accounting for 94,18 percent. response rate. According to Kothari & Garg (2019 a response rate above 50% is rated at average level whereas a response rate above 70% is considered excellent. The response rate in the study at 94.18% can be rated excellent.

4.3 Demographic Information

4.3.1 Gender

Male participants accounted for 84.4 percent whereas 15.6 percent were female as illustrated in figure 4.1.

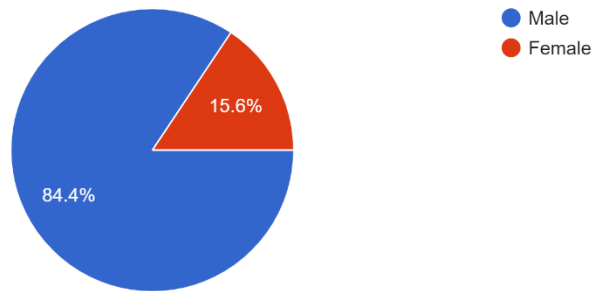


Figure 4.1: Gender of the respondents

Source: Survey Data (2022)

The trend of having more male project team members compared to female project team members is common in the energy sector. For instance, in a study by Sandeep (2017) involving last mile connectivity project, 72.9 per cent were male whereas 27.1 percent were female.

4.3.2 Years of Experience in Employment

Participants working experience was distributed among the respondents as illustrated in figure 4.2.

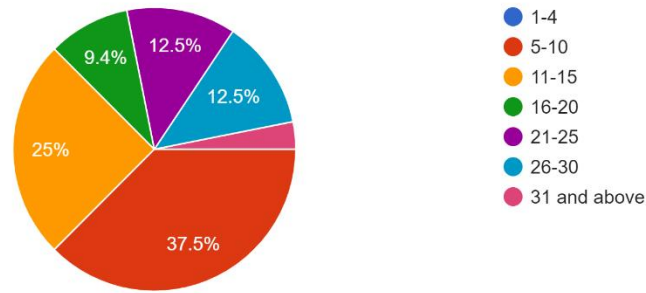


Figure 4.2: Years in Employment

Source: Survey data (2022)

Majority of participants had a project management experience of five to ten years 37.5 per cent followed by 11-15 years 25.0 Percent, 21-25 years- 12.5 percent. 26-30 years 12.5 and above 31 years 3.1 percent. Majority of the respondents 59.4 per cent had an experience of above 10 years whereas 96.9 had an experience of above 5 years. This is indicative of a population with vast experience in project management. Similar study on power distribution project in Murang’a county established that majority of the respondents- 77.8 percent had served for five to 8 years (Dhanjal, 2021), This is indicative of KenGen having more experienced employees in project management.

4.3.3 Respondents Classification by Number of Years

Study participants had varied ages as illustrated in figure 4.3.

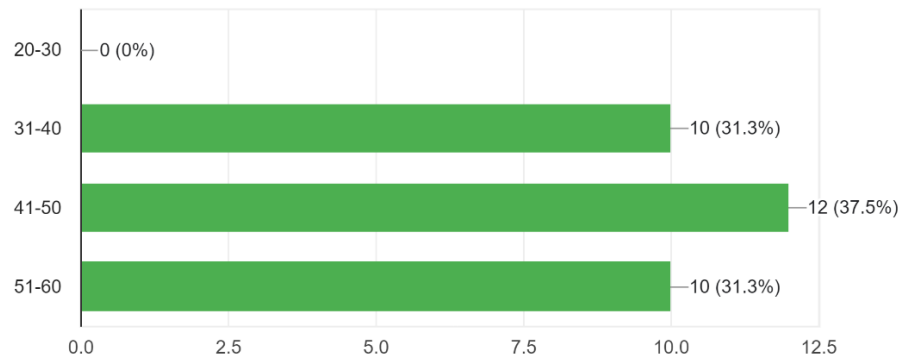


Figure 4.3: Respondents Age

Source: Survey Data (2022)

Majority of the respondents, 37.5 per cent, were in the age bracket of 41-50 years followed by 31- 40 years and 51-60 years each taking 31.3 per cent. This is indicative of majority of project managers within middle working age. The findings are similar to age brackets findings in other studies for instance in a study on power distribution project in Murang’a County, majority of the respondents (36 percent) were 26 – 30 years old. This is indicative of higher middle age population in the energy sector.

4.3.4 Project Type Experience

The respondents had participated in varied types of projects as illustrated in figure 4.4.

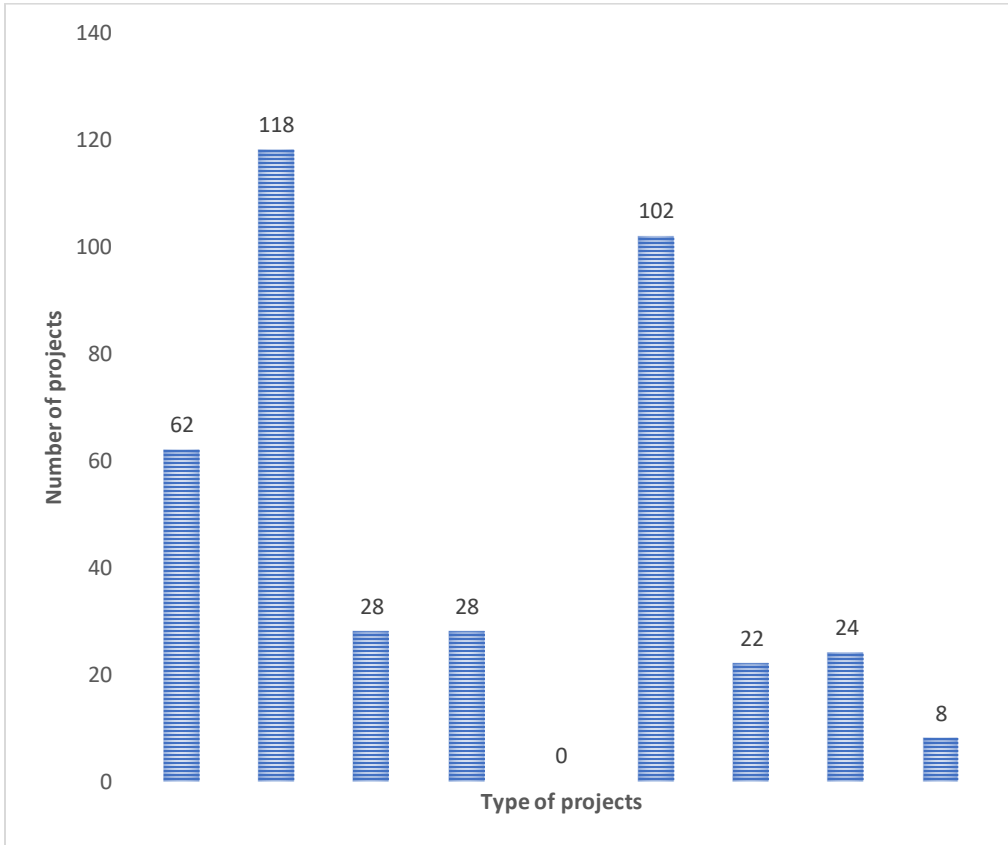


Figure 4.4: Project Type Experience

Source (Survey data 2022)

