

**FACTORS INFLUENCING EFFECTIVE HYDROELECTRIC POWER SUPPLY
GENERATION IN KENYA; A CASE OF KINDARUMA POWER STATION PROJECT
IN MACHAKOS COUNTY**

BY

ESTHER SHELMITH NJOKI WAWERU

**A research project report submitted in partial fulfillment of the requirement for the award
of the degree of Masters of Arts in Project Planning and Management of the University of
Nairobi**

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DECLARATION

This research project report is my original work and has not been submitted or presented for award of a degree or any award in any other institution.

Signature: **Date:**

ESTHER SHELMITH NJOKI WAWERU
L50/85246/2016

This research project report has been submitted for examination with my approval as the University

Supervisor

Signature: **Date:**

PROFESSOR CHARLES RAMBO
UNIVERSITY OF NAIROBI

DEDICATION

I dedicate this research project report to my beloved family; my spouse Paul Waweru, son Collins Kiambuthi and my beloved mother Lois Waithera for their great love and support.

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ABBREVIATIONS AND ACRONYMS

MW	-	Mega Watts
KenGen	-	Kenya Electricity Generating Company
KPLC	-	Kenya Power and Light Company
KPC	-	Kenya Power-Company
MOE	-	Ministry of Energy
PPP	-	Public Private Partnerships (PPP)
KV	-	Kilo Volts
U.S.	-	United States
IEA	-	International Energy Agency
KWH	-	Kilowatt-Hour
DOE	-	Department of Energy
TARDA	-	Tana River Development Authority
IDT	-	Innovative Diffusion Theory

ABSTRACT

The purpose of this study was to investigate factors influencing effective hydroelectric power supply generation in Kindaruma Power Station project, in Machakos County, Kenya. The study was guided by the following objectives; to determine how upgrading of machine influence effective hydroelectric power supply generation in Kindaruma Power Station; to establish the influence of human resource on effective hydroelectric power supply generation in Kindaruma Power Station; to determine how project financing influence effective hydroelectric power supply generation in Kindaruma Power Station; to establish how top management support influence effective hydroelectric power supply generation in Kindaruma Power Station. The study adopted a descriptive survey design because it was aimed at giving an accurate description on the situation factors influencing effective hydroelectric power supply generation. The study targeted a population 12 management staff and 24 Unionsable staff. Therefore the study targeted a total population of 36 respondents. Since the total population was small the researcher did not sample the target population hence used census, capturing the entire population of the respondents. Therefore the researcher used 36 as sample size. Questionnaires and an interview schedule were used to collect data. Data was analysed using SPSS ns MS Excel spreadsheets with the eventual findings indicating that the variables under study; upgrade of machines, human resources, project financing and top management support all influenced effective hydroelectric power supply at the Kindaruma Power Station. The findings revealed that the respondents agreed there was need to upgrade machines for future development since the technology changes with time in terms of innovation and also the respondents agreed that the employees received appropriate training before using the upgraded machines (97%) of the respondents indicated that the machines in Kindaruma were very effective while 1(3%) of the respondents indicated they were fairly effective. Based on the findings, the majority of the respondents agreed and affirmed that the human resource indicators influenced effectiveness of operations in Kindaruma Power Station to a very great extent. This implied that human resource management is very important to any organization for effective operation. In addition, the respondents agreed that technical support and training was provided to the project staff at Kindaruma Power station. They also agreed that the staff are competent on the organizational operations and machine operations. The highest number of the respondents (85%) indicated that indeed financial resources influenced the efficiency of operations. However, 15% of the respondents did not.

The findings implied that financial resources were crucial for organizational operations and their availability creates efficiency in operations. Also, 88% of the respondents agreed that leadership skills were crucial for efficient operations thus implying that a project managed by personnel with leadership traits and abilities was more likely to be successful as they would lead the project on the right track. Finally, the respondents (76%) agreed that the top management put emphasis on hiring qualified and competent staff. The study eventually concluded that the success of a project heavily depends on the successful coordination of its critical success factors.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

As the world has continued developing, global energy consumption has risen by 55 percent over the last 20 years (BP 2014). This rise in consumption is driven mostly by development in Asia, specifically China and India. Energy consumption has greatly increased in these countries in line with the continued economic growth and development. The future growth of energy consumption will be in Africa where the current population of one billion persons will double over the next 40 years ("2013 World Population Data Sheet." 2013).

This projected growth in population, and economic development will see the global demand for energy increase 41 percent over the next 20 years (BP 2014). Growing concerns about climate change are now influencing energy production policies around the world. Denmark and Germany, for example, are turning to renewable energy sources such as wind and solar to reduce their GHG emissions. Other nations, such as Canada and Norway, have based their energy systems on hydroelectricity.

Generating inadequate electricity capacity and an unreliable power supply have been perennial problems in Kenya for over a decade. Other African countries, lacking integration between implementation and planning has plagued the industry. A good example, a 328MW expansion in capacity planned for the period 1996 to 2000 saw only 205MW actually being installed, leaving a significant shortfall (Nyoike, 2002).

Hydropower has long dominated Kenya's generating capacity and, in 2010, it supplied almost 55 percent of the country's electricity. However, severe droughts in the 1990s had virtually paralyzed the industry, with the 1999 drought (the worst since 1949), leading to a 79 per cent decrease in hydro capacity between July and December 2000 (Nyoike, 2002). Power cuts were widespread and commerce and industry suffered significant losses. Ironically, the effect of the power outages on

domestic consumers was mitigated by the fact that only 18 per cent of Kenyan households have access to electricity.

In 1997, the Kenyan government had commissioned two independent power producers (IPPs) with combined capacity of 100MW. And when the 1999 drought exacerbated existing problems, an additional 105MW of emergency thermal generation was deployed in 2000. These two interventions proved costly however; the price of electricity rose considerably and has remained high ever since. While the persistent drought forced the government to introduce stopgap measures, a more fundamental reform of the electricity sector had, in fact, been initiated in 1996. This saw the establishment of an independent regulator, and the unbundling and liberalization of the electricity sector (described in more detail later in this chapter). As a result, by 2010, Kenya had been able to attract more IPPs than any other African country. This, coupled with capacity expansion, reinforcement and electrification being undertaken by the two dominant utilities, the Kenya Electricity Generating Company (KenGen) and the Kenya Power and Lighting Company (KPLC), means that Kenya is well placed to overcome the challenge of inadequate and unreliable electricity supply.

KenGen traces its history back to 1954 when the Kenya Power Company (KPC) was formed (KenGen, 2010). KPC was set up to construct an electric power interconnector to transmit power from the Owen Falls Power Station in Uganda and to develop electricity generation facilities in Kenya. From its inception, KPC was operated by KPLC through a management contract. This arrangement continued until 1997 when the electricity industry was unbundled. KenGen was then established and it incorporated KPC's generation assets. KenGen remained wholly state-owned until 2006 when it was partially privatized. This was in tune with government's 2003 economic strategy that acknowledged that electricity supply in Kenya was expensive and unreliable and that some form of public-private partnership would be necessary to 'mobilise the investment needed for expanding generating capacity' (Government of Kenya, 2003: 20).

Consequently 30 per cent of the company's equity was floated on the Nairobi Stock Exchange in 2006. The initial public offering, which was oversubscribed by 233 per cent, raised Ksh26 billion (US\$325 million) (Njoroge, 2006). At the time, it was the largest-ever initial public offering on the Nairobi Stock Exchange. The success of the share offer meant that both KenGen and KPLC were listed on the local stock exchange and their shares publicly traded.

This is an unusual ownership structure for state-owned utilities in Africa and has two important implications. Firstly, the two utilities are obliged to adhere to the reporting and governance requirements of the stock exchange. Secondly, although their private shareholders are profit seeking, they are also consumers of electricity who expect a quality, reliable and competitively priced service.

KenGen's installed capacity as at June 2009 was 1018.6MW with 74 per cent being hydropower (KPLC, 2009) as shown in Table 1.2. Kenya's dependence on hydro-generation represents a risk not only to the country's electricity supplies but also to KenGen's future revenue stream. This, and the ever present need to increase capacity, have led KenGen to plan for the diversification of its generation mix over the medium term, and the expectation is that hydropower will account for just per cent of Ken-Gen's installed capacity by 2018. As shown in Figure 1.2, increased exploitation of the country's geothermal and wind-energy resources is expected to drive this diversification.

Table 1.1 Ken Gen's power plants and installed capacity,

Hydro	MW	Thermal	MW	Geothermal	MW	Wind	MW
Gitaru	225.0	Kipevu Diesel	75.0	Olkaria II	70.0	Ngong	0.4
Kiambere	156.0	Kipevu Turbines	Gas 60.0	Olkaria I	45.0		
Turkwel	106.0	Fiat (Nairobi South)	13.5				
Kamburu	94.2	Garissa & Lamu	5.4				
Sondu Miriu	60.0						
Kindaruma	40.0						
Masinga	40.0						
Tana	14.4						
Other (small)	13.7						
Sub total	749.3		153.9		115.0		0.4
Total MW 1 018.6MW							

In this modern world of rapid high-technology changes, technological advancement will continue to accelerate the future. Technological advancement changes the organizational policies and strategies.

In any organization, most of challenges are generated by competition, advanced technology, enhancing employee efficiency and repaid growth, new leadership and management (Madsen et al.,6 2005).

KenGen's core business is to develop, manage, operate power generation plants and supply electric power to the Kenyan Market and the East African Region. It is the leading electric power generator in Kenya, producing about 80% of electricity consumed in the country. The company uses various sources to generate electricity ranging from Hydro, Geothermal, Thermal and Wind. Hydro is the leading source of electricity, with an installed capacity of 811.9 MW, which is about 53% of the country's total installed capacity (KenGen, 2014). It sells the power in bulk to Kenya Power and Lighting Company (KPLC), which distributes to consumers. The company is now operating in a liberalized market and is in direct competition with five (5) Independent Power Producers who between them produce about 25% of the country's electric power.

