



MODERATING EFFECT OF PORTFOLIO RISK MANAGEMENT ON PERFORMANCE OF KENYA WATER SERVICE BOARDS

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Abstract

The majority of water service boards are investing millions of money in different portfolios with the objective of profit maximization. Therefore, the purpose of this study was to determine the influence of project portfolio management practices on the performance of water service boards in Kenya. The specific objectives of the study were; to determine the effect of project evaluation, project selection, and prioritization and to establish the moderating effect of portfolio risk management on the relationship between project portfolio management practices and performance of water service boards in Kenya. The study was based on Modern Portfolio Theory, Multi-Criteria Utility theory. The study was population the employees of water boards in Kenya which include the coast water service board (CWSB), Rift valley water service board (RVSB), Lake Victoria North(LVNSB), Tana water, TanaAthi water service board, Athi water service board. The unit target constituted Engineers, senior management, middle management, and project team. The study targeted a population of 1310 key technical staffs in the project. SPSS version 24.0 was used to process and analyze the collected data using descriptive and Inferential statistics. Multiple regression analysis was used to test the relationship between

project portfolio management practices and organizational performance. The study found that there is a significant influence of project evaluation as a project portfolio management practice on the performance of water service boards in Kenya. The study thus concludes that companies should consider adopting various project prioritization methods such as ranking method, scoring model, Analytic Hierarchy Process (AHP) Technique.

Keywords: prioritization, allocation, portfolio management, performance, Analytic hierarchy process, water service boards

INTRODUCTION

According to Project Management Institute (2006, 2008, 2013) project portfolio management (PPM) is defined as the centralized or coordinated management of one or more portfolios, which included identifying, prioritizing, authorizing, managing, and controlling projects, programmes, and other related work, to achieve specific strategic business objectives. They recognized that “portfolio management produces valuable information to support or alter organizational strategies and investment decisions” (Project Management Institute, 2013) and allowed decision-making that controlled the direction of portfolio components as they achieved specific outcomes.

In PPM resources are allocated according to organizational priorities and are managed to achieve the identified benefits. They further elaborated that: “the organizational strategy is a result of the strategic planning cycle, where the vision and mission are translated into a strategic plan” (Project Management Institute, 2008) and that: Portfolio Management, through the alignment of the strategic planning establishes the portfolios required to achieve organizational strategy and objectives and performance goals. Management of authorized programs and projects and management of ongoing operations are required to execute portfolios consisting of programs, projects, and operations activities to realize the organizational strategy and objectives (Project Management Institute, 2013).

The management of the portfolio requires that the alignment between objectives and portfolio components be maintained. A change in circumstances (external or internal) could result in a change in the portfolio mix. According to PMI (2013), they describe PPM as “Optimizing Portfolio” and describe this process as “evaluating the portfolio based on the organization's selection criteria, creating the portfolio component mix with the greatest potential to support the organizational strategy.” Delays in projects are a global phenomenon and have become a typical part of the project manager’s concern (Zidane *et al.*, 2015). For effective company strategy implementation, there is an increasing need to address the importance of project portfolio management. Portfolio management is the coordinated management of one or

more portfolios to achieve organizational goals, objectives, and strategies. It includes interrelated organizational processes by which an organization evaluates, selects, prioritizes, and allocates its limited resources to best accomplish organizational strategies consistent with its vision, mission, and values. Portfolio management produces valuable information to support or alter organizational strategies and investment decisions (Abrantes & Figueiredo, 2014).

Statement of the Problem

As per the Countrywide Water Services Strategy (NWSS) (2007 -2015) “Kenya is exposed to serious problems in availing sustainable access to safe drinking water which is projected at around 60% in metropolitan and 40% in rural settings. According to the WASREB report (2017), the total investment made by Water Service Boards (WSBs) in Kenya between 2015 and 2017 amounted to Ksh34,456 billion. This investment was aimed at increasing water supply, reducing non-revenue water (NRW), and increasing the number of hours of water supply but, this has not been realized. There is no correlation between a constantly growing development budget and the positive impact on the Kenyan people. According to the WASREB impact report, (2018), Kenya’s water coverage stands at 55 percent against a 2015 National Water Services Strategy (NWSS) target of 80 percent. This indicator has not registered any significant growth in the last three (3) years and non-billed water (NBW) is at 42% against a target of 30% and the hours of supply has dropped to 14 hours from 18 hours in 2015, despite a numerous implementation of water projects and a minimum investment of 29 billion Kenya shillings.