Majority of the projects implemented by the respondents were new geothermal power plant construction with 118 project engagements followed by Hydro power plant refurbishment with 102 project engagements. The least engaged project was wind refurbishment project with 8 project engagements followed by geothermal refurbishment with 22 project engagement. New power plant project for wind and thermal projects recorded 28

engagements in each. New hydro power construction projects recorded 62 project engagements.

Out of the 392 recorded project engagements, 156 (39.8 per cent) involved powerplant refurbishment indicating that refurbishment projects form a significant proportion of power generation projects in as much as they are not the predominant projects. Similar study in the energy sector, within power distribution projects in Murang'a and Kitui Counties respectively (Dhanjal, 2021) and (Kathongo 2021), focused on the general experience in project management and did not single out the specific type of energy sector projects where the experience was attained. The model used in this study where the type of project where experience was attained was a better style in identifying the specific experience attained.

4.4 Descriptive Statistics and Qualitative Data Analysis

To obtain data on the respondents rating of various project management dynamics influencing performance of Kenya Electricity generation company projects, various statements were aligned to the independent variables and rated on a richert scale that was coded as follows: Very great extent (5) Great extent (4) Moderate extent (3) low extent (2) and very low extent (1). Besides analysis of individual items, an aggregated analysis of mean and standard deviation was obtained for the dependent variable and the distinct independent variables.

4.5 1. Performance of Electricity Generation Projects

The respondents rated attributes of performance of electricity generation projects as outlined in table 4.3.

Table 4.2: Project Performance

	1.00	2.00	3.00	4.00	5.00	Mean	Std. Devt
Timely completion of power generation projects	-	3.13	12.50	46.88	37.50	4.19	0.77
Implementation within budget	-	-	15.63	54.69	29.69	4.14	0.67
Meeting project quality targets	-	-	15.63	53.13	31.25	4.16	0.67
Profitable Power Purchase Agreement (PPA)	3.13	3.13	15.63	50.00	28.13	3.97	0.93
Aggregate value for performance of electricity generation projects						4.11	0.76

Source: Survey Data (2022)

Aspects relating to performance of electricity generation projects were rated at an aggregate value of 4.11 out of 5.0 and a standard deviation of 0.76. This is indicative of an agreement that Timely completion of power generation projects, Implementation, meeting project quality targets within budget and Profitable Power Purchase Agreement (PPA) as aspects that significantly contribute to performance of electricity generation projects. Timely completion of power generation projects was the highest rated aspect with a mean of 4.19 out of 5.0 and a standard deviation of 0.77. Project performance in power generation projects is similar to project performance aspects identified in a study on project risk and performance and KPLC last-mile distribution project in Murang'a devolved unit (Dhanjal, 2021). In the study, the respondents evaluated project performance based on ability to be implemented in time, set quality and budget.

4.5 2. Finance and Performance of Electricity Generation Projects

Data on various aspects of project management financing was obtained as outlined in table 4.4:

Table 4.3: Finance Dynamics and Project Performance

	1.00	2.00	3.00	4.00	5.00	Mean	Std. Devt
Foreign Direct investment funding	0.00	3.13	9.38	56.25	31.25	4.16	0.72
Financing using KenGen internal resources	0.00	6.25	25.00	50.00	18.75	3.81	0.81
Financing Private Public Partnership (PPP)	43.75	25.00	25.00	6.25	0.00	1.94	0.97
Profitable power purchase agreement	3.13	3.13	15.63	50.00	28.13	3.97	0.93
Financing is influenced by company's reputation and value creation effort	3.13	3.13	18.75	46.88	28.13	3.94	0.94
Timely availability of required finances during various project milestones implementation	0.00	6.25	9.38	37.50	46.88	4.25	0.87
Accurate project cost estimates	0.00	0.00	15.63	53.13	31.25	4.16	0.67
Political and economic status in Kenya affect electricity generation project financing by donors	3.13	9.38	21.88	37.50	28.13	3.78	1.06
Aggregate value for project finance dynamics						3.75	0.87

Source: Survey Data (2022)

The aggregate rating for project finance dynamic on performance of electricity generation projects was 3.75 and a standard deviation of 0.87. The score was rated within moderate

level rating indicating of need for addressing attributes related to project financing dynamics. These findings are similar to (Maendo et al 2018) in a study on road infrastructure projects in Nyanza region where it was established by that funds mobilization affected the accomplishment of road development ventures by county-based enterprises in Nyanza bloc within Kenya.

In this study, foreign direct investment and accurate project cost estimates were rated highly as project finance dynamics affecting performance of electricity generation projects with a mean of 4.16 for each and standard deviation of 0.72 and 0.67 respectively.

The respondents favoured varied financing approaches such as Initial Public Offer (IPO), Foreign Direct investment. Financing through Public Private Partnership approach received the lowest rating at a mean of 1.94. The respondent also observed that finance outlays and structuring for projects was important for instance a respondent commented that there was need for having very good banking facilities which are cost effective that come in handy to bridge the gap between project commencement and when Foreign direct investment comes in place to avoid delayed interest on payments to contractors. In another response a respondent indicated that accurate project estimate is key to successful and profitable end product especially for construction project. Under estimation shall hinder quality project delivery and over estimation shall result in commercially unviable project. KenGen projects are capital intensive and apart from social aspect of providing cheap and clean energy, KenGen must recover the investment cost to continuously generate electricity and growing demand. It was further observed that both conducive political environment and economic conditions of the Country are needed to facilitate the investment cost

recovery and manage expansion activities. Ondara, (2017) made similar findings in construction projects where it was observed that financing uncertainty mitigation impacted construction companies project implementation.