According to MOE (2011) the positive economic growth since 2003 has triggered the increase for demand in Electricity. MOE also indicates that the economic growth rate has also has translated to an average annual electric power demand growth rate of 8%. This is further projected to at an average of 10% for the next twenty (20) years. In 2013 the Government of Kenya promised to deliver 5000+ MW in 40 months (Business Daily 17.9.2013). This means the installation will be completed by end of 2017. Due to the high demand of power in Kenya and in order to fast track the delivery of the 5000+ MW, the government has introduced different structures such as Public Private Partnerships (PPP), more emphasis being on Geothermal Power. The 5000 MW+ expected by 2017 will come from the projects currently under implementation as well as the ones to be implemented later.

1.2 Statement of the Problem

Most of the research has shown that new technology is not only essential for company or government, it is also important for the nation. Companies cannot run with old technologies. Technology increases human performance when human or employees use technology for the benefits of the organization and use with ethical values. The selection of machinery that is suitable and profitable for a particular business is a recurrent, complex, and important decision confronting organizational leaders the world over. A criteria-based decision analysis is required as firms decide to perform upgrades on their plant machinery. Electricity generating companies including KENGEN have equipment used in production that needs to be regularly maintained or replaced. They have many advanced pieces of production

equipment that support its operations. These pieces of production equipment operate in conjunction with support equipment. Breakdowns can cause a variety of issues. In some cases, they occur in support equipment when the production equipment is not in use. Lead times in obtaining replacement parts or extended repair time can cause outages that delay production, and result in missed deadlines. These can have severe impacts in the short term for lost award money from current contracts, and in the long-term will reduce the number of contracts and programs. Continuous equipment maintenance and replacement processes prevent excess work or costly breakdowns.

Despite a significant amount of investigation already being undertaken to examine adoption of technology and their effects in organization performance. Previous studies have addressed effect of technology on organization performance; however, those studies have given little attention to effective hydroelectric power supply generation giving a dearth gap in the existing literature, this study will address the above gap by addressing the factors influencing effective hydroelectric power supply generational case of Kindaruma Power Station project.

1.3 Purpose of the Study

The main purpose of this study was to establish factors influencing effective hydroelectric power supply generation in Kindaruma power station project, in Machakos County, Kenya.

1.4 Research Objectives

The study was guided by the following objectives;

- i. To determine how upgrading of machine influence effective hydroelectric power supply generation in Kindaruma Power Station.
- ii. To establish the influence of human resource on effective hydroelectric power supply generation in Kindaruma Power Station.
- iii. To determine how project financing influence effective hydroelectric power supply generation in Kindaruma Power Station.
- iv. To establish how top management support influence effective hydroelectric power supply generation in Kindaruma Power Station.

1.5 Research Questions

The study was guided by the following research questions;

- i. How does upgrading of machine influence effective hydroelectric power supply generation in Kindaruma Power Station?
- ii. How does human resource influence effective hydroelectric power supply generation in Kindaruma Power Station?
- iii. How does project financing influence effective hydroelectric power supply generation in Kindaruma Power Station?
- iv. How does top management support influence effective hydroelectric power supply generation in Kindaruma power station?

1.6 Significance of the Study

The researcher hoped that the findings of the study may assist the stakeholders understand the significance of effective hydroelectric power supply generation. The researcher hoped that the study may be of great help to the government through Ministry of Energy, because it may provide information on how well to improve the performance energy sector by formulating policies and laws to make projects more effective. The researcher also hoped that the findings may be of great help to the company since it may help reduce on cost, time and labor. Finally, the researcher hoped that the findings may contribute to the existing body of knowledge.

1.7 Assumptions of the Study

The study assumed that all the respondents answered all the questions as asked and honestly. It also assumed that some respondents was biased based on the questions. It also assumed that the relevant concerned authorities would give their full cooperation and that the gaps and challenges to be highlighted would be a cause for review on plans and policies as well as the implementation process.

1.8. Limitations of the Study

Some respondents were not willing to freely offer information required for this study. This was delimited by assuring the informants of the confidentiality of their responses. The other limitation were that some questionnaires were not be submitted on time. This was delimited by face to face interview schedules.

1.9 Delimitation of the Study

This study was delimited to the factors influencing effective hydroelectric power supply generation; a case of Kindaruma power station project. It focused on this station since it most recent upgraded .The station was commissioned in 1968, Kindaruma was the first major power station in independent Kenya.

1.10 Definition of Significant Terms used in the study

Upgrade of Machine - To raise to a higher grade or standard:

Human resources - The resource that resides in the knowledge, skills, and motivation of people

Project financing - Loan arrangement in which the repayment is derived primarily from the project's cash flow on completion, and where the project's assets, rights, and interests are held as collateral

Top management support - Most senior staff of an organization or business, including the heads of various divisions or departments led by the chief executive

1.11 Organization of the Study

The study consists of five chapters. Chapter One covers the background of the study, statement of the problem and purpose of the study. This is followed by the research objectives, research questions, justification of the study, limitations of the study, delimitations of the study, significance of the study, definition of significant terms and concludes with the organization of the study.

Chapter Two covers the literature review from various sources to establish work done by other researchers, their findings, conclusions and identification of knowledge gaps which forms the basis of setting objectives and research questions of the study. The theoretical and conceptual frameworks are also explained.

Chapter Three covers the research design, target population of the study, sample size and sampling procedures. This is followed by data collection procedures, data collection instruments, validity of the instruments, reliability of instruments, data analysis techniques, ethical considerations and concludes with operational definition of variables.

Chapter four will cover the findings form data analysis, presentation of findings and interpretation of findings. It will be concluded with the summary of the chapter.

Chapter five will cover the summary of findings, discussions, conclusions and recommendations of the study. It will be concluded with suggested areas for further research and contribution to the body of knowledge.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers relevant literature on the factors that influence effective hydroelectric power supply generation. The chapter also offers theoretical review, empirical review, theoretical framework and conceptual frameworks on which the study is based.

2.2 Hydroelectric Power Supply Generation

Availability of hydro energy is in many forms; potential energy from high heads of water retained in dams, kinetic energy from current flow in rivers and tidal barrages, and kinetic energy also from the movement of waves on relatively static water masses. Moreover, many ingenious ways have been developed for harnessing this energy but most involve directing the water flow through a turbine to generate electricity. (British Hydropower Association 2014),

Hydro-electric power now supplies 17.5% of the world's electricity, with 99% in Norway, 57% in Canada, 55% in Switzerland, 40% in Sweden and 7% in USA. In addition, Hendricks (2015) asserts that hydroelectric power stations in the United States are currently the largest renewable source of energy. He adds that hydroelectric power produced 35% of the total renewable electricity in the U.S. in 2015, and 6.1% of the total U.S. electricity. According to the International Energy Agency (IEA), the United States was the 4th in the hydroelectricity power in the world in 2008 after China, Canada and Brazil, with a production of 282 TWh (2008). This amount was 8.6% of the world total hydropower. The amount of hydroelectric power generated is strongly affected by changes in precipitation and surface runoff. The Columbia River Basin in the US state was the source of 44% of the nation's hydroelectricity (Markey, 2009).

In Africa, the power sector is facing many challenges, mainly due to insufficient generation capacity which has limited electricity supply, resulting in low access (Ikeme, 2005). The main impediment to the increase in electricity generation capacity is the high cost of producing electricity, forcing governments to subsidize consumption. In 2010, the average effective electricity tariff in Africa was

US \$0.14 per kilowatt-hour (kWh) against an average of US \$0.18 per kWh in production costs (Ohunakin, 2011). Electricity tariffs in South Africa and Zambia are among the lowest in the world, prices in Djibouti and Gabon are among the highest globally.

With thousands of miles of waterways and enormous untapped potential, the African continent is poised for an explosion of hydropower growth (Kucukali, 2009). Africa as a continent face inadequate electrical capacity. This capacity shortfall, which hinders the growth and development of the continent, is ironic because Africa holds great untapped hydropower potential.

The gradual process of developing Africa's hydropower projects has started yielding fruit for Africa's hydropower. This is evident by the international and local power projects underway and in the panning process. Africa has about 12% of the world's hydropower potential, with a technically feasible output of about 1,800 TWh per year. Yet Africa produces only about 3% of the global hydropower and exploits less than 10% of its technical potential, the lowest proportion of any of the world's regions (Rao, 2000).

According to the American Society of Civil Engineers, due to the huge contribution of 19% of the world's electricity power from both large and small power plants, hydro power is the most widely used renewable energy. Department of Energy (DOE) defines large hydropower as power plants having generation capacity of more than 30 MW. Small hydropower plants are termed as having a generation capacity of 100 KW to 30 MW. Micro-hydropower plants are defined as having a generation capacity ranges from 5 KW to 100 KW. Water heads of 2 meters can be suitable to generate power efficiently with proper implementation of advanced technology (Newbery, 2000). The energy problems in remote and hilly areas exist due to the uneconomical planning of the grid network. Micro-hydropower provides low-cost solution for these remote sites.

According to the Global Energy Observatory, The Kindaruma Hydroelectric Power Station in Kenya is operated by the Tana River Development Authority (TARDA). The infrastructure is of type Hydro Power Plant with a design capacity of 40MWe, with two units. Energy demand is increasing worldwide amid rising fuel cost and environmental pollution. Small Hydro Power has emerged as alternative source of energy that can be easily harnessed with minimal environmental impact. Between

the years 2007 to 2013, the power station underwent rehabilitation and upgrade which increased its installed capacity from 40MW to 72MW. In June 2012, a third Kaplan turbine generator rated at 24MW was commissioned. In January and June 2013, the original two 20MW Kaplan turbine generators were upgraded to 24MW each, respectively. These upgrades are a critical factor which has subsequently increased the efficiency of the power station.