The prevailing water condition in Kenya shows that only 57 % of the population has access to clean and safe drinking water as per Kenya National Water Services Strategy (2010). The existing studies on the implementation of projects have focused on the effects of monitoring techniques on project performance of Kenyan State Corporation, Muchelule et al (2017). Other studies have focused on factors influencing the completion of water projects in Kakamega, Kanda et al (2016). The research was done on water project viability such as (Ngetich, 2009) found that many water projects did not operate to the optimum capacity and suggested further research to be done on the impact of the project on sustainability of water projects. A lot of research attention has been on the tools and techniques for portfolio evaluation and prioritization (Kester *et al.*, 2011; Hesing, 2012; McNally *et al.*, 2013; Jugend and da Silva, 2014), portfolio-oriented product development process management, and resource management dilemmas and solutions (Kopmann *et al.*, 2015).

Some studies show clear positive associations between some project portfolio management practices and the performance of organizations (Dutra *et al.*, 2014; Kester *et al.*, 2014; Kock *et al.*, 2015). Evidence on the factors explaining project portfolio management

performance is still limited and more research is needed to test all aspects of the frameworks especially in the real estate sector where organizations are investing in multiple portfolios. With the call for more evidence, this study seeks to fill this knowledge gap by investigating the influence of portfolio management practices on the performance of water service boards in Kenya. Besides, it is clear several studies (McNally *et al.*, 2013; Jugend and da Silva, 2014; Dutra *et al.*, 2014; Kester *et al.*, 2014; Kock *et al.*, 2015; Kopmann *et al.*, 2015) has been done in developed countries with limited empirical literature in Kenya. It is in this light that the current study sought to fill the existing research gap by studying the project portfolio management practices on the performance of water service boards in Kenya.

Objectives of the Study

General Objective

This study sought to investigate the moderating effect of portfolio risk management on the performance of water service boards in Kenya.

Specific Objectives

- i. To determine the influence of project prioritization on the performance of water service boards in Kenya.
- ii. To determine the influence of resource allocation on the performance of water service boards in Kenya

Research Hypotheses

The study tested the following null hypotheses:

H₀₁: There is no significant influence of project selection and prioritization as a project portfolio management practice on the performance of water service boards in Kenya.

H₀₂: There is no significant influence of resource allocation as a project portfolio management practice on the performance of water service boards in Kenya.

LITERATURE REVIEW

Theoretical Framework

Modern Portfolio Theory (MPT)

In the early 1950s, Harry Markowitz (Markowitz, 1952) began developing his theories on modern portfolio theory (MPT). In applying the concepts of variance and covariance, Markowitz showed that a diversified portfolio of financial assets could be optimized to deliver the maximum return for a given level of risk". This theory determines the highest return on a specific mix of

investments for a given level of risk. According to Markowitz (1952), several assumptions must be formulated concerning investor behavior in portfolio management. The assumptions include; the investor views each investment alternative to be represented by the distribution probability of the expected returns throughout the investment was held. Also, there is the maximization of expected utility for one period the curves of utility demonstrate marginal wealth utility, utility curves of investors are a function of expected risk and returns because investors solely base decisions on expected risk and return. He also argued that less risk will always be preferred by investors for any given expected return level (Markowitz, 1952).

A good understanding of the shareholder's wealth was advocated for in evaluating the asset classes for various investors by the fund manager as it also influences the risk appetite for trustees in a pension fund. Investors weigh all investment options as representations of potential classifications of future returns for a given period. Also, one period expected utility is maximized by investors as they have utility curves demonstrating diminishing wealth marginal utility. Concurrently, the variability of expected returns is used as a basis for estimating risk. In this framework, assets and portfolios are efficient if no other alternative offers higher expected returns for similar or lower risk (Choudhury and Sabherwal, 2003).

