

## Factors Influencing Operational Performance of Wanjii Power Station Upgrade in KenGen, Murang'a County, Kenya

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### Abstract

*There has been power shortage in Africa and supplying electricity based on demand has not yet been met. The cost of generating electricity has been on rise resulting to high cost of energy forcing the government to subsidize. The study sought to examine the factors influencing operating performance of Wanjii power station in KenGen, Murang'a County, Kenya. The study used a descriptive survey research design. A sample size of ninety-three respondents was incorporated. Simple random sampling technique was used to select respondents. Questionnaire was used to collect primary data. It was piloted before actual study to improve the validity and reliability of the research instrument. The data collected was analyzed quantitatively and qualitatively. Data was presented using frequency distribution tables and measures of central tendency. A multi-regression analysis was conducted to establish the relationship between variables and the level of significance. The study noted that leadership, resources, project monitoring and evaluation positively influenced operational performance of the Wanjii power station of KenGen.*

**Key words:** Operational performance, leadership, resources, project monitoring, project evaluation

### 1.0 Background of the study

Hydroelectric organizations are exponentially using information technology to manage geographically dispersed projects. The technology entails changes hitherto working processes and practices. Upgrades comprising of structural and technological advancement that help construction and project managers to value procedural tasks so that accessible organizational resources are used efficiently and effectively. The part of the improvement in the firm operations can be actualized if the new technology is extensively utilized and diffused. However, the formulation, implementation and utilization of the advanced technologies depend on the commitment and willingness of the top management (Hueskes & Block, 2017).

Automation is a profound determiner of skillfulness in industrial operations. Majority of the most established systems are no longer in use, sometimes costly to sustain, and occasionally impossible to keep. It is becoming more and more problematic to come across resourceful persons on the old systems. This is due to inadequate training and apprenticeship to sustain and troubleshoot the "outdated" system. Upgrade provides an avenue to enhance operational performance and production. Downtime due to old system failures can have a leading effect output (Schipper and Silvius, 2014).

According to Mandil (2013), energy consumption across the world in particular China and India has been growing exponentially. Economic growth and development have attributed to high rate of energy consumption. The census report in various countries has shown a tremendous growth in population which is also contributing to increasing rate of energy consumption. In regard to this, energy projects are being witnessed in various countries with an aim to generate and increase power supply to counter attack power shortage, perennial reliability of hydropower and rationing. The growth of solar and wind power projects has increased for example in Germany and Denmark as an alternative means to increase energy supply and more so to reduce environmental degradation. Other countries are still relying on hydroelectricity for example Norway and Canada.

With the rate of economic development in China, there have been notable cases of water pollution which compromises quality water. As a result, there is a public and private partnership for environmental water treatment projects. The aim of the project is to alleviate the negative impact towards natural environment and promote social, economic, resource and environmental sustainability (Li, Lv, & Wang, 2019). According to Enshassiet. al (2016), inception phase of construction projects require thorough consideration of environmental factors (noise, air, water pollution, ecological conservation and waste generation), social factors (community amenities, assessment of employee health and safety, infrastructure capacity and employment), and economic factors (impact on local economy, business scope, financial plan and capital budget). During the design phase, key elements to be considered entails; materials design, life cycle design, safety and security considerations, and standardization.

There has been power shortage in Africa and supplying electricity based on demand has not yet been met. The cost of generating electricity has been on rise resulting to high cost of energy forcing the government to subsidize. South Africa and Zambia are known in African to have the lowest electricity tariffs while Gabon and Djibouti have the highest prices of electricity tariffs worldwide. Despite the high cost of energy production cost, Africa has untapped capability of hydro power however, hydropower projects initiated are now bearing fruits. Growth in generation and power supply has steadily increased, and economic growth and development witnessed in Africa. Consequently, attempts are done to reduce the cost of electricity to increase manufacturing process and lower the standard of living (Ohunakin & Ajayi, 2011).