2.3 Machine Upgrades and Effective Hydroelectric Power Supply Generation

Hydroelectric power is electricity produced by the movement of fresh water from rivers and lakes. At higher ground, water has stored gravitational energy that can be extracted by turbines as the water flows downstream. Hydroelectric firms are increasingly utilizing information technologies to better manage geographically dispersed projects. Often these technologies involve changes to existing working practices and processes (Todaro, 2006). Upgrades involve technological and structural improvements that assist project and construction managers to standardize routine tasks so that available organizational resources are utilized both effectively and efficiently (Adam et al., 2007). Past research has shown organizational benefits from upgrades in existing operations (Bjork, 2003).

Walker (2005) stated that the benefits of innovations can be limited if the adoption and use is poorly diffused, as effective diffusion requires user acceptance. Poor user acceptance can occur when transitioning from an existing system to a new system. Machine upgrades requires users to fully and readily adopt and utilize the information technology (Walker, 2005). The technology adoption decision within organizations is usually authorized by a group of senior managers. Studies have shown that some industries are reluctant to apply new technologies and employ lower levels of technology than other industries. Organizations tend to become accustomed to their own tools and technologies, and they find it difficult to give up and change established procedures and familiar information technology products. (Yang (2007).

Senior management influences the implementation and use of new technologies, which according to Young (2008) involves managers devoting time to the technology in proportion to its costs and potential, as well as reviewing plans, monitoring results and facilitating the management problems involved with integrating the technology with the management process of the business. The contribution of upgrades in the organizational operations can only be realized when and if the new technology is widely diffused and used. Diffusion itself results from a series of individual decisions

to begin using the new technology, decisions which are often the result of a comparison of the uncertain benefits of the new invention with the uncertain costs of adopting it (Ristinen, 2006).

Automation is a key influencer of efficiency in industrial operations (Bartle, 2010). Most installed systems are old and becoming obsolete, sometimes expensive to maintain, and in some cases, almost impossible to support. It is increasingly difficult to find people knowledgeable about old systems. Further compounding the problem is a lack of training for new people who try to maintain and troubleshoot these old systems. Upgrades provide an opportunity to improve production (Head, 2000). Downtime due to older system failures can have a major impact on production. Obsolete industrial control and automation components that fail are a challenge to replace, because they can be difficult to find (Bartle, 2010). When they are found, they usually have a large price tag. Challenges for repair include lack of hardware and software documentation and availability of repair parts.

2.4 Human Resources and Effective Hydroelectric Power Supply Generation

The skill level of workers and their availability are crucial for successful implementation and operation of a new invention (Pavic, 2007). Successful implementation of a technology requires skilled personnel and the required level of competence. As a consequence, the overall level of skills available is important. Al Gahtami (2007) also stresses the importance of the technical capacity of an industry for adoption of new systems.

According to Grandon (2004), the availability of in house expertise is an important determinant of operational success. Technical knowledge of hydropower machines and overall operations is a key resource influencing efficiency (Garcia, 2009). In most organizations, employees are regarded as significant assets, and seriously affect the firm's survival and success. Well trained personnel are a precious resource for firms which need to be developed to contribute to the success of operations (Blili, 1993). Workers' characteristics of including knowledge of the systems, training, attitudes and participation and involvement in adoption process could affect the acceptance of machine upgrades. Lack of training and skills will result in a limited use of the improvements and lack of success in reaping benefits from organizational improvements. Zhu (2005) stated that the successful adoption needs the sharing of knowledge, training, and higher levels of skills by those employees who use the

technology. Increasing user awareness of the benefits of technology adoption also influences usage of the newer technology hence efficient operations (Qureshi, 2008).

Bruque (2007) asserted that employee acceptance and usage of machines influences the success of operations. Similarly, lack of user acceptance has long been confirmed to be an impediment to the success of new technology hence user acceptance is regarded as the key factor determining success or failure. Employee attitudes have significant impact on system acceptance and adoption success (Harrison, 1997). Negative attitudes of some users could negatively affect successful implementation. Nonetheless, employee attitudes should be encouraged by clear support from top management, which will bring about a more tolerable conversion in existing work practices and company operations. These attitudes can fully affect acceptance (Levy, 2001).

End user acceptance is strongly affected by perceived benefit and expectations. Motivation occupies an important place and position in the whole management process (New, 2005). Motivation can be used to encourage workers to make positive contribution for achieving organizational objectives. New further added that motivation is necessary as human nature needs some sort of inducement, encouragement or incentive in order to get better performance. Motivation acts as a technique for improving the performance of employees working at different levels.

As compared to financial resources, human resources have the capability to create competitive advantage for their organizations (Pavic, 2007). Generally speaking, employee performance depends on a large number of factors, such as motivation, appraisals, job satisfaction, training and development. In conclusion, MacGregor (2002) stated that getting the employees to reach their full potential at work under stressful conditions is a tough challenge, but this can be achieved by motivating them.

2.5 Project Financing and Effective Hydroelectric Power Supply Generation

Long-term sources of finance must be available for achievement of long-term goals, such as purchasing new machines or the upgrading of existing ones (Harrison, 1997). He further added that relying on short-term sources would lead to a finance shortage for long-term projects and could repeatedly stall projects. Capital budgeting refers to a decision to invest current funds in financing long term assets in anticipation of an expected flow of benefits over a series of years (Nguyen, 2009).

According to Garcia (2009), funds must be clearly designated and committed to the project so as to ensure successful implementation of activities without the possibility of stalling and subsequent abandonment. Prior arrangement for procurement of finances both internally; such as appropriation-in-aid and externally, in form of loans and grants, must be done. The operating impact of a capital project is an essential factor to consider when making an informed decision about proceeding with the project (Zhu, 2005). Capital projects can impose significant consequences upon the operating budget. While this is typically an additional operating budget burden, these impacts can also represent a positive impact on the operating budget (Levy, 2001).

Resources, both financial and political, present the biggest challenges and obstacles to African hydropower (Ikeme, 2005). This has therefore hindered much needed development. Transparent financial structures are a fundamental requirement to sustaining project development. Financial resources are one of the most important requirements for project success. Rao (2000) stated that limited financial resources compel organizations to be cautious about their investment and capital spending. Organizations need higher capacity and new technology to cut unit costs and keep up with competitors (Qureshi, 2008). New technology can be relatively expensive to the business and is seen as a long term investment. A financial plan or budget entails a realistic estimation of the financial inputs, including sources of income and the planning of expenditure over time.

Each project task will have a cost, whether it is the cost of the staff labor hours, travel costs or the cost of purchasing equipment (Acar, 2005). In budget preparation for projects, Staff costs should be factored; as should travel and subsistence cost and costs of the equipment. In conclusion, overheads should be factored and this is usually a fixed percentage of the other costs. Venkatesh (2003) resources refer to all the requirements resources required for a project such as financial resources and human resources. Resource allocation involves the planning of all the resources required for the project. It helps you to utilize only that much resources which are required. Project managers have to work in limited or even tight budgets.

2.6 Top Management Support and Effective Hydroelectric Power Supply Generation

Hendricks (2015) stated that acquisitions of new machinery and equipment or upgrade are directly affected by top management where all decisions from daily functions to future investments are made

by them. Decisions of the top management are central to the enterprise, since their decision influences all firms' activities, both currently and in the future. Thongs (1997) further added that several factors, including management's perception of and attitude on operational effectiveness, support and commitment, innovativeness, perceived behavioral control and the desire for growth directly affect the process of technical upgrades.

Accordingly, the characteristics of the top management should be taken into consideration in the decision making of strategic activities, such as the adoption of innovation (Pavic, 2007). A positive attitude by top management has resulted in relative success of projects. When management has been highly willing to implement changes, then there is likelihood of project success, identifiable by greater efficiency of operations. A positive attitude by top management will result in acceptance and subsequent success in projects (Grandon, 2004). Top management support and commitment towards innovation is the cornerstone of higher levels of success and satisfaction.

McGregor (2002) stated that top management support and commitment are key factors contributing to project success. Management support is identifiable by the frequency of attendance at computerization project meetings; level of involvement in information requirements analysis; level of involvement in decision-making relating to a computerization project; level of involvement in reviewing consultants' recommendations and the level of involvement in monitoring the project.

Top management consisting of knowledgeable people about technical issues and production efficiency are more likely to adopt upgrades (Garcia, 2009). Without top level support the project may never be approved, or if it is approved at all it may take forever for it to get through the process. Nonetheless, Zhu (2005) asserted that without senior management support, cooperation from other departments may be impossible to obtain, and the commitment from team members will lack enthusiasm. Subsequently, there will be a lack of commitment by the organization at large.

Top management and the senior managers are the key stakeholders in project implementation (Harrison, 1997). When committed to the project, the project team has a good handle on the project readiness, willingness and the ability of the top management to implement the projects. Bruque

(2007) stated that senior leaders must understand and apply open innovation. Top management gives a fundamental push to implementation procedures. Management support is instrumental in achieving successful project rollout across the whole organization (Shin, 2006). Executive sponsorship is needed to remove roadblocks and mandate participation. Direct involvement of the top management often translates to a shift in the organizational culture. The role of top management in early and mid-project implementation is often seen as a prerequisite project success (Nguyen, 2005). Interventions by the top management are successful once the project staff is convinced of the need for change.

There is need for gradual and continuous rise in project success rates especially in developing countries (Poon, 1999). Most of the projects succeed due to managerial skills and leadership styles of project managers. In addition, transformational leadership behaviors have long been considered as an important factor for better performance in various general organizations (Keegan & Den Hartog, 2004; Yang *et al.*, 2011). Transformational leaders have the ability to arise the interest of the followers by clearly defining the goals, and task requirements. In addition, these leaders possess a charisma and can get extra ordinary results with and through their followers. In addition, transformational leadership theories are considered most effective because they have widened the scope of leadership theories by recognizing the importance of emotional, symbolic and highly motivating behaviors (Al Ghatami, 2007). Moreover, they have ability to appeal to the followers' minds and hearts directly.

On the other hand, top management also plays a crucial role in providing and facilitating the required resources for project success. Top management generally plays an important role in defining the scopes of a project. Projects with top management support were less likely to be unsuccessful. In addition, Meredith and Mantel (2010) termed the project with top management support as “sacred cows”, which means that these types of projects seldom fail.