Markowitz (1999) gives credit to A.D. Roy for his contribution to MPT. "Roy also proposed making choices based on the mean and variance of the portfolio as a whole. He proposed choosing the portfolio that maximized a portfolio $(E - d) / \sigma$, where d is a fixed disastrous return and σ is the standard deviation of return. Roy's formula for the variance of the portfolio included the co-variances of returns among securities". The main differences between Roy's analysis and Markowitz's analysis are that Markowitz required nonnegative investments whereas Roy's allowed the amount invested in any security to be positive or negative. Markowitz also proposed allowing the investor to choose a desired portfolio from the efficient mean-variance combinations whereas Roy recommended the choice of a specific portfolio (Markowitz, 1999).

In essence, the work by Markowitz provided the concepts and foundation for subsequent studies - even in non-financial fields. Further, McFarlan (1981) suggested that the selection of projects based on the risk profile of the portfolio could reduce the risk exposure to the organization. However, McFarlan does not go into any detail regarding the portfolio management methodology, approach, or definition but merely introduces the concept of portfolio management from a perspective of risk management. Nevertheless, the application of portfolio theory in a new field, specifically real estate investment, has resulted in further study towards developing methods and standards for applying portfolio theory to Project portfolio management. Modern portfolio theory (MPT) is relevant for this research as it provides a

financial investment metaphor that can be applied to project portfolio management. Projects, programmes, and operational initiatives can be viewed as investments that must be aligned to organizational goals. The project portfolio mix should be balanced in terms of risk exposure and investment returns. To understand the full impact of decisions regarding individual portfolio components, the aggregate must be considered, as opposed to the singular, projects, programs, and operational initiatives.

Multi-Criteria Utility Theory (MCUT)

MCUT considers the decision maker's preferences in the form of the utility function, which is defined over a set of criteria (Goicoechea, Hansen, and Duckstein, 1982 as cited in Stewart and Mohamed (2002). The utility is a measure of desirability or satisfaction and provides a uniform scale to compare tangible and intangible criteria (Ang & Tang, 1984 as cited in Stewart and Mohamed (2002). Stewart and Mohamed (2002) state that decisions typically involve choosing one or a few alternatives from a list of several with each alternative assessed for desirability on many scored criteria. The utility function connects the criteria scores with desirability. According to Stewart and Mohamed (2002), the most common formulation of a multi-criteria utility function was the additive model (Keeney and Raiffa, 1993).

MCUT generally combines the main advantages of simple scoring techniques and optimization models. According to Stewart and Mohamed (2002) business unit managers typically proposed projects they wished to implement in the upcoming financial year. These projects were supported by business cases in which costs were detailed. As cost is only one criterion related to project selection, other criteria would be based on business value, risk, organization needs that the project proposes to meet, and also other benefits to the organization like product longevity and the likelihood of delivering the product. Each criterion is made up of several factors that contribute to the measurement of that criterion. For example, to determine the value that a PPM investment delivers, organizations need to go beyond the traditional NPV (Net Present Value) and ROI (Return on Investment) analysis methods. Value can be defined as the contribution of technology to enable the success of the business unit.

Stewart and Mohamed (2002) discussed the investment management process, project selection process and framework, investment evaluation, and multiple criteria decision-making. This is relevant to this research, as the research problem statement described in Chapter 1 refers to the evaluation of multiple criteria when assessing the contribution of project portfolio management practices to organizational objectives, and MCUT contributes to the understanding of evaluating multiple criteria when determining the contribution of portfolio components to organizational objectives.