For a long period, Kenya has been relying on hydropower. However, with instances of drought and environmental degradation, the power supply has been fluctuating. This has forced the government to come up with various power generating projects to increase its supply across the country. Kenya Electricity Generating Company (KenGen) is known in generating power and instituting various power generating projects in various parts of the country and Kenya Power and Lighting Company (KPLC) which supplies power generated in the country. Up to 2006, KenGen was owned by the government. However, it was partly privatized with an aim to increase electricity supply and reduce the cost and its unreliability. It's now a public-private partnership. KenGen generate power through various sources such as, wind, thermal and geothermal however, hydro is the leading source power generated in the country (Waweru, 2017).

Akuma (2012) focuses on impact of corporate social responsibility in KenGen and argues that KenGen has focused on environmental programs with an aim to improve the current situation of environment which has been degraded. Though could not be able to directly relate the participation of KenGen in Corporate Social Responsibility and its financial performance. Waweru (2017) did a study on a factor affecting hydroelectric power supply in Kindaruma power station project in Machakos. Factors considered were human resource, machine upgrade, financing, and top management support. Waweru (2017) concludes that those factors have a correlation with effective operation of power supply.

### **1.1 Problem Statement**

There has been power shortage in Africa and supplying electricity based on demand has not yet been met. The cost of generating electricity has been on rise resulting to high cost of energy forcing the government to subsidize. South Africa and Zambia are known in African to have the lowest electricity tariffs while Gabon and Djibouti have the highest prices of electricity tariffs worldwide (Patil and Laishram, 2016). Despite the high cost of energy production cost, Africa has untapped capability of hydro power however, hydropower projects initiated are now bearing fruits. Growth in generation and power supply has steadily increased, and economic growth and development witnessed in Africa. Consequently, attempts are done to reduce the cost of electricity to increase manufacturing process and lower the standard of living (Ohunakin & Ajayi, 2011)

In Kenya, there have been notable insufficient budgetary allocation to meet project requirements and this hinders effective hydroelectric power supply generation (Waweru, 2017). Consequently, there have been mismanagement of resources coupled with buying of substandard transformers rendering the project to become ineffective. This has negatively affected the operational performance of KenGen and the ministry of energy forcing to fire its top management to correct the defaults and make it operate effectively. The current study seeks to investigate the factors

### **1.2 Objectives of the study**

The general objective of the study was to examine the factors influencing operating performance in Wanjii power station in KenGen, Murang'a County. The specific objectives are:

- i. To determine the influence of leadership on operational performance of Wanjii power station in KenGen, Murang'a County.
- ii. To assess the influence of resources on operational performance of Wanjii power station in KenGen, Murang'a County.
- iii. To establish the influence of project monitoring and evaluation on operational performance of Wanjii power station in KenGen, Murang'a County.

### **2.0 Literature Review**

The study was guided by resource dependency theory and institutional theory. Various empirical literature were also reviewed that unveiled a number of literature gaps that this study purposed to fill. Tabassiet. al (2016) did a study on leadership behavior of project managers in sustainable construction projects. The most critical aspect of leadership is leadership competencies and strategies deployed in achieving the desired project. The study found that leadership attributes are key in attainment of a project objectives and project managers should endeavor to equip themselves with appropriate knowledge, skills and competencies to enable them attain the purpose of the project.

However, the study mainly focused on leadership behavior in building projects in Malaysia, this study focuses on leadership of project managers in power supply project in Kenya.

Patil and Laishram (2016) did a study on public–private partnerships from sustainability perspective—a critical analysis of the Indian case. The focus was on resource management and influence on performance on a project partnership between public and private sectors. The study found that there is need to efficiently utilize resources for the project and ensure there is value for the money. Resource management in terms of human resource is a key element that results to a successful project in comparison to technical factors. However, the study focused mainly on human resources in particular public-private partnership but this study focuses on resources in terms of financial provision and its management and employee’s motivation and their influence to operational performance. In addition, the current study will be based in the Kenyan context.