2.7 Theoretical Framework

The study is guided by the innovative diffusion theory (IDT), the resource based theory and the theory of reasoned action.

2.7.1 Innovative Diffusion Theory

The theory of diffusion of innovation by Rogers, (1995) provides perceptions that individuals may have of adopting an innovation such as upgrades to existing technology. The theory explains,

predicts, and accounts for the factors which influence adoption of an innovation. This is in line with the studied variables. According to Rogers (2003), individuals' technology adoption behavior is determined by his or her perceptions regarding relative advantage, compatibility and complexity of the innovation. This relates to attitude towards adoption of new technology to improve hydroelectric power supply generation.

2.7.2 Resource Based Theory

The resource based theory states that the basis for competitive advantage of a firm lies primarily in the adoption of the resources at the firms' disposal. A firms' ability to reach competitive advantage is achieved when different resources are employed and the subsequent innovations cannot be imitated by competitors. Resource-based theory contends that the possession of strategic resources provides an organization with a golden opportunity to develop competitive advantages over its rivals. These competitive advantages in turn can help the organization enjoy strong profits. A strategic resource is an asset that is valuable, rare, difficult to imitate, and non-substitutable. A resource is valuable to the extent that it helps a firm create strategies that capitalize on opportunities and ward off threats.

2.7.3 Theory of Reasoned Action

The theory of Reasoned Action was developed by Martin Fishbein and Icek Ajzen as an improvement over Information Integration theory. There are two important changes. First, Reasoned Action adds another element in the process of persuasion, behaviour intention. Rather than attempt to predict attitudes, as does Information Integration theory (and several others), Reasoned Action is explicitly concerned with behaviour.

However, this theory also recognizes that there are situations (or factors) that limit the influence of attitude on behaviour. Reasoned Action predicts behavioral intention, a compromise between stopping at attitude predictions and actually predicting behavior. Because it separates behaviour intention from behavior, Reasoned Action also discusses the factors that limit the influence of attitudes (or behavioral intention) on behaviour. Both attitude and subjective norm are important determinants of people's intention to adopt and use technology in enterprises. Further the intention to adopt and to continue using technology is influenced by ones attitude.

2.8 Conceptual Framework

An operational framework is a brief explanation of the relationships between the variables identified for study in the statement of the problem, objectives and research questions. In this research, the

operational framework will be the concise description of the phenomenon under study accompanied by visual depiction of the variables under study (Mugenda&Mugenda 2008). The figure is the diagrammatic representation of the relationship between the independent and the dependent variables. The arrows indicate the direction of influence and thus showing the independent variables influence the dependent variable.

Independent Variables

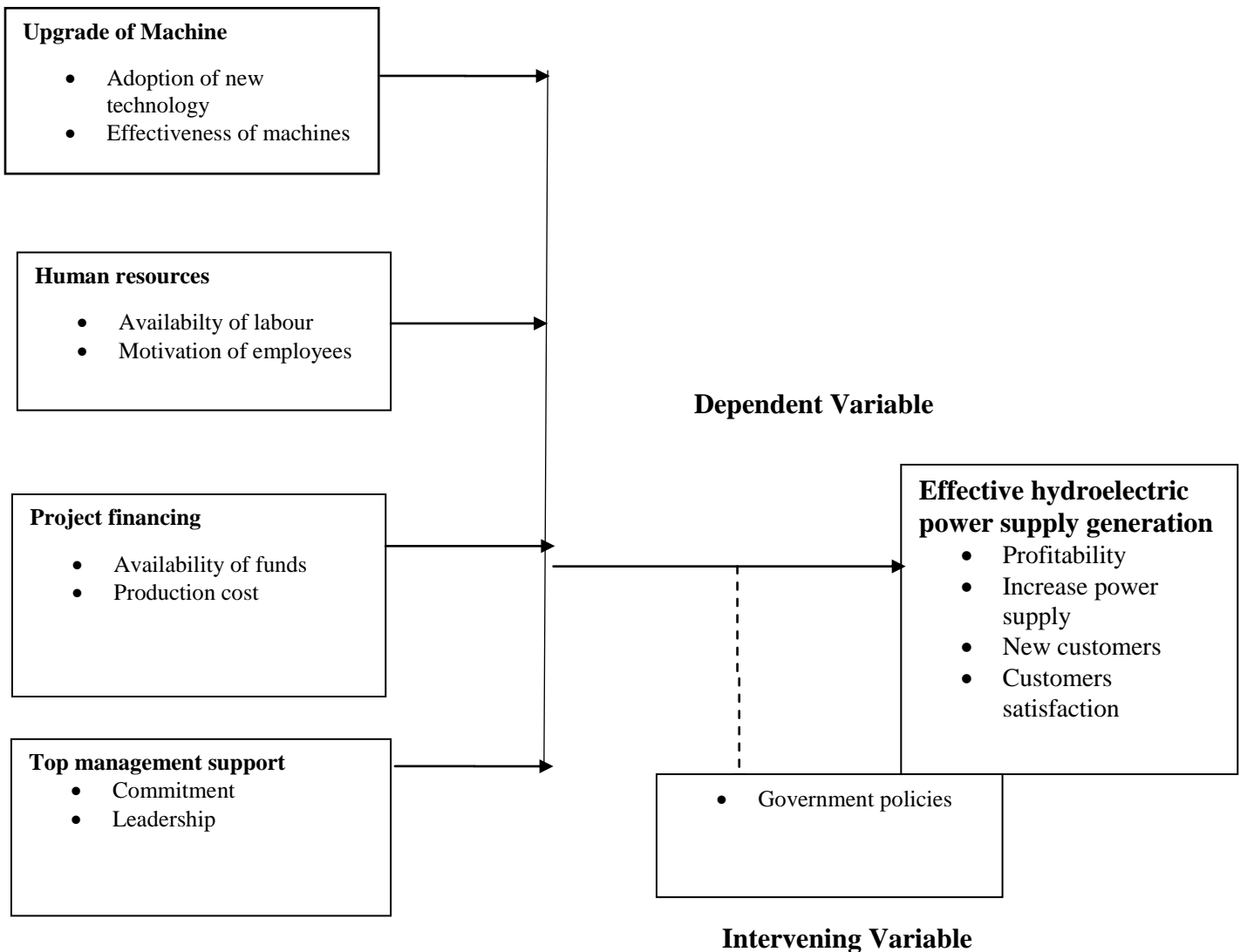


Figure 1 Conceptual framework

2.9 Research Gap

Table 2.1 Research gap

Variable	Indicators	Author (Year)	Title of Study	Findings	Knowledge Gaps
Upgrade of Machine	<ul style="list-style-type: none"> • Adoption of new technology • Effectiveness of machines 	Peansupap and Walker (2005)	Factors affecting ICT diffusion: a case study of three large Australian construction contractors	Benefits of innovations such as information technologies can be limited if the adoption and use is poorly diffused, It requires user acceptance. Poor user acceptance can occur when transitioning from an existing system to a new system.	The author acknowledged that adoption of newer technologies holds massive benefits for an organization. However, the authors failed to acknowledge that implementation of newer technologies if there is a lack of readiness to adopt it. This study seeks to identify the other factors that affect effective hydroelectric power supply generation in addition to machine upgrades.

<p>Human resources</p>	<ul style="list-style-type: none"> • Availability of labour • Motivation of employees 	<p>Long et al., 2004a).</p>	<p>A study on project success factors in large construction projects in Vietnam</p>	<p>Obsolete and unsuitable equipments and methods cause the progress of construction works become slower. Some countries try to import or transfer the modern technology into their countries. However, the method is unsuccessful because lack of skilful human to operate the technology.</p>	<p>The author identified lack of appropriate skills as the main factor affecting effective project implementation and subsequent completion. However, the author failed to identify that even in case of advanced technology; the workers need to be available and well motivated.</p>
<p>Project financing</p>	<ul style="list-style-type: none"> • Availability of funds • Production cost 	<p>Angelo, W. J., & Reina, P. (2002).</p>	<p>Megaprojects Need More Study Up Front to Avoid Cost Overruns.</p>	<p>Cost overrun is a common phenomenon and majority projects in</p>	<p>The study failed to acknowledge that cost control for successful project delivery is based on good project control practices. Financial management checks need to be in place to ensure efficiency in project activities. These include: budgeting and expenditure</p>

				industries face this problem. Inflationary pressures, increases in material prices and workmen's wages, difficulties in obtaining construction materials and construction delays are major financial challenges	checks, which this study seeks to investigate.
Top management support	<ul style="list-style-type: none"> • Commitment • Leadership 	Zwikael, O. and Globerson, S. (2004)	Evaluating the extent of use of project planning: a model and field results	Top management support is known to have a positive influence on project success.	From the study, it was clear that managers are not aware of, or are ignorant of the supporting processes that impact on project success. The focus was on developing project management procedures. This study seeks to highlight leadership and commitment and clear definition of project goals as some of the factors that may influence project goal achievement.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the methods that were used to carry out this study. It focuses on: - Research design, location of the study, target population and sample size, research instruments, piloting, validity and reliability, data collection techniques, data analysis and finally the logistics and ethical considerations in the study.

3.2 Research Design

This study used a descriptive survey design, this is because the study was aimed at giving an accurate description on the situation factors influencing effective hydroelectric power supply generation; a case of Kindaruma power station project. This design was appropriate since the researcher aimed at collecting data on conditions that already exists or ongoing. Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of a phenomenon and wherever possible to draw a valid general conclusion from the facts discovered (Gay, 1992; Kombo and Tromp, 2006). It mainly seeks to obtain information that describes the existing phenomena by asking individuals about their perceptions, attitudes, or values. It is therefore useful in describing the conditions or relations that exist between variables (Cohen, et. al 2000).