4.5 3. Project Procurement Dynamics and Performance of Electricity Generation

Projects

Various aspects related to project procurements dynamics were rated by the respondents as tabulated in table 4.5.

Table 4.4: Rating on Project Procurement Dynamics

	1	2	3	4	5	Mean	Std Dvtn
Direct procurement method	6.25	25.00	25.00	28.13	15.63	3.22	1.18
Use of restricted tendering method	3.13	28.13	18.75	46.88	3.13	3.19	0.99
Use of open tendering method]	-	6.25	28.13	31.25	34.38	3.94	0.94
Use of framework contracting method]	3.13	12.50	31.25	37.50	15.63	3.50	1.01
Well defined equipment and material warranty and guarantee	0.00	3.13	9.38	50.00	37.50	4.22	0.75
Availability of service level agreement for procured equipment	0.00	6.25	18.75	43.75	31.25	4.00	0.87
Commitment of competent supply chain representative in the project	0.00	6.25	12.50	53.13	28.13	4.03	0.82
Transparent tender evaluation process	0.00	0.00	9.38	43.75	46.88	4.38	0.66

	1	2	3	4	5	Mean	Std Dvtn
Commitment of legal department representative in project tender evaluation committee	0.00	3.13	18.75	50.00	28.13	4.03	0.78
Front end planning before tendering]	0.00	3.13	18.75	34.38	43.75	4.19	0.85
Comprehensive tender and contract documents]	0.00	0.00	9.38	43.75	46.88	4.38	0.66
Contracting through engineering, Procurement, and construction (EPC) method]	0.00	12.50	12.50	37.50	37.50	4.00	1.01
Availability of accurate project designs and bill of quantities]	0.00	0.00	15.63	53.13	31.25	4.16	0.67
Aggregate value for Procurement dynamics						3.94	0.86

Source: Survey Data (2022)

The overall rating on procurement dynamics and performance of electricity generation projects was within a moderate rating of 3.94 with a standard deviation of 0.86. The highest rated aspects were Transparent tender evaluation process and Comprehensive tender and contract documents each with a mean score of 4.38 and standard deviation of 0.66. This was followed by a great extent rating on the following aspects Well defined equipment and material warranty and guarantee, front end planning before tendering, availability of accurate project designs and bill of quantities, availability of service level agreement for procured equipment, commitment of competent supply chain representative in the project Commitment of legal department representative in project tender evaluation committee

Contracting through engineering and procurement and construction (EPC) method.

The findings in this study relate to a study by Safapour (2022) that was done among forty-four companies spread across North America and Asia, on Phase-Based Cost and Schedule Performances in Complex Construction Projects. The study found that early implementation of alignment can significantly improve design and/or procurement cost and schedule performance, and that timely adoption of front-end planning and partnering can help avoid construction cost overruns caused by legal issues and conflicts.

The respondents further in their suggestions preferred aspects such as Integrity, Clarity of roles in procurement i.e., tender opening, evaluation, due diligence, professional opinions, tender award & contract implementation committees and use of engineer procure and construct (EPC) in implementing electricity generation projects.

4.5 4. Organizational Dynamics and Performance of Electricity Generation Projects

Respondents rated organization dynamics issues as outlined in table 4.6.:

Table 4.5: Organizational Dynamics and Performance of Electricity Generation

Projects

	1	2	3	4	5	Mean	Std Dvt n
Availability of change management procedure	0.00	15.63	28.13	43.75	12.50	3.53	0.91
Direct project supervision through appointed Project Implementation Team (PIT)	0.00	0.00	3.13	40.63	56.25	4.53	0.56
Political goodwill	3.13	3.13	31.25	28.13	34.38	3.88	1.03
Participatory leadership style in PIT	0.00	3.13	12.50	34.38	50.00	4.31	0.81
Appointment of a KenGen director in PIT	3.13	15.63	34.38	25.00	21.88	3.47	1.10
Regular visit to the project by senior management	3.13	3.13	31.25	31.25	31.25	3.84	1.01
Regular KenGen elected political leadership engagement	9.38	18.75	34.38	25.00	12.50	3.13	1.15
Availability of defined project values	0.00	3.13	18.75	50.00	28.13	4.03	0.78
Project values being rehearsed during project meetings	0.00	3.13	37.50	37.50	21.88	3.78	0.83
Outlined scope change approval procedure	0.00	6.25	28.13	40.63	25.00	3.84	0.88
Regular project reports	0.00	3.13	15.63	34.38	46.88	4.25	0.84
Multidisciplinary composition of Project implementation Team (PIT)	0.00	0.00	3.13	43.75	53.13	4.50	0.56
Strict Adherence to workplan and work breakdown structure	0.00	3.13	12.50	46.88	37.50	4.19	0.77
Regular communication to project stakeholders	0.00	0.00	15.63	43.75	40.63	4.25	0.71
Aggregate value for organizational dynamics						3.97	0.85

Source: Survey Data (2022)

The rating for organization dynamics and performance of electricity generation projects was towards a great extent rating with a mean of 3.97 and a standard deviation of 0.85. This underscores the role played by organization dynamics in performance of electricity generation projects. The organization dynamics that were on average rated at the level within great extent are Direct project supervision through appointed Project Implementation Team (PIT), Participatory leadership style in PIT, Availability of defined project values, Regular project reports, Multidisciplinary composition of Project implementation Team (PIT), regular communication to project stakeholders and strict Adherence to workplan & work breakdown structure. The highest rated dynamic was direct project supervision through appointed Project Implementation Team (PIT) with a mean of and standard deviation of 4.53 and 0.56 respectfully. It was closely followed by multidisciplinary composition of Project implementation Team (PIT) averaging at 4.50 out of 5.0. The highest rated dynamic is indicative of the importance placed by the respondents in organization of project teams with varied skills set. The finding in this study related to the study by Adu & Apawole (2018) on analysis of teamwork aspects relating to interpersonal dynamics and senior executive assistance and their bearing on projects accomplishment in Nigeria infrastructure industry clientele, outsourced project expatriates and builders. The study found out that project expatriates rated interpersonal dynamics above senior executive assistance, with mean item score of 4.42 and 4.35 respectively. Project implementation through teams is therefore preferred by project expatriates in Kenya and Nigeria.