Conceptual Framework

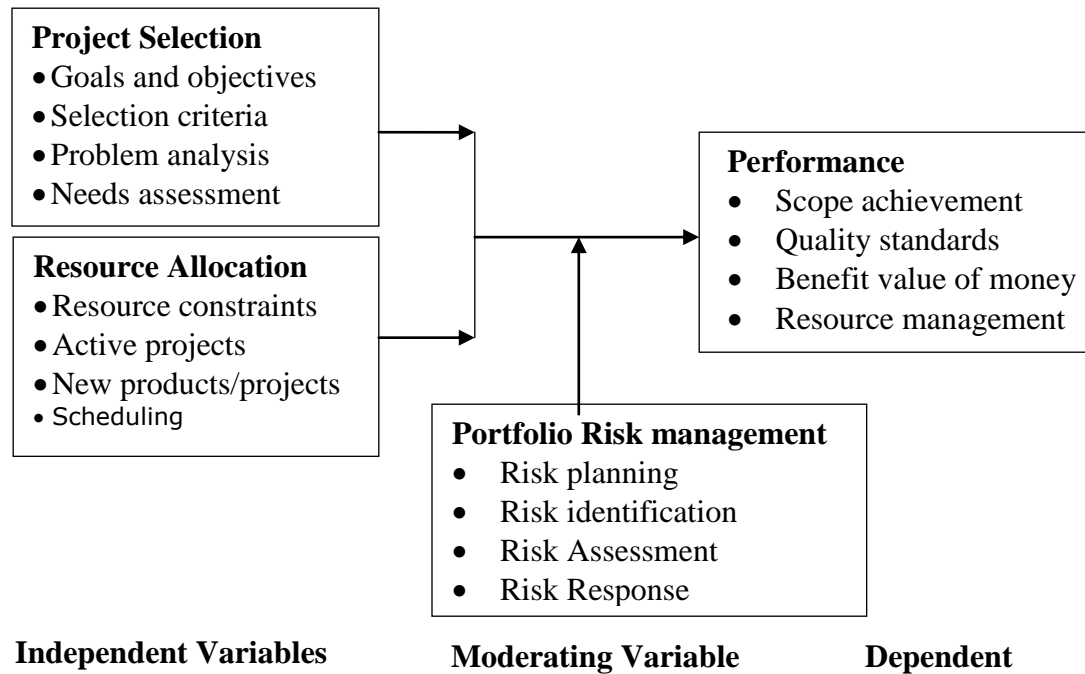


Figure 1: Conceptual Framework

Project Portfolio Management Practices

Projects Selection

This practice aims at a balanced project portfolio, considering the mission, vision, and strategy of the organization (PMI, 2008; Rocha *et al.* 2009). It prioritizes the projects in an orderly manner in each strategic or financial category and establishes an organizational focus (PMI, 2008; Rabechini, Maximiano, and Martins 2005). Projects must be compared with each other, and their priority defined by their importance and strategic contribution (Rocha *et al.* 2009; Castro and Carvalho, 2010). The involvement of senior management is critical (Kerzner 2006).

This practice ensures that projects and programs are reviewed to prioritize resource allocation and that the management of the portfolio is consistent with and aligned to organizational strategies (PMI, 2013). Different types of criteria are used to evaluate and prioritize the portfolio components, such as financial criteria, technical criteria, risk-related criteria, resources-related criteria (human resources, equipment), contractual conditions criteria, and experience and other qualitative criteria. Examples of financial criteria include benefit-cost ratio, net present value, payback period, internal rate of return (IRR), weighted average cost of capital, and terminal value. (Rocha *et al.* 2009).

According to Rocha *et al.* (2009), the following elements should be taken into consideration while conducting project selection, ad hoc selection techniques, scoring models, the analytic hierarchy process (AHP) method, sensibility matrix, and analysis, mission/vision/strategy operationalization, commercial success probability, technical success probability, bubble chart, indicators of success, the establishment of a prioritized list of projects, the involvement of senior management, analysis of selection criteria (subjective, objective, quantitative, or intuitive), determination of the cost of each project, and urgency and seriousness.