3.3 Target Population

Mugenda and Mugenda (2008) define “population” as the set of all the elements, units, objects or subjects in the universe of interest for a particular study. The study targeted 12 management staff and 24 unionsable staff. Therefore the study targeted a total population of 36 respondents. KenGen has a population of 2804 employees. Between 2007 and 2013 the power station underwent a rehabilitation and upgrade which increased its installed capacity from 40 MW to 72 MW. In June 2012, a third Kaplan turbine-generator, rated at 24 MW, was commissioned. In January and June 2013, the original two 20 MW Kaplan turbine-generators were upgraded to 24 MW each, respectively.

Table 3.1 Target population

Respondents	Target Population	Percentage
Management Staff	12	33
Unionsable Staff	24	67
Total	36	100%

Source; (KenGen 2017)

The total target population of this includes 36 respondents.

3.4 Sampling Procedures and Sample Size

3.4.1 Sample Size

A sample is a smaller group or sub-group obtained from the accessible population (Mugenda and Mugenda, 2008). The sample is selected in such a way as to ensure that certain sub-groups in the population are represented in the sample proportion. Since the total population was small the researcher did not sample hence used census, capturing the entire population of the respondents. The study therefore used 38 respondents as the sample.

3.4.2 Sampling Procedures

Sampling procedures involve defining the sampling techniques, the population, and the instrumentation and procedures used to obtain the data (Powell & Connaway 2004). Stratified random sampling was used in this study to identify the participants as it gave everyone in the population an equal chance to be selected as part of the sample that was ultimately used. Stratified random sampling is a technique whereby a population is divided into mutually exclusive groups called strata and then a simple random or systematic sample is selected from each group or stratum (Johnson & Christensen 2004:2007)

3.5 Research instruments

To achieve the objectives, the researcher collected data using questionnaires and interview schedules for respondents. Part one of the questionnaire contains the background information of the respondents. Closed questions sought to establish if the research variables influence effective hydroelectric power supply generation The likert scale of 1-5 items had five categorizations ranging from strongly agree (SA), agree (A), neither agree nor disagree (ND), disagree (D) and strongly disagree (SD). Two sets of data are relevant to the effective conduct of this research namely primary and

secondary. The primary data, which refers to field data, was obtained with well-structured questions while secondary data was obtained through journals and books.

3.5.1 Pilot testing

The purpose of the pilot testing aims to establish the validity and reliability of the research instruments and hence enhance face validity, (Joppe, 2011). The pilot testing was conducted using the questionnaire on 14 respondents. The pilot group was selected through random sampling. The respondents were required to answer the questions after which they were analyzed by the researcher to check whether the respondents filled in the questions with ease. In the event of any problems, the questions in the questionnaire and interviews were rephrased and returned after a week so the respondents could fill again.

3.5.2 Validity of the Instrument

On the other hand, validity is the extent to which differences found with a measuring tool reflect true differences among respondents being tested (Copper and Schindler (2010). Validity aims at ascertaining the extent to which the research instruments collect the data intended. The study used both face and content validity to ascertain the validity of the questionnaires and interview schedules. Content validity draws an inference from test scores to a large domain of items similar to those on the test. Content validity is concerned with sample-population representativeness. Gillham (2011) stated that the knowledge and skills covered by the test items should be representative to the larger domain of knowledge and skills.

3.5.3 Reliability of the Instrument

Reliability refers to the accuracy and precision of a measurement procedure (Copper and Schindler 2010). It measures the degree to which a research instrument gives consistent results. A construct composite reliability co-efficient (Cronbach alpha) of 0.6 or above, for all the constructs, will be considered adequate for this study. The acceptable reliability coefficient will be 0.7 and above, (Rousson, Gasser & Seifer, 2012). Cronbach Alpha was used to test the reliability of the research instrument.

3.6 Data collection procedures

The researcher sought for an introductory letter from University of Nairobi and Authorization letters and research permit. This letter introduced the researcher to respondents and the institution to administer questionnaires and interviews schedules. The researcher then embarked on administering of data collection instruments to the sampled respondents.

The instruments were collected the same day but in case the respondents will not be present, the researcher interviewed the respondent.

3.7 Data Analysis Techniques

Data Analysis is a stage where data collected by research study from sample is analyzed, and interpreted into organized and useful information that can be used for decision making process on population. Data Analysis is a process that makes data understandable and useful to other users (Munywoki & Mulwa 2012). The entire process begins after data collection and came into conclusion at the point of interpretation of the results there of, is data analysis (Cooper & Schindler, 2003). Statistics happens to be a discipline that offers tools of data analysis in research and one which refers to facts data to a system of data collection and analysis (Chandran, 2004).

The raw data collected with the help of questionnaire instrument was edited, summarized, coded, tabulated and analyzed using descriptive statistics and inference statistics. The data was tabulated in form of data matrices, data reduction and then discussed, this provided easy data computation, easy data understanding and communication and extrapolation (Munywoki & Mulwa 2012).

Generally, both qualitative and quantitative research approaches were used for data analysis. Qualitative data comes in form of words rather than in numbers like giving opinion, quality, and judgment on worthiness of something. For quantitative data, descriptive statistics analysis was used to analyze the data in form of mean, ratio, frequencies and percentages. Other data analysis techniques like computer Microsoft excel scientific calculators and statistic approaches using statistical inference and non-parametric chi square test will be used. Finally data will be presented in form of tables.

3.8 Ethical Consideration

The study was conducted professionally with the respondents duly informed of their rights including voluntary participation in the study. Consent was sought from authorities before gaining access to data collection sites in company. For the purpose of this study, approval was sought from the University and a letter granted to allow the researcher to carry out the research. The findings of this study were not doctored to fit any pre-conceived ends.

3.9 Operationalization of the Variables

According to Martyn (2008) operationalization is defined as the process of strictly defining variables into measurable factors. This process defines fuzzy concepts and allows them to be measured, empirically and quantitatively. Operationalization is achieved by looking at behavioral dimensions, indicators, facets or properties denoted by the concept, translated into observable and measurable elements to develop an index of the concept. Measures can be objective or subjective. It is not possible to construct a meaningful data collection instrument without first operationalizing all the variables.

Objectives	Variable	Indicators	Measurement	Scale of measurement	Research Approach	Tool of data analysis	Analysis of techniques
To determine how upgrading of machine influence effective hydroelectric power supply generation in Kindaruma power station.	Independent Upgrade of machine	<ul style="list-style-type: none"> Adoption of new technology Effectiveness of machines 	Efficiency Effectiveness	Nominal	Descriptive Means Frequencies Percentages	Questionnaires and Interview	Inferential
To establish the influence of human resource on effective hydroelectric power supply generation in Kindaruma power station.	Independent Human resource	<ul style="list-style-type: none"> Availability of labour Motivation of employees 	Number of Employees Performance	Nominal	Descriptive Means Frequencies Percentages	Questionnaires and Interview	Inferential
To determine how project financing influence effective hydroelectric power supply generation in Kindaruma power station.	Independent Project Finance	<ul style="list-style-type: none"> Availability of funds Production cost 	Amount of funds Expenses	Nominal interval Nominal	Descriptive Means Frequencies Percentages	Questionnaires and Interview	Inferential
To establish how top management support influence effective hydroelectric power supply generation in Kindaruma power station	Independent Top management	<ul style="list-style-type: none"> Commitment Leadership 	Performance Performance	Nominal	Descriptive Means Frequencies Percentages	Questionnaires and Interview	Inferential

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter present the analysis, presentation, interpretation of results based on the study findings on the following thematic and sub-thematic areas; general information of the respondents, upgrade of machines and effective hydroelectric power supply generation, human resource and effective hydroelectric power supply generation, project finance and effective hydroelectric power supply generation, Top management and effective hydroelectric power supply generation.

4.2 Questionnaire Return Rate

The study targeted a sample size of 36 respondents, from that sample size 33 filled in and submitted the questionnaires making a response rate of 92% while 3 respondents never filled the questionnaires making a response rate of 8%. The results are presented in Table 4.1.

Table 4.1 Response Rate

Response Rate	Frequency Rate	Percentage	Cumulative
Returned	33	92	92
Not returned	3	8	100
Total	36	100	

Based on this analysis in Table 4.1 above 33 (92%) response rate was good and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. This implies that majority of the respondents filled the questionnaires and the return rate was appropriate for data analysis

4.3 Demographic characteristics of the respondents

The study sought to establish the demographic characteristics of the respondents based on gender, age, education level and working experience. The importance of this to know whether the

employees are well educated and have enough knowledge and skills to facilitate the effectiveness of hydroelectric power generation, all this are further discussed in sub thematic areas.

4.3.1 Distribution of Gender of the respondents

The study also sought to establish the gender of the respondents working in Kindaruma power station .The findings are as presented in Table 4.2.

Table 4.2 Distribution of the Gender of the respondents

Gender	Frequency Rate	Percentage	Cumulative
Male	28	85	85
Female	5	15	100
Total	33	100	

Based on the finding in table above 4.2 out of the 33 respondents who participated in the study 28(85%) where male while 5(15%) where female. This shows that despite our constitutional of Kenya embraces the third gender rule the result shows that gender inequality stills it's in practices.

4.3.2 Distribution of Age of the respondents.

The researcher sought to establish the ages of the respondents as she embarked on the study. The various age of respondents who participated in the study. The results is represented in Table 4.3

Table 4.3 Distribution of Age of the respondents

Age	Frequency Rate	Percentage	Cumulative
Below 25	2	6	6
26-35	8	24	30
36-50	16	48	78
Above 50	7	22	100
Total	33	100	

From the study presented in Table 4.3 it shows that out of 33 respondents who participated in the study 2(6%) were aged below 25 years 8(24%) between 28-35 years.16 (48%) were aged between 36-50 years while 7(22%) were aged 50 years of above. The findings of this study implies that majority of the employees working in Kindaruma Power station were within the age of 36-50 years thus shows some experience in the work place.

4.3.3 Education level of the Respondents

The study also sought to establish the highest level of education of the respondents. The findings are as presented in Table 4.4.