Regular KenGen elected political leadership engagement was the lowest rated dynamic with a mean and standard deviation of respectively. This was indicative of likelihood of engagement of political leaders being more counterproductive than productive to the project.

4.5 5. Individual dynamics and performance of electricity generation projects

Individual dynamics aspects were rated by the respondents as tabulated in table 4.7.:

Table 4.6: Individual Dynamics and Performance of Electricity Generation Projects

	1	2	3	4	5	Mean	Std Dvtn
Certification in Project management for PIT Members	0.00	21.88	25.00	43.75	9.38	3.41	0.94
Ethical standards of Project implementation Team	0.00	3.13	6.25	43.75	46.88	4.34	0.74
Education at graduate level and above for project implementation team	0.00	3.13	34.38	40.63	21.88	3.81	0.81
High seniority of PIT members in KenGen job levels	0.00	9.38	53.13	31.25	6.25	3.34	0.74
ICT proficiency of project implementation team	0.00	9.38	37.50	37.50	15.63	3.59	0.87
PIT members with manageable workload and commitments in other projects and functions	0.00	3.13	31.25	46.88	18.75	3.81	0.77
Quarterly PIT/Contractor Project meetings]	-	-	15.63	46.88	37.50	4.22	0.70
Training of PIT on the project management	3.13	9.38	15.63	59.38	12.50	3.69	0.92
Project supervision through outsourced project supervisor	-	12.50	53.13	21.88	12.50	3.34	0.86
Teamwork spirit among project implementation team members	-	-	15.63	46.88	37.50	4.22	0.70
Aggregate value for Individual dynamics						3.78	0.81

Source: Survey Data (2022)

The individual dynamics in the study were rated towards moderate to great extent with a mean and standard deviation standing of 0.61 respectively. The individual dynamics aspects that received high rating at the great extent average rating were Ethical standards of Project implementation Team (Mean 4.34, Standard deviation 0.74), Quarterly PIT/Contractor Project meetings (Mean 4.22, Standard deviation 0.70) and teamwork spirit among project implementation team members (Mean 4.22, Standard deviation 0.70). Findings in this study emphasize on the quality of teamwork skills more than the ranking seniority of project team members. The findings are similar to the study by Krzysztof (2017). In the study whose purpose was to produce a competency model for project managers in the construction industry in Poland, it was found out that the factors that determine the competency of construction project managers include basic managerial abilities, interpersonal talents that support managing skills, emotional intelligence, and formal skills. These studies were leaning more towards competencies than job seniority of project implementation team.

Individual dynamics aspects that received the lowest rating were High seniority of PIT members in KenGen job levels (Mean 3.34, Standard deviation 0.74) and Project supervision through outsourced project supervisor response was (Mean 3.34, Standard deviation 0.86). This is indicative of the respondents view that project team members drawn from senior job levels do not impact project performance. This could be as a result of overstretched managerial span of control and unavailability for day to day

project team tasks. Similarly, the respondents did not favor use of outsourced project supervisor implying that they were more comfortable working with an internal team compared to an outsourced supervisor.

4.5 6. Stakeholder Management Dynamics and Performance of Electricity

Generation Projects

Dynamics touching on stakeholder management were rated by respondents as tabulated in table 4.8.:

Table 4.7: Stakeholder Management Dynamics and Performance of Electricity

Generation Projects

	1	2	3	4	5	Mean	Std Dvtn
Documented project stakeholder mapping]	-	3.13	12.50	50.00	34.38	4.16	0.76
Availability of project stakeholder engagement plan	-	6.25	18.75	37.50	37.50	4.06	0.91
Local community engagement during project initiation	-	6.25	9.38	37.50	46.88	4.25	0.87
Regular county officials engagement throughout project lifecycle	-	12.50	28.13	43.75	15.63	3.63	0.90
National government administration engagement throughout project lifecycle	-	6.25	18.75	50.00	25.00	3.94	0.83
Engagement with project financiers throughout project lifecycle	-	3.13	6.25	40.63	50.00	4.38	0.75
Engagement with executive throughout project lifecycle	-	-	18.75	31.25	50.00	4.31	0.77
Engagement with KenGen board throughout project lifecycle]	-	3.13	18.75	37.50	40.63	4.16	0.84

	1	2	3	4	5	Mean	Std Dvtn
Involvement of local community in provision of labour	-	3.13	12.50	40.63	43.75	4.25	0.80
Involving local community in supplies of project supplies	3.13	12.50	34.38	37.50	12.50	3.44	0.97
Community participation enhances security and protection of property of the project.]	3.13	-	21.88	50.00	25.00	3.94	0.87
Stakeholder participation enhances commitment on the part of stakeholders in this project organization.]	-	3.13	12.50	59.38	25.00	4.06	0.71
Involvement and participation create a sense of motivation and enthusiasm among the necessary stakeholders	-	6.25	15.63	53.13	25.00	3.97	0.82
Availability of project community liaison officers]	-	6.25	15.63	31.25	46.88	4.19	0.92
Aggregate value for stakeholder management dynamics						4.05	0.84

Source: Survey Data (2022)

Stakeholder management dynamics were rated at an aggregate mean value of 4.05 out of 5.0 with a standard deviation of 0.84. This was a high rating at the level of great extent. It was also the highest mean score compared to the other variables in the study, thus indicating that stakeholder management dynamics influence electricity generation project at a great extent. The highly rated aspects were engagement with project financiers throughout project lifecycle followed by engagement with executive throughout project lifecycle at a mean and standard deviation of 4.38 & 0.78 and 4.31 and 0.77 respectfully. These findings outcome is similar to findings by Mashali, (2022) on Critical success

dynamics in big building projects in Qatar. From the study influence of stakeholders was established to have a significant effect on success of the project.

4.5 Inferential Statistics for Study Variables

4.6 1. Diagnostic Tests

To ensure that the data was suitable to be regressed, tests were first done to establish whether the data was fit for assessment. The diagnostic tests that were conducted tested multicollinearity, heteroscedasticity and normality.

4.6.1. 1. Multicollinearity Test

Test of collinearity was conducted to verify whether regressed variables were correlated. Use of tolerance and variance inflation factors (VIF) was employed to establish possibility of multicollinearity. A conservative VIF of < 5 was used as the threshold of multicollinearity.