According to Gutierrez and Magnusson (2014), the main criteria adopted for selecting projects is the appreciation that members attach to the association's lines of action. Based on the survey results, project expectations and priorities are assessed, as well as the need for investment in realization and communication. Projects are not placed in strict categories (strategic, financial, or organizational focus), allowing further analysis. Financial analysis is done only by project budgets. Run-time is considered in the selection and final prioritization, but not consistently since projects that are at risk of not being completed in the specified period (annually) are also prioritized. A few empirical, qualitative studies give partial support to the potential linkage between portfolio selection and portfolio management performance. Chien, (2012), reported prioritization as a success factor in multi-project environments. He further stated that resource allocation issues and lack of portfolio-level activities, including project overlaps and lack of prioritization, as problems with managing multi project environments.

Resource Allocation Practices

Several projects share the same resources, and the matrix allocation of resources has become common practice (Castro and Carvalho, 2010). Resources allocation enables the creation of a portfolio management plan, which includes developing rules for adding new projects, as these will join the competition for the organization's resources. Strategy and resource allocation should be closely linked (Rabechini, Maximiano, and Martins, 2005).

According to PMI (2008), the elements that should be considered in portfolio resource allocation include consideration of resource constraints on the type and total of projects, analysis of active projects and new products, and allocation made by the functional areas and other stakeholders. After defining and formalizing the portfolio through contracts with sponsors, projects are neither canceled nor added. For this reason, funds are not reallocated and departments do not compete with each other for resources. Therefore, resource allocation determines the business success of the portfolio (Castro and Carvalho, 2010).

Projects are centered in the project department and may involve, sporadically, other sectors, or even other organizations in the execution. The resource allocation practice for project portfolio management plays an important role in the implementation of projects (Unger *et al.*, 2015). Hence, it is important to determine the influence of portfolio resource allocation on the organizational performance of water service boards that have several projects which share the same resources.

Portfolio Risk Management

PMBOK-(PMI), (2013) defined portfolio risk as an uncertain event or condition that, if it occurs, has positive or negative effects on a project's objectives, thus the likelihood that a project will fail to meet its objectives. Thus project risk management is laid down as project management activities for controlling and as such mitigate these risks (Amugsi & Muindi, 2017). Projects' risks are, therefore, various and diverse, where, Luis (2017) argued that projects attract a lot of interest from various stakeholders, resulting in wrangles that are risky to project's success and performance.

Technically and economically, therefore, well-planned projects may fail to achieve its goal, due to stakeholders conflicting interests. This, thus, calls for stakeholder analysis that, must be rigorously and systematically done, to control unexpected problems from arising and harm projects continuity and subsequent performance (Eshna, 2017). On the other hand, projects employ computerized project management software technology as a tool for project planning, scheduling, resource allocation, and change management. This besides, ensures a seamless understanding of the project management team and stakeholders and thus allowing a common understanding of costs and quality management for the projects being undertaken (Kuria, 2016).

However, project technology at times is prone to risks, among which are information hacking, unauthorized information access, the risk of viruses, and rerouting transactions that may cause delays and consequential projects unsustainability (Kumar *et al.*, 2017). Projects managers should thus, be versed with ways and procedures of managing these risks. Further, Sabihah, Intan, Siti, and Ahmad (2017) argued that projects often experience execution risks especially when financial assistance is offered by outside vendors or sponsors who, at times stops such assistances without warning. This is because project sponsors are not directly controlled by the project management team. Thus, making projects to encounter risks of sustenance different from expected, making it difficult to merge their plans with those of the project's management team (Mwololo, 2016).

Further, projects are also prone to a lack of continued support from both internal and external authorities. This may arise as a result of project management politics that in most cases occur when projects, are poorly scoped ending up to spills over to more additional time, leading to wastage of resources (Gabriela & Agnieszka, 2017). It is, therefore, this research intends to study how proper project risk management should be aligned with project management practices to influence the performance of solid wastes projects in Kenya.