Belloni and Hakkinen (2011) did a study on barriers and drivers of a project. The variables in consideration were shareholders, monitoring and evaluation and finances. The findings indicated that the shareholders/stakeholders perpetually review the ongoing project to track its performance based on what is expected per phase/stage of the project. In case there are challenges and utilization of resources issues during monitoring and evaluation, improvements are done to ensure successful implementation of the project is on course. Project monitoring and evaluation helps the project manager and stakeholders spot the gaps that are existing while implementing the project having formulated the intended ideas. It also an eye opener to detect what was in a way forgotten during the formulation stage and is detected during implementation stage. However, the study did not indicate whether these barriers and drivers have influence on operational performance. The current study sought to demonstrate how this barriers and drivers of a project influences operational performance.

### 3.0 Methodology

The study employed descriptive survey research design. Bothe primary and secondary data was collected using a questionnaire and a document review guide. The study targeted project managers, supervisors, staffs and community leaders at the Wanjii power project. Simple random technique was adopted to select participants. Data was analyzed using correlation and regression analysis.

### 4.0 Research findings and discussions

#### 4.1 Response rate

Ninety two participants were emailed and the responses were 80% which is sufficient (Mugenda&Mugenda, 2003) as shown in the table below:

Participation	Frequency	Percentage
Active	74	80%
Passive	18	20%
Total	92	100%

Table1: Response rate

#### 4.2 Regression results

R is the relationship between observed and predicted values of operational performance (dependent variable) insinuating that the association of 0.074 between operational performance which include leadership, resource, project monitoring and evaluation. The coefficient of determination in the table is R square. The model’s three independent variables (leadership, resource, project monitoring and evaluation) were explained by 73.3% of the operational performance as revealed by R square. It signaled that the study independent variables contributed 73.3% to operational performance while factors that were not examined by the study contributed to 26.7% (the difference between 100% and 73.3%). This calls for other researchers to study other the factors influencing operational performance. Also, the 26.7% might have been error caused without knowing.

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.856 <sup>a</sup>	.733	.731	0.267

## 5.0 Summary, Conclusions and Recommendations

The study examined the factors influencing operational performance in Wanjii power station. The response rate was eighty percent effective. Majority of the respondents were male. Employees were experienced in project management. The study noted that there was leadership in place.

The first Objective was to examine the influence of leadership on operation performance in Wanjii power station. The study noted there was leadership in place. It was noted that there was a bureaucratic process of communication. The most practiced leadership styles were participatory and charismatic. The employee indicated signs of satisfactions towards their management and also, there engagement made employees feel valued to be part of the organization. However, it was noted that at times leadership position was misused and corrupt deals was conducted leading to unethical behaviors. The study found that leadership had influenced operational performance in Wanjii power station and their progress noted due to efficient and effective leadership practices.

The second objective was to assess the influence of leadership on operational performance in Wanjii power station. The study noted that the most important resources were finances, manpower, materials of work and tools of work. It was revealed that finances were a key contributor to successful operations. There was a budgetary allocation for the Wanjii power station and, items required and footing the bill were paid without delay for easier and smooth operation of the project. But sometimes financial allocation is not enough and forced to write the supplementary budget seeking assistance to fast track the project. The study revealed that one of the key assets and resource is the manpower to implement the formulated project and achieve its objectives. It was noted that employees were clearly stipulated their mandate, trained and equipped with the necessary skills to deal with the old and new technologies. The study noted that employees had the right attitude towards the project and motivated to work, however, their level of satisfactions differed among employees. The findings showed that tools of work were provided and employee safety was enhanced and there were minimal accidents noted. Respondents stated that they were sufficient materials provided for work and this made the project to run smoothly with no delay and fast tracked the operation. However, it was revealed that the resources were misappropriated for the interest of the few therefore undermining the operations due to sometimes buying of substandard materials with an aim of misuse of resources for individual benefits. The study noted that sufficient resources positively influenced operational performance while insufficient/ lack of resources negatively influenced operational performance.