Table 4.8: Multicollinearity test results

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Finance Dynamics	.448	2.232
	Procurement Dynamics	.280	3.577
	Organizational Dynamics	.149	6.691
	Individual Dynamics	.295	3.392
	Stakeholder Dynamics	.166	6.025
a. Regressed Variable: Project Performance			

Source: Survey Data (2022)

Three independent variables had a variance inflation factor (VIF) of below 5 which implied no collinearity involving the sets. However, two independent variables relating to organizational dynamics with 6.691 and stakeholder dynamics had variance inflation value of 6.025. As a result, organizational dynamics, being the independent variable with the highest VIF was dropped. The findings in this study differ with studies done in roads projects where organization culture was found to be an important determinant of project performance (Maendo et al, 2018)

4.6.1. 2. Heteroskedasticity Test

For data to fit linear regression analysis, it was necessary to ensure that continued increase in values does not have a trend of increase in variance. This situation is called homoscedasticity. Glejser test was employed at significance level of $p > 0.05$ to establish whether there was a violation of homoskedasticity which is a status called heteroskedasticity. The output coefficients are illustrated in table 4.10.

Table 4.9: Output Coefficient on Glejser test

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.739	.187		3.957	<.001
	Finance Dynamics	-.024	.066	-.065	-.365	.716
	Procurement Dynamics	-.183	.084	-.484	-2.165	.035
	Individual Dynamics	.110	.070	.341	1.566	.123
	Stakeholder Dynamics	-.083	.083	-.291	-1.002	.321
	Organizational Dynamics	.053	.090	.180	.587	.560

a. Response Variable: AbsUT

Source: Survey Data (2022)

Review of above table shows that significance of output coefficient are as follows: project financing at 0.716, project procurement at 0.035, individual dynamics at 0.123, stakeholder management dynamics at 0.321 and organization dynamics at 0.560. all the above values are greater than 0.05 at $p > 0.05$ and therefore there is no heteroskedasticity. In a separate road construction project, using modified Wald test, two of variables similar to variables in this project involving organizational aspects and finance factors/ projects resourcing, heteroskedasticity significance of output coefficient was 0.43 at P- 0.05, citing that there was no heteroskedasticity problem with the variables within the study (Maendo et al, 2018). This is indicative of the current study variables showing a similar trend with past studies,

4.6 2. Correlation Analysis

Pearson correlation analysis was used to establish the relationship between the dependent variable of Performance of electricity generation projects and the predictor variables of finance dynamics, Procurement dynamics, Individual dynamics and stakeholder management dynamics. Outcome is as illustrated in table 4.11:

Table 4.10: Correlation Coefficient between Performance of Electricity Generation Projects and Project Dynamics

		Correlations				
		Project Performance	Finance Dynamics	Procurement Dynamics	Individual Dynamics	Stakeholder Management Dynamics
Project Performance	Pearson Correlation	1	.795**	.782**	.709**	.737**
	Sig. (2-tailed)		<.001	<.001	<.001	<.001
	N	64	64	64	64	64
Finance Dynamics	Pearson Correlation	.795**	1	.723**	.603**	.615**
	Sig. (2-tailed)	<.001		<.001	<.001	<.001
	N	64	64	64	64	64
Procurement Dynamics	Pearson Correlation	.782**	.723**	1	.738**	.780**
	Sig. (2-tailed)	<.001	<.001		<.001	<.001
	N	64	64	64	64	64
Individual Dynamics	Pearson Correlation	.709**	.603**	.738**	1	.795**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001
	N	64	64	64	64	64
Stakeholder Management Dynamics	Pearson Correlation	.737**	.615**	.780**	.795**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	
	N	64	64	64	64	64

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

Source: Survey Data (2022)

Pearson correlation coefficient (r) expresses where there is a positive or negative relationship between the variables. The r varies between +1 and -1, where +1 is a perfect

positive correlation, and -1 is a perfect negative correlation. 0 means there is no linear correlation at all. Between +1 and -1, where +1 denotes a perfect positive correlation and -1 denotes a perfect negative correlation, is the range of Pearson's r. Zero denotes the absence of any linear correlation (Kothari & Garg, 2019).

Pearson correlation coefficient r , therefore determines extent of association between variables, whether negative or positive association, that is, whether they are negatively or positively related. From the table it was established that all the independent variables had strong positive relationship with the dependent variable- Performance of electricity generation project, starting with project finance ($r=0.795$ $p<0.01$), Project procurement dynamics ($r=0.782$ $p<0.01$), stakeholder management dynamics ($r=0.737$ $p<0.01$), and individual dynamics ($r=0.709$ $p<0.01$).

The high rating on project finance dynamics was akin to findings from a study by Ondara et al. (2017) that established how resource uncertainty mitigation measures affected accomplishment of infrastructure companies. From the study, the most significant perceived influence on firm performance was ensuring ready availability of key implements which reduced implementation delays, as well as making sure there was machinery and quality building materials which in turn led to timely completion and standard of work.

Enhancement of procurement dynamics ($r=0.782$ $p<0.01$) is indicative of contributing to improvement of project performance. These findings are consistent with studies done on

performance of projects in Kenya Ports Authority that established that project procurement had major impact on project performance (Akira & Simba, 2017).

Stakeholder management dynamics was established to have a positive influence on performance of electricity generation projects ($r=0.737$ $p<0.01$). The outcome is similar to outcome in a study on building projects in Qatar that established that participation of stakeholders in decisions as well as involvement throughout the project lifecycle enhanced building projects success in Qatar (Mashali, 2022).

Individual dynamics also rated at a significant rating ($r=0.709$ $p<0.01$). The findings are similar to findings in a study on the key dynamics that enhance cost and schedule performance in United states complex projects. The American study found out that significant factors at play for the projects' success were individual traits linked to team building, alignment, partnering and change management strategies.

4.6 3. Regression Analysis

Regression analysis conducted involved an analysis on change of predictor variable on response variable, analysis of variance and determining the regression coefficient that led to deducting of regression coefficient model. During the analysis a comparison of the study outcome and other studies outcome was made.