Empirical Review

Cooper (2011), found that effective portfolio management practices improved time to market and improved quality in execution which are among the main goals of PPM and the Idea-to-Launch process. The process is a cross-functional team approach, as an effective cross-functional project team is needed to develop and launch a new product into a new market - new projects are bound to fail if functions are working in silos. Effective portfolio management practices must be an integral part of the process to keep the right projects in the pipeline, but most companies suffer from too many projects and not enough resources (Cooper, 2011). Therefore, if proper resource allocation and project selection are done accordingly, there will be a successful project portfolio (Girotra, Terwiesch, and Ulrich, 2007).

Project Management Institute (2013), effective portfolio management begins with oversight of the risk in individual investors. Prudent risk selection is vital to maintaining favorable investment quality. Therefore, the historical emphasis on controlling the quality of individual investment approvals and managing the performance continues to be essential. But better technology and information systems have opened the door to better management methods. A portfolio manager can now obtain early indications of increasing risk by taking a more comprehensive view of the portfolio.

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Montibeller *et al.* (2009) found that the use of multiple criteria portfolio analysis models in resource allocation helped decision-makers identify options that generated greater value for the

organization. They recognized, however, that there were still several unexplored opportunities and suggested the need for further research in this area. More recently, authors such as Killen *et al.* (2012) and Martinsuo (2013) discussed the application of strategic management theories to PPM research and recognized that despite good practices being implemented for PPM, companies still struggled with suboptimal performance. Therefore, this study aims to fill this knowledge by investigating the effect of portfolio management practices on the performance of real estate investment companies.

RESEARCH METHODOLOGY

This study adopted a cross-sectional survey research design that focused on the effect of project portfolio practices on the performance of water service boards in Kenya. A positivism research philosophy was adopted since positivism reflects the belief that reality is stable that can be observed and described from an objective viewpoint without interfering with phenomena.

The target population for this study were employees of eight water boards in Kenya which include coast water service board(CWSB), Rift valley water service board (RVSB), Lake Victoria North(LVNSB), Lake Victoria South, Tana water, TanaAthi water service board, Athi water service board, and Northern water service board. These water boards constitute all the legally mandated water service providers in Kenya.

The unit target constituted Engineers, senior management, middle management, project team, and some senior management from water service providers comprising of 280 key people (WASREB report, 2018).The sample size was determined using Yamane's (1967) formula where a sample of 165 was obtained. Stratified sampling was preferred because the population sampled was divided into homogeneous groups based on the characteristics considered important to the study.

A standardized self-designed questionnaire was used to collect primary data. After the data collection process, the data was edited, coded, classified, and tabulated so that they could be amendable to analysis. The quantitative data collected was analyzed by calculating the response rate with descriptive statistics such as mean, median, standard deviation, and proportions using Statistical Package for Social Sciences (SPSS) version 22 and Microsoft Excel. Multiple regression analysis was done to test the relationship between the independent variables and dependent variables. F-test was carried out in the study at a 95% confidence level. The significance of each independent variable was evaluated based on the value of the t-statistic and corresponding p-value in the regression output. The null hypothesis $H_0: B_2 = 0$ was rejected whenever the p-value was less than 5%.

RESEARCH FINDINGS

The study selected a sample of 165 management-level employees of eight water boards in Kenya but the researcher was able to receive back only 133 questionnaires. This formed a response rate of 80.6%. According to Mugenda and Mugenda (2013), a response rate of 50% and above is good for analysis and reporting, that of 60% is sufficient while 70% and above is excellent. Reliability test was done and Cronbach alpha of more the 7.0 was attained making the study to be significant. Therefore, since our response rate was above 70%, it was considered to be excellent and was used for further analysis and reporting.