The third Objective was to determine the influence of project monitoring and evaluation on operational performance in Wanjii power station. The study noted that there was a team conducting project monitoring and evaluation to assess the project and detect the shortcomings and correct them in advance for successful operations. The study noted that monitoring and evaluation was conducted often which helped to determine the level of success, to what extent objectives had been achieved, challenges noted and how to correct them. The findings indicated that the designing for the monitoring and evaluation system were meant to inform management if the project implementation was done as per the formulation or set objectives or there was need for rectification based on shortcomings.

### 5.1 Conclusion

The study noted that leadership, resources, project monitoring and evaluation influenced operational performance both positively and negatively. It was revealed that Wanjii power station leadership was effective and had positively transformed Wanjii power station and its objectives had been achieved. However, it was indicated that leadership had negatively influenced operational performance and made employees feel insecure and uncertain of their future due to favoritism and misuse of power.

The study noted that there were sufficient resources to cater for Wanjii power station however despite ethical standards being advocated, resources were misappropriated and used for self-gratification which affected successful operational performance. It was noted that project monitoring and evaluation were done which had ensured the project processes were critically monitored and evaluated to spot the successes and challenges. This helped to correct errors detected in advance and maintain the standards required. Consequently, the whole process of monitoring and evaluation helped to perpetuate a smooth operational performance.

### 5.2 Recommendations

1. The study noted that resources were being misappropriated and the person's responsible was only given a temporal leave to pave way for investigation. There is need for stern action to avoid misuse and wastage of resources by firing employees found guilty and ensure his properties are confiscated to restore the stolen/misappropriated resources.
2. The study noted leaders did not have avenue to train potential leaders to take future responsibilities. There is need to create an avenue for leaders to apprentice employee to take future responsibilities of leader when need arises instead of sourcing outside.

3. The research studied on factors influencing operational performance by focusing on leadership, resources, project monitoring and evaluation. The study recommends that a research should be carried out on the other factors influencing operational performance.

## References

- Borg, S. & Gall, M. (2003). *Research Methodology*. London: Prentice Hall.
- Hueskes, M., & Block, T. (2017). Governing public–private partnerships for sustainability: an analysis of. *International Journal of Project Management procurement and governance practices of PPP infrastructure projects*, 35(6), 1184-1195.
- Kothari, C. (2012). *Research Methodology Method and Techniques*. New Delhi: New Age International LTD Publishers.
- Li, H., Lv, L., & Wang, L. (2019). Identifying Factors Affecting the Sustainability of Water Environment Treatment Public-Private Partnership Projects. *Hindawi Advances in Civil Engineering*, 1(1), 1-15.
- Mandil, C. (2013). *Power generation investment in electricity market*. Paris: International Energy Agency.
- Ohunakin, O., & Ajayi, O. (2011). Small hydropower generation in Nigeria: An assessment. *Renewable and Sustainable Energy Reviews*, 15(1), 2006-2013.
- Patil, N., & Laishram, B. (2016). Public–private partnerships from sustainability perspective-a critical analysis of the Indian case. *International Journal of Construction Management*, 16(2), 161-174.
- Tabassi, A., Argyropoulou, M., Roufehaei, K., & Argyropoulou, R. (2016). Leadership Behavior of Project Managers in Sustainable Construction Projects. *Procedia Computer Science*, 100(1), 724-730.
- Waweru, E. (2017). *Factors influencing effective hydroelectric power supply generation in Kenya: A case of Kiandaruma power station project in Machakos County*. University of Nairobi, Department of Project Management. Nairobi: University of Nairobi.
- Yukl, G. (2002). *Leadership in Organizations*. 5th ed. Prentice-Hall: Englewood Cliffs, NJ.