Table 4.11: Model Summary

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df 2	Sig. F Change
1	.873 ^a	.761	.745	.30503	.761	47.037	4	59	<.001
a. Predictors: (Constant), Stakeholder Dynamics, Finance Dynamics, Individual Dynamics, Procurement Dynamics									

Source: Survey Data (2022)

In conducting regression analysis, observation is made to ensure that the observed scores for variables are close to the fitted values in a regression line. a coefficient of multiple determination for multiple regression/R-Squares is determined through evaluating the observed data and fitted values. a greater R-squared values denotes minimal differences between the scattered data and the fitted values (Kothari & Garg, 2019). This study established adjusted R Square of 0.745 which implies that 74.5 percent change of the predictor variables of (project finance dynamics, project procurement dynamics, Individual dynamics and stakeholder management dynamics) influences the response variable of performance of electricity generation projects. This is indicative of a strong influence. The estimated error of variability is accounted for the adjusted R square is 74.5 per cent which also denotes a high percentage. A review of change statistics indicated that ‘f’ statistic for R square change is significant where <0.01 is less than 0.05 indicative of a good model of fit. Other dynamics not factored in the study account for the balance of 25.5 percent.

Table 4.12: ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.506	4	4.377	47.037	<.001 ^b
	Residual	5.490	59	.093		
	Total	22.996	63			
a. Regressed Variable: Project Performance						
b. Regressors: (Factor), Stakeholder Dynamics, Finance Dynamics, Individual Dynamics, Procurement Dynamics						

Source: Survey Data (2022)

Kothari & Garg (2019) observed that in conducting Analysis of Variance, a high F Value, null hypothesis is rejected, Conversely, when F value is low, null hypothesis is upheld. In this study, ANOVA results indicated that F value was 47.037. The significant value between performance of electricity generation project and predictor variables was <.001. The impact level (P) was below 0.005 at $p < 0.05$. This was indicative of estimation pertaining to regression model that project finance dynamics, project procurement dynamics, individual dynamics and stakeholder management dynamics significantly influences performance of electricity generation projects.

Table 4.13: Regression Coefficient

Model		Coefficients				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Strd. Error	Beta		
1	(Constant)	.146	.328		-.444	.659
	Finance Dynamics	.532	.114	.443	4.685	<.001
	Procurement Dynamics	.261	.148	.214	1.759	.084
	Individual Dynamics	.136	.117	.130	1.161	.250
	Stakeholder Dynamics	.179	.112	.194	1.607	.113

a. Response Variable: Project Performance

Source: Survey Data (2022)

The regression model that was subjected to investigation was:

$$PEGP = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_4 X_4 + \beta_5 X_5 + \mu$$

Where;

β_0 is the intercept; β_1 , β_2 , β_4 , and β_5 represent regression-coefficients. Y represent Composite-Index relating to Performance of Electricity-Generation projects performance; X_1 represent composite-index on Project Financing dynamics; X_2 represent composite-index on Project Procurement dynamics; X_4 represent composite-index on Individual Dynamics and X_5 represent composite-index on Stakeholder management Dynamics while μ represents error-term.

From the analysis the following model was computed:

$$Y = 0.146 + 0.532X_1 + 0.261X_2 + 0.136X_4 + 0.179X_5$$

Analysis of the coefficient table indicated that the coefficient for finance dynamics attained at ($p = -0.001$, $\beta_1 = 0.532$). The p-value of -0.001 was below 0.05, establishing that project finance dynamics had a substantial implication on performance electricity generation projects. Regression coefficient was positive implying that one unit increase in financial dynamics increased performance of electricity generation projects by 0.532. The findings are similar to a study on road construction projects in Embu County by Irina & Kidomo, (2017) which established that project financing factors affected success of road construction projects.

Regarding procurement dynamics, at ($p = 0.084$, $\beta_1 = 0.261$), the regression coefficient was affirmative thus indicating that enhancement of procurement dynamics such as structured procurement plan and optimum procurement method increased performance of electricity generation projects by 0.261 units. However, with a P-value of 0.084 that is higher than 0.05, this led to inference that procurement dynamics cannot be concluded to have a substantial impact on performance of electricity generation projects. The results are not consistent with results of a study by Chepkemoi (2020) who examined bearing of procurement management competencies on project progress within Machakos County Roads Project. In that study, the most influential variable in the performance of road construction projects was discovered to be procurement skills.

In the study, individual dynamics had regression coefficient that was positive thus indicating that individual dynamics influenced performance of electricity generation projects ($p = 0.250$, $\beta_3 = 0.136$). This implied that employing aspects of individual dynamics such as team work, competent projects team and enhanced ethical standards increased performance of electricity generation projects by 0.136 units. Nevertheless, with a P-value of 0.250 being above 0.05, this led to inference that individual dynamics did not lead to substantial impact on performance of electricity generation projects. The conclusion is not consistent with findings by Safapour (2022). In that study on crucial dynamics that Enhance Phase-Based Cost and Schedule Performances in Complex Construction Projects, individual traits linked to the use of team building, alignment, partnering, and change management strategies in construction projects were recognized as having a substantial impact on the resolution of complexity-related issues.

Regarding stakeholder management dynamics, at ($p = 0.113$, $\beta_4 = 0.179$), the regression coefficient was positive thus indicating that increase to stakeholder management dynamics such as conducting a stakeholder mapping and engaging the stakeholders such as county government, energy sector agencies as well as local community influenced performance of electricity generation projects by 0.179 units. However, with a P-value of 0.113, being more than 0.05, this led to inference that stakeholder management dynamics did not substantially impact on performance of electricity generation projects. The results are not consistent with results of a study by Omondi & Kinoti, (2020). The research undertaken in Kilifi County that assessed impact by communities and persons of interest and

accomplishment of road construction projects. From that research, stakeholder participation in project identification, project planning, project implementation, and project monitoring was found to have a significant impact on the performance of road construction projects in Kenya's County of Kilifi.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

The chapter includes a summary of the research, its findings, contributions to knowledge, policy implications, suggestions, and areas in need of additional study.

5.2 Summary of the study

The major intention of the research involved examination of project management dynamics and their bearing on project performance of Kenya Electricity Generation Company projects. The dynamics under investigation were finance dynamics, Procurement dynamics, Organizational dynamics, Individual dynamics and stakeholder management dynamics. Data was collected through self-administered questionnaire in a survey. Descriptive and exploratory research design was used and data was analysed using descriptive statistics through measures of dispersion and central tendency through studying the standard deviation and mean respectively. Inferential statistics were also employed by conducting correlation and regression analysis.

The study had five objectives, the first objective was to examine the influence of project finance dynamics on project performance of Kenya Electricity Generating Company projects, using descriptive statistics with an attained score compared out of a maximum score of 5.0, finance dynamics were rated between moderate and great extent. The specific finance dynamic attributes that attained highest rating were foreign direct investment and

accurate project cost estimates. When analysed through regression analysis, finance dynamics regression coefficient was positive. This led to establishment that project finance dynamics led to substantial influence on performance of electricity generation projects.