Table 4.4 Education level

Age	Frequency Rate	Percentage
Certificate Holder	0	0
Diploma Holder	2	6
Bachelor Degree Holder	22	67
Master's Degree	6	18
PhD Holder	3	9
	33	100

According to the findings in Table 4.4 2(6%) respondents had a diploma level of education, 22(67%) had a Bachelor degree level of education, 6(18%) had a master's degree holder and 3(9%) were PhDholders. Majority of the participants holds bachelor degree, masters and PhD this indicates that 31(94%) of the respondents who participated in the study are well educated holding Degree, masters, PhD therefore are expected to have enough knowledge and skills to facilitate effective hydroelectric power supply generation for the organization. This implies senior management influences the implementation and use of new technologies, which according to Young (2008) involves managers with high education devoting time to the technology in proportion to its costs and potential, as well as reviewing plans, monitoring results and facilitating the management problems involved with integrating the technology with the management process of the business. The contribution of upgrades in the organizational operations can only be realized when and if the new technology is widely diffused and use.

4.3.4 Working Experience in Kindaruma Power Station

The study further sought to establish how long the respondents had worked in the organization because the more years the respondents have worked for the organization therefore they are in a position to have more skills and knowledge about their job positions. The results are presented in table 4.5.

Table 4.5 Working Duration in Kindaruma

Duration	Frequency	Percentage
1-5 years	8	24
5-10 years	22	67
10-15 years	3	9
Total	33	100

From the findings in Table 4.5 above, 8(24 %) respondents had worked in the power station for 1 to 5 years, 22 (67%) for 5 to 10 years and 3(9%) for 10 to 15 years. This implies that the respondents had worked long enough with the power station and therefore had sufficient knowledge of the organization to respond to the questionnaire. Years of the experience should not be an impediment to effective hydroelectric power supply generation

4.4 Machine Upgrades and effective hydroelectric power supply generation

The first objective, the study sought to determine how upgrading of machine influence effective hydroelectric power supply machine. To achieve these the study focus on how long it has been since upgrade were made to existing machines these are further discussed in the following sub thematic areas how long has it been since upgrades were made to the existing machines and how effective are the machines to organizational operations.

4.4.1 How long has it been since upgrades were made to the existing machines?

The study further sought to establish how long it has been since upgrades were made to the existing machines. The findings are as presented in Table 4.6.

Table 4.6 How long has it been since upgrades were made to the existing machines?

Duration	Frequency	Percentage
0-5 years	33	100
6-10 years	0	0
More than 10 years	0	0
Total	33	100

Based on the findings in Table 4.6, 33(100%) respondents indicated that the machine upgrades falls between 0-5 years. These findings, coupled with the additional responses gathered by the

researcher indicated that there was a shift in effectiveness and efficiency within the organization as a result of the upgrades done. This implies that hydroelectric firms are increasingly utilizing information technologies to better manage geographically dispersed projects. Often these technologies involve changes to existing working practices and processes (Todaro, 2006). According to Adam et al., (2007) upgrades involve technological and structural improvements that assist project and construction managers to standardize routine tasks so that available organizational resources are utilized both effectively and efficiently.

4.4.2 How effective are the machines to organizational operations?

The study further sought to establish how effective machines to the organization operations are. This was important because the study wanted to establish whether they were frequent breakdown that affect effective hydroelectric power supply generation. The result are represented in Table 4.7.

Table 4.7 How effective are the machines to organizational operations?

Response	Frequency	Percentage
Very effective	32	97
Fairly effective	1	3
Upgrade are needed	0	0
Total	33	100

Based on the findings in Table 4.7, 32 (97%) of the respondents indicated that the machines in Kindaruma were very effective while 1(3%) of the respondents indicated they were fairly effective. In line with finding the study also sought to find out whether there were any future development plans for the existing machines and if so, had the staff received appropriate training. The respondents agreed there was need to upgrade machines for future development since the technology changes with time in terms of innovation and also the respondents agreed that the employees received appropriate training before using the upgraded machines. Automation has been a key influencer of efficiency in industrial operations (Bartle, 2010). Many installed systems, however, are old and becoming obsolete, expensive to maintain, and in some cases, almost impossible to support.

4.5 Human Resource and Effective Hydroelectric Power Supply Generation

The second objective of the study was set to achieve was to establish how human resources influence effective hydroelectric supply generation in Kindaruma Power Station. To achieve this objective, the study focused on the extent to which project staff influences effective operations and how human resource indicators will influence effective operations. These are further discussed in the following sub thematic areas.

4.5.1 Human Resource and Effective Hydroelectric Power Supply Generation

The analysis of revealed that technical support and training were provided to the project staff and that the staff were competent on the organizational operations and machine operations. The table 4.8 shows the findings:

Table 4.8 Human Resource and Eeffective Hydroelectric Power Supply Generation

Response	Frequency	Percentage
5 Strongly agree	0	0
4 Agree	33	100
3 Neutral	0	0
2 Disagree	3	9
1 Strongly disagree	0	0
Total	33	100

Based on the findings in the Table 4.8 above 33 (100%) respondents agreed to the statement that Technical support and Training is provided to the project staff in Kindaruma Power Station and also agreed that the staff are competent on the organizational operations and machine operations. The findings mirror Al Gahtami (2007)'s assertion that technical capacity is important for an industry for adoption of new systems.

4.5.2 Project staff on effectiveness of operations

The researcher sought to determine the extent of project staff influence on the effectiveness of operations. This was important because staff contribution determines the effectiveness of operations. The results of this study are represented in the Table 4.9.

Table 4.9 Extent which the project staff influence the effectiveness of operations

Responses	Frequency	Percentage
Very great extent	22	67
Great extent	8	24
Moderate extent	3	9
Very low extent	0	0
Low extent	0	0
Total	33	100

The findings in Table 4.9 show that out of the 33 respondents, 22 (67%) of the respondents indicated that project staff influence the effectiveness of operations, 8(24%) influence great extent, 3(9%) influence moderate extent. This implies that majority of the respondents indicated that the project staff influence effectiveness of operation in Kindaruma station at a very great extent. This findings are in agreement with Pavic (2007), who stated that the skill level of workers and their availability are crucial for successful implementation and operation of a new invention.

4.5.3 Human resource indicators and effectiveness of operations in Kindaruma

The study investigated the extent to which various human resource indicators influence effectiveness of operations in Kindaruma. This was important because human resources are an important determinant of project success and human resources are key in influencing efficiency of operations. The findings are show in Table 4.10.

Table 4.10 Human resource indicators influence effectiveness of operations in Kindaruma

Indicators	Frequency					Total
	Very great extent	Great extent	Moderate extent	Low extent	Very Low extent	
The organization staff is well motivated	11	10	12	0	0	33
A motivated team	33	0	0	0	0	33

ensures efficiency in operations						
The organization trains, educates and supports the employees in operations	33	0	0	0	0	33
The human resource influences employees' job satisfaction and organization commitment	33	0	0	0	0	33
The human resource has enough personnel to ensure smooth running of operations	33	0	0	0	0	33

Based on the findings in Table 4.10 above majority of the respondents agreed and affirmed that the human resource indicators influenced effectiveness of operations in Kindaruma Power Station at a very great extent. This implies that human resource management is very important to any organization for effective operation, this was as Blili, (1993) stated; well trained personnel are a precious resource for firms which need to be developed to contribute to the success of operations.

4.6 Project Financing and Effective Hydroelectric Power Supply Generation

The third objective of the study sought to determine how project financing influence effective hydroelectric power supply generation in Kindaruma Power Station. This section will discuss the findings based on the following sub thematic.

4.6.1 Budgetary allocation and meeting project requirements

The researcher addressed the third objective which sought to determine how project financing influences effective hydroelectric power supply generation. The researcher sought to know whether the budgetary allocation amounts disbursed met the project requirements. The responses were as highlighted in the Table 4.11.

Table 4.11 Budgetary allocation and meeting project requirements

Response	Frequency	Percentage
Yes	12	36.4
No	21	63.6
Total	33	100

Based on the findings in the Table the majority of the respondents 21(63.6%) indicated that the budgetary allocation was not sufficient to meet all the project requirements. The other 12(36.4%) indicated that it did meet the project requirements. This implied that the organization's budgetary allocation was not sufficient enough to cover the project expenses. According to Garcia (2009), funds must be clearly designated and committed to the project so as to ensure successful implementation of activities without the possibility of stalling and subsequent abandonment. Prior arrangement for procurement of finances both internally; such as appropriation-in-aid and externally, in form of loans and grants, must be done.

4.6.2 Source of Funds and influence of effectiveness project

The study further inquired whether the source of funds had a significant influence in projects. The responses were as shown Table 4.12.

Table 4.12 Source of Funds and influence of effectiveness project

Response	Frequency	Percentage
5 Strongly agree	0	0
4 Agree	8	24.2
3 Neutral	14	42.4
2 Disagree	11	33.3
1 Strongly disagree	0	0
Total	33	100

According to the findings Table 4.12, the majority of the respondents 14(42%) were neutral in their responses, 8(24%) agreed while 11(33%) disagreed. The findings imply that the source of the funds does not influence the projects; however, some of the respondents stated that top management did allocate specific funds for project they deemed as critical, hence influencing the speed at which such projects were undertaken, as they bypassed bureaucratic procedures. Resources, both financial and human, present the biggest challenges and obstacles to African hydropower (Ikeme, 2005). This has therefore hindered much needed development. Transparent financial structures are a fundamental requirement to sustaining project development. Financial resources are one of the most important requirements for project success. Rao (2000) stated that limited financial resources compel organizations to be cautious about their investment and capital spending.

4.6.3 Budgetary processes and bureaucracy on effectiveness of the project

The researcher sought to investigate whether budgetary processes were bureaucratic and whether this affected the projects. From the responses, the majority 25(76%) indicated that the budgetary processes were bureaucratic and this affected the organizational projects. The other respondents, 15% were neutral in their responses and 9% disagreed.