Descriptive Statistics

Table 1: Descriptive Statistics for Project Selection and Prioritization

Statement	Mean	Std. Dev.
It provides the opportunity to compare different scenarios through the creations of different versions.	3.773	1.251
This practice prioritizes the projects in an orderly manner in each strategic or financial category and establishes an organizational focus.	3.75	1.306
Project selection and prioritization help in the elimination of efforts on product/project redundancies.	3.616	1.091
Proper project selection and prioritization contributes to reducing time to market	3.598	1.391
It helps to compare projects and measurably compare each project's contribution to the organizational strategy	3.547	1.232
It helps in aligning each project to the strategy formulation	3.517	1.296
Aggregate Score	3.634	1.261

The findings presented in Table 1 show that the aggregate mean value was 3.634 and the standard deviation was small (1.261). This suggests that on average, the respondents agreed with the statements about the influence of project selection and prioritization on the performance of water service boards in Kenya. The study specifically established that the respondents agreed that it provides the opportunity to compare different scenarios through creations of different versions (M=3.773, SD=1.251); that this practice (project selection and prioritization) prioritizes the projects in an orderly manner in each strategic or financial category, and establishes an organizational focus (M=3.75, SD=1.306); and that project selection and prioritization helps in elimination of efforts on product/project redundancies (M=3.616, SD=1.091). Further, the respondents agreed that proper project selection and prioritization contributes to reducing time to

market (M=3.598, SD=1.391); it helps to compare projects and measurably compare each project's contribution to the organizational strategy (M=3.547, SD=1.232); and that it helps in aligning each project to the strategy formulation (M=3.517, SD=1.296).

The findings concur with PMI (2013) that project selection and prioritization ensures that projects and programs are reviewed to prioritize resource allocation and that the management of the portfolio is consistent with and aligned to organizational strategies. It also agrees with Chien, (2012) who reported prioritization as a success factor in multi-project environments. He further stated that resource allocation issues and lack of portfolio-level activities, including project overlaps and lack of prioritization, as problems with managing multi-project environments.

Table 2: Descriptive statistics on Resource Allocation

Statement	Mean	Std. Dev.
It aids in the investment of funds in appropriate business areas.	3.8	1.337
It leads to an increased cost saving of resources.	3.795	1.265
Resource allocation practice for project portfolio management plays an important role in the implementation of projects	3.783	1.428
This practice helps to ensure funds are not reallocated and departments do not compete with each other for resources.	3.771	1.285
Optimal allocation of resources enhances the business success of the portfolio.	3.739	1.431
Resource allocation enables the creation of a portfolio management plan.	3.587	1.282
Aggregate Score	3.746	1.338

The findings in Table 2 show that the aggregate mean is 3.746 and the standard deviation is small ($1.338 < 2$). This suggests that on average, the respondents agreed with the statements on the influence of resource allocation on the performance of water service boards in Kenya. Specifically, the findings show that the respondents agreed that it aids in the investment of funds in appropriate business areas (M=3.800, SD=1.337); it leads to an increased cost saving of resources (M=3.795, SD=1.265); and that resource allocation practice for project portfolio management plays an important role in the implementation of projects (M=3.783, SD=1.428). The study further found that the respondents agreed that this practice helps to ensure funds are not reallocated and departments do not compete with each other for resources (M=3.771, SD=1.285); optimal allocation of resources enhances the business success of portfolio (M=3.739, SD=1.431); and that resources allocation enables the creation of a portfolio management plan (M=3.587, SD=1.282).

The findings agree with Castro and Carvalho, (2010) that resource allocation enables the creation of a portfolio management plan, which includes developing rules for adding new projects, as these will join the competition for the organization's resources. It also concurs with Unger *et al.*, (2015) that the resources allocation practice for project portfolio management plays an important role in the implementation of projects.

Table 3: Descriptive Statistics on the Moderating Effect of Portfolio Risk Management

	Mean	Std. Dev.
The success or failure of projects depend on portfolio risk	3.845	1.459
The company has laid down project management activities to control and mitigate portfolio risk	3.802	1.461
Wrangles arising from stakeholders interest causes risks to project success and performance	3.793	1.408
Adoption of project management software ensures a seamless understanding of the projects management team	3.778	1.321
Aggregate Score	3.805	1.412