The second objective was to establish the relationship between project procurement dynamics and project performance of Kenya Electricity Generating Company projects. Procurement dynamics were rated at a range of moderate to great extent. The highest rated specific procurement dynamics were Transparent tender evaluation process and availability of comprehensive tender and contract documents. Analysis using regression analysis established that though regression coefficient was positive, procurement dynamics could not be established to lead to substantial influence on performance of electricity generation projects.

The third objective was to ascertain the influence of organization dynamics on project performance of Kenya Electricity Generating Company projects. Organizational dynamics score was in the range of moderate to great extent. The highest rated specific organization dynamic was direct project supervision through appointed Project Implementation Team (PIT) Organizational dynamics were nevertheless dropped from multiple linear regression after the study established their multicollinearity challenge thus dropped from the regression model.

The fourth objective was to assess the how individual dynamics affects project performance of Kenya Electricity Generating Company projects. Individual dynamics score was in the range of moderate to great extent. The specific individual dynamics attribute that received high rating at the great extent average rating was level of ethical standards of project implementation team followed by quarterly employer project implementation team alongside contractor project meetings. Analysis using regression analysis established that though regression coefficient was positive individual dynamics could not be concluded to lead to substantial influence on performance of electricity generation projects.

The fifth objective was to evaluate the effect of stakeholder management on performance of Kenya Electricity Generating Company projects. Stakeholder management dynamics scored the highest mean score among the independent variables. The score was in the range of great extent. The highly rated specific stakeholder management dynamics aspects were engagement with project financiers throughout project lifecycle followed by engagement with executive throughout project lifecycle. Analysis using regression analysis established that though regression coefficient was positive, stakeholder management dynamics could not be concluded to lead to substantial influence on performance of electricity generation projects.

The research instrument was also tailored to meet study gaps explored from previous studies. Finance dynamics gaps that were incorporated include varied project financing

means such as foreign direct investment and Public Private Partnership financing. The two financing approaches received a high rating whereas Public Private Partnership financing received a low rating. In procurement dynamics, the study explored the preferred project procurement approaches with transparency in tender evaluation receiving a higher rating than choice of procurement method. Regarding organization dynamics aspects such as leadership style and political interference in electricity generation projects, participatory leadership attained a high preference. Regarding individual dynamics, teamwork and project management competencies were explored. From the analysis, teamwork skills attained a high rating. Concerning stakeholder management dynamics, the types of key electricity generation project stakeholders was subjected to study. Project financiers were established to be the highly rated key project stakeholders.

5.3 Conclusion

Conclusion was made based on findings of the study that aimed at examining the project management dynamics and their influence on performance of electricity generation projects. It was established that finance dynamics contributed to increase in performance of electricity generation projects. Finance dynamics were the sole dynamics among the other dynamics that were established to have statistically significant relationship with performance of electricity generation projects. The leading specific finance dynamics aspects that received the leading ratings were project financing through foreign direct investment followed by accurate project cost estimates in project resource planning. Project financing through Public Private partnership received the lowest rating among finance

approaches preferred in electricity generation projects financing indicating that it was the less preferred electricity generation projects financing mode.

Project procurement dynamics, individual dynamics and stakeholder management dynamics increased performance of electricity generation projects. However, their regression coefficient was not statistically significant. This led to the inference that that project procurement, individual dynamics and stakeholder management dynamics do not have significant influence on performance of Kenya Electricity Generation Company projects. There were aspects of project procurement, individual factors and stakeholder management items that attained a high rating such as transparent tender evaluation, ethical standard of project implementation team and engagement of financiers throughout project life cycle.

5.4 Recommendations:

The study results revealed that there were financing approaches that were not rated to have been optimized in financing Kenya Electricity generation projects such as private public partnerships (PPP). The government of Kenya should therefore establish a workable framework on PPP and other varied financing approaches to make the PPP financing approach preferable in the electricity generation projects financing.

Kenya Electricity Generation company should give priority focus on finance dynamics while scoping the electricity projects, above other project dynamics. The government on the other hand through the ministry of finance should guarantee power projects based on the financiers with a history of undelayed cash outlays during project milestones.

In project finance plan, KenGen should place special emphasis on foreign direct investment in financing electricity generation projects. To ensure that projects do not stall along the implementation path, project management expertise in finance scheduling should be sought and approved to ensure the project is guided by accurate project cost estimates.

5.5 Suggestions for Further Research

In as much as finance dynamics were established to significantly influence performance of Kenya electricity generation project, there was a limit of significance. This calls for further studies on other finance dynamics accounting for 24.5% that were not within the purview of the study.

Further studies are also required in relation project management dynamics that were established not to have a significant effect on performance of electricity generation projects, namely project procurement dynamics, individual dynamics and stakeholder management dynamics.

Other than electricity generation projects undertaken by KenGen, there are other independent Power Producers that have implemented electricity generation in Kenya. A comparative analysis is indicated to establish the project management dynamics that contribute significantly to the performance of those generation projects.

Other electricity projects in the region that feed into the Kenyan grid such as electricity generation projects in Ethiopia and Uganda need a comparative study against KenGen generation projects.

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Appendix I: QUESTIONNAIRE

This form seeks to obtain information that will aid academic research relating to the dynamics and performance of KenGen power generation installations. The information is obtained in pursuit of MBA in Project Management from Kenyatta University and hence will be purely used for academic purposes. Please answer the question honestly as ultimate confidence is assured.

SECTION, (A): RESPONDENTS PERSONAL DATA-

1. Sex

2. Department _____ Section _____

3. Years of Service in the company

4. Age

5. Please provide information on the number of projects you have implemented based on the type of project, whether refurbishment of power plants or new power plants.