Table 4.13 Budgetary processes and bureaucracy on effectiveness of the project

Response	Frequency	Percentage
5 Strongly agree	0	0
4 Agree	25	76
3 Neutral	5	15
2 Disagree	3	9
1 Strongly disagree	0	0
Total	33	100

This depicted that bureaucracy did affect project operations especially when it came to decision making and funding of project operations. The multiple layer of authority delayed decision making hence affecting the project operations, also the approvals required to release funds had a significant impact on the project. This implies that Long-term sources of finance must be available for

achievement of long-term goals, such as purchasing new machines or the upgrading of existing ones (Harrison, 1997). He further added that relying on short-term sources would lead to a finance shortage for long-term projects and could repeatedly stall projects. Capital budgeting refers to a decision to invest current funds in financing long term assets in anticipation of an expected flow of benefits over a series of years (Nguyen, 2009).

4.6.4 Regular Project Update and organization operation

The researcher sought to know how regular budget update was important for operations. The responses were as shown Table 4.14.

Table 4.14 Regular Project Update and organization operation

Response	Frequency	Percentage
Yes	30	91
No	3	9
Total	33	100

The respondents overwhelmingly agreed that a regular project update was vital. The vast majority 30(91%) affirmed that it was important. These findings implied that the project managers especially required the regular updates so as to plan ahead in regard to project operations; whether to scale down on operations, add or reduce staff and on remuneration plans.

4.7 Top management and effectiveness of hydro power supply generation

The fourth objective of the study was to establish how top management support influences effective hydroelectric power supply generation in the Kindaruma power station. To achieve this, the study focused on the extent to which commitment and leadership as indicators will influence effective operations. Top management support and commitment towards innovation is the cornerstone of higher levels of success. These are further discussed in the following sub thematic areas.

4.7.1 Investment in training the workforce

The study further inquired on the extent to which the management had invested in training the workforce. The findings were as follows in Table 4.15.

Table 4.15 Investment in training the workforce

Response	Frequency	Percentage
To a very low extent	3	9
To a low extent	2	6
To a moderate extent	8	24
To a great extent	20	61
Total	33	100

From the Table 4.15 the researcher found out that the majority 20 (61%) felt that the organization invested a lot in training the workforce. The other 8 (24%) respondents stated that they felt investment in training was at a moderate extent, 2 (6%) respondents felt it was to a low extent and finally 3 (9%) felt that it was to a very low extent. These findings implied that the organization took great importance in staffing and made sure that the staff was very well equipped to handle the projects. In addition, as Grandon (2004) stated, a positive attitude by top management will result in acceptance and subsequent success in projects.

4.7.2 Top Management support and project implementation

The researcher sought to establish how the top management supported implementation of projects. The respondents had varied responses, but praised the organization for efforts made in acquiring new machines, availing funds to project operations, ensuring proper staffing and staff remuneration, adopting technological advances and ensuring commitment to project work.

4.7.3 Leadership Skills and Efficient Operations

The analysis of findings on whether leadership skills were crucial for efficient operations revealed the finding in Table 4.16.

Table 4.16 Leadership Skills and Efficient Operations

Response	Frequency	Percentage
5 Strongly agree	0	0
4 Agree	29	88
3 Neutral	3	9
2 Disagree	1	3
1 Strongly disagree	0	0
Total	33	100

From the responses provided, 29(88%) of the respondents agreed that leadership skills were crucial for efficient operations; 3(9%) were neutral in their response while 1(3%) disagreed. This implies that a project managed by personnel with leadership traits and abilities was more likely to be successful as they would lead the project on the right track. These findings agree with Yang (2011) who stated that transformational leadership behaviors are an important factor for better organizational performance.

4.7.4 Top Management emphasis on hiring qualified and competent staff

The researcher wanted to know whether the management put emphasis on hiring qualified and competent staff. The findings are shown in Table 4.17.

Table 4.17 Top Management emphasis on hiring qualified and competent staff

Response	Frequency	Percentage
5 Strongly agree	0	0
4 Agree	25	76
3 Neutral	5	15
2 Disagree	3	9
1 Strongly disagree	0	0
Total	33	100

The responses as observed in Table 4.17 showed that 25 (76%), the majority of the respondents, agreed that that the top management put emphasis on hiring qualified and competent staff; 3 (9 %) however disagreed and 5 (15%) were neutral in their responses. The responses implied that the management of the organization put emphasis on staff qualifications and competence. This was evidenced in the project outputs and the high rate of successful projects as Garcia (2009) added when he stated that knowledgeable people are more likely to adopt upgrades.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, discussion, conclusions and recommendations drawn from the study.

5.2 Summary of the Findings

This section presents the summary of findings as drawn from the responses provided by the respondents. The study targeted a sample size of 36 respondents, from that sample size 33 filled in and submitted the questionnaires making a response rate of 92% while 3 respondents never filled the questionnaires making a response rate of 8%. Based on this analysis 33 (92%) response rate was good and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. This implies that majority of the respondents filled the questionnaires and the return rate was appropriate for data analysis.

5.2.1 Upgrading of machine on effective hydroelectric power supply generation

The first objective, the study sought to determine how upgrading of machine influence effective hydroelectric power supply machine. Based on the findings in table 4.6, 33(100%) respondents indicated that the machine upgrades falls between 0-5 years. These findings, coupled with the additional responses gathered by the researcher indicated that there was a shift in effectiveness and efficiency within the organization as a result of the upgrades done. This implies that hydroelectric firms are increasingly utilizing information technologies to better manage geographically dispersed projects. Often these technologies involve changes to existing working practices and processes (Todaro, 2006).

5.2.2 Human Resource on Effective Hydroelectric Power Supply Generation

The second objective of the study was set to achieve was to establish how human resources influence effective hydroelectric supply generation in Kindaruma Power Station. Based on the findings in the 33 (100%) respondents agreed to the statement that Technical support and Training is provided to the project staff in Kindaruma Power Station and also agreed that the staff are competent on the organizational operations and machine operations.

5.2.3 Project Financing on Effective Hydroelectric Power Supply Generation

The third objective of the study sought to determine how project financing influence effective hydroelectric power supply generation in Kindaruma Power Station. Based on the findings in the Table the majority of the respondents 21(63.6%) indicated that the budgetary allocation was not sufficient to meet all the project requirements. The other 12(36.4%) indicated that it did meet the project requirements. This implied that the organization's budgetary allocation was not sufficient enough to cover the project expenses.

5.2.4 Top management support on effective hydroelectric power supply generation

The fourth objective of the study was to establish how top management support influences effective hydroelectric power supply generation in the Kindaruma Power Station. The researcher found out that the majority 20 (61%) felt that the organization invested a lot in training the workforce. The other 8 (24%) respondents stated that they felt investment in training was at a moderate extent, 2(6%) respondents felt it was to a low extent and finally 3 (9%) felt that it was to a very low extent. These findings implied that the organization took great importance in staffing and made sure that the staff was very well equipped to handle the projects. In addition, as Grandon (2004) stated, a positive attitude by top management will result in acceptance and subsequent success in projects.

The analysis of findings on whether leadership skills were crucial for efficient operations revealed the finding in 29(88%) of the respondents agreed that leadership skills were crucial for efficient operations; 3(9%) were neutral in their response while 1(3%) disagreed. This implies that a project managed by personnel with leadership traits and abilities was more likely to be successful as they would lead the project on the right track. These findings agree with Yang (2011) who stated that transformational leadership behaviors are an important factor for better organizational performance.

5.3 Discussion of findings

This section presents the discussion of the findings as drawn from the responses provided by the respondents based on the objectives of the study which are; To determine how upgrading of machine influence effective hydroelectric power supply generation in Kindaruma Power Station; to establish the influence of human resource on effective hydroelectric power supply generation in Kindaruma Power Station; To determine how project financing influence effective hydroelectric power supply generation in Kindaruma Power Station and to establish how top management support influence effective hydroelectric power supply generation in Kindaruma Power Station.

5.3.1 Upgrading of machine on effective hydroelectric power supply generation

Hydroelectric firms are increasingly utilizing information technologies to better manage geographically dispersed projects. Often these technologies involve changes to existing working practices and processes. Based on the findings in table, 32(97%) of the respondents indicated that the machines in Kindaruma were very effective while 1(3%) of the respondents indicated they were fairly effective. In line with the finding the study also found out there was need to upgrade machines for future development since the technology changes with time in terms of innovation and also the respondents agreed that the employees received appropriate training before using the upgraded machines. Based on the finding 15% felt that machine upgrades had the greatest influence in project effectiveness.

5.3.2 Human Resource on Effective Hydroelectric Power Supply Generation

Availability of in house expertise is an important determinant of operational success. Technical knowledge of hydropower machines and overall operations is a key resource influencing efficiency. Based on the findings in this study 33(100%) respondents agreed to the statement that Technical support and Training is provided to the project staff in Kindaruma Power Station and also agreed that the staff are competent on the organizational operations and machine operations.

According to the findings, 22 (67%) of the respondents indicated that project staff influenced the effectiveness of operations, 8(24%) influence great extent, 3(9%) influence moderate extent. This implies that majority of the respondents indicated that the project staff influence effectiveness of operation in Kindaruma Power Station at a very great extent. The study also sought to find out the extent various human resource indicators influence effectiveness of operations in Kindaruma. Based on the finding above majority of the respondents agreed and affirmed that the human resource indicators influenced effectiveness of operations in Kindaruma Power Station at very great extent. This implies that human resource management is very important to any organization for effective operation.

5.3.3 Project Financing on Effective Hydroelectric Power Supply Generation

Transparent financial structures are a fundamental requirement to sustaining project development. Financial resources are one of the most important requirements for project success.

The researcher addressed the third objective which sought to determine how project financing influences effective hydroelectric power supply generation. Based on the findings, the majority of the respondents 21(63.6%) indicated that the budgetary allocation was not sufficient to meet all the project requirements. The other 12(36.4%) indicated that it did meet the project requirements. This, the implication was that the organization's budgetary allocation was not sufficient enough to cover the project expenses.