Mode of Generation project	No of projects implemented	
	Refurbishment project	New Power Plant project
Wind		
Hydro		
Geothermal		
Thermal		
Solar		

ELECTRICITY GENERATION PROJECT PERFORMANCE.		Very low extent	Low extent	Moderate extent	Great extent	Very great extent
Rate to what extent the following aspects contribute to performance of KenGen electricity generation projects in KenGen						
1	Timely completion of power generation projects					
2	Implementation within budget					
3	Meeting project quality targets					
4	Profitable Power Purchase Agreement (PPA)					

...	SECTION, (B): PROJECT FINANCE DYNAMICS: Rate to what extent the following project finance dynamics enable KenGen electricity generation projects successful performance	Very low extent	Low extent	Moderate extent	Great extent	Very great extent
1.	Foreign Direct investment funding					
2.	Financing using KenGen internal resources					
3.	Financing Private Public Partnership (PPP)					
4.	Profitable power purchase agreement					
5.	Financing is influenced by company’s reputation and value creation effort					
6.	Timely availability of required finances during various project milestones implementation					
7.	Accurate project cost estimates					
8.	Political and economic status in Kenya affect electricity generation project financing by donors					
9.	Give your suggestions on other project finance dynamics that enable KenGen electricity generation projects successful performance					
	SECTION, (C): PROJECT PROCUREMENT DYNAMICS Rate to what extent the following dynamics enables KenGen electricity generation projects successful performance	Very low extent	Low extent	Moderate extent	Great extent	Very great extent
10.	Direct procurement method					

11.	Use of restricted tendering method					
12.	Use of open tendering method					
13.	Use of framework contracting method					
14.	Well defined equipment and material warranty and guarantee					
15.	Availability of service level agreement for procured equipment					
16.	Commitment of competent supply chain representative in the project					
17.	Transparent tender evaluation process					
18.	Commitment of legal department representative in project tender evaluation committee					
19.	Front end planning before tendering					
20.	Comprehensive tender and contract documents					
21.	Contracting through engineering, Procurement and construction (EPC) method					
22.	Availability of accurate project designs and bill of quantities					
23.	Please provide any other feedback on procurement approach that can improve successful project completion.					
SECTION D: ORGANIZATION DYNAMICS. Rate how the following Organizational dynamics enable successful project performance in KenGen		Very low extent	Low extent	Moderate extent	Great extent	Very great extent

24.	Availability of change management procedure					
25.	Direct project supervision through appointed Project Implementation Team (PIT)					
26.	Political goodwill					
27.	Participatory leadership style in PIT					
28.	Appointment of a KenGen director in PIT					
29.	Regular visit to the project by senior management					
30.	Regular KenGen elected political leaders' engagement					
31.	Availability of defined project values					
32.	Project values being rehearsed during project meetings					
33.	Outlined scope change approval procedure					
34.	Regular project reports					
35.	Multidisciplinary composition of Project implementation Team (PIT)					
36.	Strict Adherence to workplan and work breakdown structure					
37.	Regular communication to project stakeholders					
38.	Any other organizational factor that leads to success in projects. Please state					
SECTION F INDIVIDUAL DYNAMICS: Rate how effective the following individual dynamics affect successful project performance in KenGen		Very low extent	Low extent	Moderate extent	Great extent	Very great
39.	Certification in Project management for PIT Members					

40.	Ethical standards of Project implementation Team					
41.	Education at graduate level and above for project implementation team					
42.	High seniority of PIT members in KenGen job levels					
43.	ICT proficiency of project implementation team					
44.	PIT members with manageable workload and commitments in other projects and functions					
45.	Quarterly PIT/Contractor Project meetings					
46.	Training of PIT on the project management					
47.	Project supervision through outsourced project supervisor					
48.	Teamwork spirit among project implementation team members					
49.	Any other individual factor that leads to success in projects. Please state					
SECTION G: STAKEHOLDER MANAGEMENT. Rate how effective the following stakeholder management dynamics affect successful project performance in KenGen		Very low extent	Low extent	Moderate extent	Great extent	Very great
50.	Documented project stakeholder mapping					
51.	Availability of project stakeholder engagement plan					
52.	Local community engagement during project initiation					
53.	Regular county officials' engagement throughout project lifecycle					

54.	national government administration engagement throughout project lifecycle					
55.	Engagement with project financiers throughout project lifecycle					
56.	Engagement with executive throughout project lifecycle					
57.	Engagement with KenGen board throughout project lifecycle					
58.	Engagement with KETRACO & KPLC throughout project lifecycle					
59.	Involvement of local community in provision of labour					
60.	Involving local community in supplies of project supplies					
61.	Community participation enhances security and protection of property of the project.					
62.	Stakeholder participation enhances commitment on the part of stakeholders in this project organization.					
63.	Involvement and participation create a sense of motivation and enthusiasm among the necessary stakeholders in the project.					
64.	Any other stakeholder management factor that affects successful project performance in KenGen. Please state.....					

Appendix II: INTRODUCTION LETTER

Simon Theuri
P.O. Box 47932

NRB

10th December 2021

Dear Participant,

RE: RESEARCH SURVEY ON THE PROJECT DYNAMICS AND PERFORMANCE OF KENYA ELECTRICITY GENERATION COMPANY PROJECTS.

I am a Kenyatta University School of Business Master of Business Administration (Project Management) student. Project dynamics and performance of Kenya Electricity Generating Company Projects are the focus of my research. I would like to ask for your cooperation and candid answers to all the following questions in the questionnaire. The findings of the study will aid in the formulation of policies for the management of power generation plants. Answers given will be kept in ultimate confidence.

Your assistance with this study is much appreciated owing to your vast expertise and experience in electricity generation projects. Questions and queries can be referred to Management Science department in the university,

Thank you in anticipation.

Yours Sincerely,

Simon Theuri

Appendix III: KENYATTA UNIVERSITY RESEARCH APPROVAL LETTER



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 22nd September, 2022

TO: Njenga Simon Theuri
C/o Management Science Dept.

REF: D53/CTY/PT/24456/2011

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 14th September, 2022 approved your Research Project Proposal for the M.B.A Degree Entitled, "Project Management Dynamics and Performance of Kenya Electricity Generating Company Projects."

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Also, please ensure that you publish article(s) from your thesis before submitting it to Graduate School for examination as per the Commission for University Education and Kenyatta University guidelines.

Thank you.

ANNBELL MWANIKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Management Science Department.

Supervisors:

1. Dr. David Nzuki
C/o Department of Management Science
Kenyatta University

Appendix V: NACOSTI RESEARCH PERMIT


NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION.

Ref No: 785112 **Date of Issue: 22/October/2022**

RESEARCH LICENSE



This is to Certify that Mr., Simon Theuri Njunga of Kenyatta University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Embu, Kisumu, Mombasa, Nairobi, Nakuru on the topic: Project management dynamics and performance of Kenya Electricity Generation Company Projects for the period ending : 22/October/2023.

License No: NACOSTUP/22/1288

Applicant Identification Number: 785112

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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See overleaf for conditions