The study findings further showed that the source of the funds does not influence the projects; however, some of the respondents stated that top management did allocate specific funds for project they deemed as critical, hence influencing the speed at which such projects were undertaken, as they bypassed bureaucratic procedures. The researcher also sought to investigate whether budgetary processes were bureaucratic and whether this affected the projects. From the responses, the majority 25(76%) indicated that the budgetary processes were bureaucratic and this affected the organizational projects.

The other respondents, 5(15%) were neutral in their responses and 3(9%) disagreed. This depicted that bureaucracy did affect project operations especially when it came to decision making and funding of project operations. The multiple layer of authority delayed decision making hence affecting the project operations, also the approvals required to release funds had a significant impact on the project. Finally, regular project updates were crucial as the respondents overwhelmingly agreed that a regular project update was vital. The vast majority 30(91%) affirmed that it was important. These findings implied that the project managers especially required the regular updates so as to plan ahead in regard to project operations; whether to scale down on operations, add or reduce staff and on remuneration plans.

5.3.4 Top management support on effective hydroelectric power supply generation

Top management support and commitment are key factors contributing to project success. Management support is identifiable by the frequency of attendance at computerization project

meetings; level of involvement in information requirements analysis; level of involvement in decision-making relating to a computerization project; level of involvement in reviewing consultants' recommendations and the level of involvement in monitoring the project.

The researcher sought to find out from the respondents if leadership skills were crucial for efficient operations. From the responses provided, 29(88%) of the respondents agreed that leadership skills were crucial for efficient operations; 3(9%) were neutral in their response while 9(3%) disagreed. This implies that a project managed by personnel with leadership traits and abilities was more likely to be successful as they would lead the project on the right track. The researcher wanted to know whether the management put emphasis on hiring qualified and competent staff.

The responses as observed showed that the majority of the respondents 25(76%) agreed that that the top management put emphasis on hiring qualified and competent staff; 3(9%) however disagreed and 5(15%) were neutral in their responses. The responses implied that the management of the organization put emphasis on staff qualifications and competence. This was evidenced in the project outputs and the high rate of successful projects. Top management consisting of knowledgeable people about technical issues and production efficiency are more likely to adopt upgrades. Without top level support the project may never be approved, or if it is approved at all it may take forever for it to get through the process.

5.4 Conclusions

As the findings suggest, effective power generation at the Kindaruma is dependent on a couple of factors. The success of a project heavily depends on the successful coordination of its critical success factors. Machine upgrades at the power plant through adopting of newer technologies has positively influenced effective operations. Nevertheless, the staff need to have a positive attitude towards the changes and also need to be adequately trained. Human resources is also a critical factor; with the availability of well trained, competent and well-motivated staff heavily likely to positively influence organizational effectiveness. This will be indicated in faster delivery of project results and positive shifts in organizational efficiency. Availability of funds is a crucial success factor. Adequate budgetary allocation ensures that project operations are not stalled by a lack of equipment. In addition, if staff is well remunerated, they remain motivated to work towards

achieving set goals. Lesser bureaucratic control ensures that funds are availed and when required in the project lifecycle. Top management support involves aligning project priorities with organizational vision. Leadership is essential for achievement of laid objectives. Top management is expected to be the sounding board for all architectural and technical decisions. Deep understanding of the objectives of the set objectives provides motivation to the staff.

5.5 Recommendations

Based on the findings of the study, the researcher recommends that:

- i. The efforts to upgrade existing machinery so as to increase operational efficiency should be more inclusive and address issues of additional training for the project staff. This will help in eliminating the fear of change associated with technological upgrades.
- ii. All staff and stakeholders need to involve in project planning and implementations. The feeling of inclusion will increase motivation.
- iii. Project staff should be highly skilled and competent to ensure sustainability of set projects and increase efficiency.
- iv. Budgeting for projects should be well researched on to ensure that all budgetary gaps are filled. Strong partnerships and collaboration needs to be forged with the project management business unit.
- v. There should be a deliberate effort to provide leadership at the ground level.

5.6 Suggestions for Further Studies

Different investigation should be carried out to establish other factors influencing effective hydroelectric power supply generation at the Kindaruma Power Station. This study only dealt with four factors that the researcher felt were the critical success factors, hence for this reason, the study cannot be taken as totally conclusive. The researcher therefore encourages that other studies be done to initiate research that provides feedback on the:-

- i. Factors influencing effective hydroelectric power supply generation both in Kindaruma and in other Power Station projects so as to increase the body of knowledge.
- ii. Factors affecting implementation of hydroelectric power supply generation both in Kindaruma and in other Power Station projects.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

University of Nairobi,
P.O Box 30197,
Nairobi Kenya

DEAR RESPONDENT,

REQUEST FOR PERMISSION TO CARRY OUT RESEARCH STUDY

I am a graduate student undertaking a degree in Master of Arts Degree in Project planning and Management in the University of Nairobi and currently conducting a research on factors that influence effective hydroelectric power supply generation in the Kindaruma Power Station project. I humbly request you to assist in providing the required information because your views are considered important to this study. Please fill this questionnaire to the best of your ability. Any information given will be treated with utmost confidentiality and will only be used for the purpose of this study.

Yours Faithfully;

Esther Shelmith Njoki Waweru

Researcher

APPENDIX II: QUESTIONNAIRES FOR MANAGEMENT AND UNION STAFF

The researcher seeks to investigate the factors that influence effective hydroelectric power supply generation in the Kindaruma Power Station project. Relevant questions have been provided to gather data for analysis. Kindly spare some time to provide the information as accurately as possible. Any information supplied will be strictly confidential and will be used for academic purposes only.

PART A: General Information

1. Please indicate your gender (a) Male [] (b) Female []
2. Please indicate your cadre (a) Management [] (b) Union staff []
3. Please indicate your age.
(a) Below 25 [] (b) 26 – 35 [] (c) 36 – 50 [] (d) above 50 []

What is your highest level of education?

- a) Certificate holder [] (b) Diploma Holder [] (c) Higher Diploma Holder []
d) Bachelor Degree Holder [] (e) Master's Degree Holder [] (f) PhD Holder []
4. What is your role in the Kindaruma Power Station Project? _____
5. How many years have you been working here? 1 – 5 [] 5 – 10 [] 10 – 15 []

PART B: Machine Upgrades

6. Who is responsible for machine maintenance? _____
7. How long have the machines been in use? _____
8. How long has it been since upgrades were made to the existing machines? 0 – 5 years () 6 – 10 years () More than 10 years ()
9. In your opinion, how effective are the machines to organizational operations?
10. Very Effective () Fairly Effective () Upgrades are needed () Are there any future development plans for the existing machines?
11. If so, has the staff received appropriate training? _____
12. Do you think there is a willingness to adopt new technology by the staff?
13. Are there certain tasks that have to be carried out by specific employees? Yes () No ()

PART C: Human Resources

14. Technical support and Training is provided to the project staff

True () False ()

15. Is the staff competent on the organizational operations and machine operations?

Yes () No ()

16. To what extent does the project staff affect the effectiveness of operations?

17. To what extent do you agree with the following statements:

1 – To a very great extent; 2 - To a great extent; 3 - Neither great nor low extent;

4 - Low extent; 5 - Very low extent

Statement	1	2	3	4	5
The organization staff is well motivated					
A motivated team ensures efficiency in operations					
The organization trains, educates and supports the employees in operations					
The human resource influences employees' job satisfaction and organization commitment					
The human resource has enough personnel to ensure smooth running of operations					

PART D: Project Financing

18. In your own opinion, do you think that budgetary allocation amount disbursed meets the project requirements? Yes () No ()

19. Does availability of financial resources influence the efficiency of operations at the power station? Yes () No ()

20. Sources of funds have a significant influence in projects

Agree () Neutral () Disagreed () Strongly Agree() Strongly Disagree()

21. Budgetary processes are bureaucratic; thus affecting organizational projects
 Agree () Neutral () Disagreed () Strongly Agree() Strongly Disagree()
22. Regular project budget update is important for operations Yes () No ()

PART E: Top Management Support

23. To what extent has management invested on training the work force?

To a very low extent [] To a low extent [] To a moderate extent [] To a great extent []

24. In what way has the top management supported the implementation of projects at the Kindaruma Power Station?

25. Kindly list the internal operations that have improved as a result of management support?

26. Leadership skills of the top management are very crucial for efficient operations

Agree () Neutral () Disagreed ()

27. Top management puts emphasis on hiring qualified and competent staff. Agree ()

Neutral () Disagreed ()

28. To what extent does the following factors influence effective hydroelectric power supply generation in the Kindaruma power station project?

Use a scale of 1-5 where 1= to a very low extent, 2= to a low extent, 3= to a moderate extent, 4= to a great extent and 5= to a very great extent. Please tick the appropriate box).

Factors	1	2	3	4	5
Machine Upgrades					
Human Resources					
Project Financing					
Top Management Support					

APPENDIX III: INTERVIEW SCHEDULE FOR MANAGEMENT AND UNION STAFF

1. What is your role in the Kindaruma Power Station Project? -

2. How many years have you been working here? 1 – 5 [] 5 - 10 [] 10 – 15 []
3. How long have the machines been in use? _____
4. How long has it been since upgrades were made to the existing machines? 0– 5 years () 6 – 10 years () More than 10 years ()
5. Do you think there is a willingness to adopt new technology by the staff?
6. Is the staff competent on the organizational operations and machine operations?
Yes () No ()
7. The organization staff is well motivated Yes () No ()
8. A motivated team ensures efficiency in operations Yes () No ()
9. In your own opinion, do you think that budgetary allocation amount disbursed meets the project requirements? Yes () No ()
10. Does availability of financial resources influence the efficiency of operations at the power station? Yes () No ()
11. In what way has the top management supported the implementation of projects at the Kindaruma Power Station?
12. Top management puts emphasis on hiring qualified and competent staff.
Agree () Neutral () Disagreed () Strongly Agree() Strongly Disagree()

APPENDIX V: MAP OF STUDY AREA