On average, the respondents agreed with the various statements on the moderating effect of portfolio risk management on the relationship between project portfolio management on the performance of water service boards in Kenya as indicated by an aggregate mean value of 3.805 and standard deviation value of 1.412. The findings further showed that the respondents agreed that the success or failure of projects depends on portfolio risk (M=3.845, SD=1.459); the company has laid down project management activities to control and mitigate portfolio risk (M=3.802, SD=1.461); wrangles arising from stakeholders interest causes risks to project success and performance (M=3.793, SD=1.408); and that adoption of project management software ensures seamless understanding of projects management team (M=3.778; SD=1.321). The study findings agree with Eshna (2017) that well-planned projects may fail to achieve its goal, due to stakeholders conflicting interests. He added that it is important to have stakeholder analysis that must be rigorously and systematically done, to control unexpected problems from arising and harm projects continuity and subsequent performance. The study also concurs with Kuria (2016) that projects that employ computerized project management software technology as a tool for project planning, scheduling, resource allocation, and change management ensures seamless understanding of projects management team and stakeholders and thus allowing a common understanding of costs and quality management for the projects being undertaken.

Table 4: Descriptive Statistics on Performance Indicators

Performance indicators	Mean	Std. Dev.
Customer satisfaction and loyalty.	3.869	1.528
Return on Assets	3.813	1.424
Competitiveness	3.798	1.445
Market share	3.792	1.426
Return on Equity	3.776	1.337
Profitability	3.757	1.356

From the findings in Table 4, the respondents agreed that project portfolio management influences performance. They specifically agreed that it influenced customer satisfaction and loyalty (M=3.869, SD=1.528); Return on Assets (M=3.813, SD=1.424); competitiveness (M=3.798, SD=1.445); market share (M=3.792, SD=1.426); Return on Equity (M=3.776, SD=1.337); and Profitability (M=3.757, SD=1.356). This agrees with Barney (2013) that today project portfolio management is considered to be one of the most important areas for organizational development and business success; it could improve business success.

Respondents were also asked to rank their organization on the following project portfolio management success criteria (Table 5). They used the scale 1= little to no importance, 2= some importance, 3= above average importance, 4= very important.

Table 5: Descriptive Statistics for Organization Project Portfolio Management Success

Statement	Mean	Std. Dev.
The average single project success – individual projects(within the portfolio) fulfilling their own set of success criteria such as cost, time, quality, and customer satisfaction	3.97	1.209
The use of synergies-making use of synergies between projects such as technical or market synergies.	3.875	1.252
The portfolio is aligned with the organizational strategy -the extent to which the portfolio reflects the board's strategy.	3.818	1.514
The portfolio is balanced -a portfolio that balances different criteria such as achieving the growth and profit objectives	3.684	1.274
Aggregate Score	3.837	1.312

From the findings in Table 5, the aggregate mean value was 3.837 and the standard deviation was 1.312. This is an indication that on average, the respondents ranked their organization project portfolio management success criteria and being very important. Specifically, they

indicated the following to be very important: the average single project success – individual projects (within the portfolio) fulfilling their own set of success criteria such as cost, time, quality, and customer satisfaction (M=3.97, SD=1.209). The use of synergies-making use of synergies between projects such as technical or market synergies (M=3.875, SD=1.252). The portfolio is aligned with the organizational strategy -the extent to which the portfolio reflects the board's strategy (M=3.818, SD=1.514). The portfolio is a balanced -a portfolio that balances different criteria such as achieving the growth and profit objectives (M=3.684, SD=1.274).

Correlation Analysis

Table 6: Correlation Analysis

		Performance	Project Selection	Resource Allocation
Organizational Performance	Pearson Correlation	1		
	Sig. (2-Tailed)			
	N	133		
Project Selection	Pearson Correlation	.811 [*]	1	
	Sig. (2-Tailed)	.017		
	N	133	133	
Resource Allocation	Pearson Correlation	.503 [*]	.325	1
	Sig. (2-Tailed)	.027	.064	
	N	133	133	133

The findings in Table 6 show that project selection and organization performance had a strong positive and significant relationship ($r=0.811$, $p=0.017$). Since the p-value was less than the selected level of significance, the relationship was considered to be significant. The findings also show that resource allocation has a strong relationship with organization performance ($r=0.503$). The p-value (0.027) was less than the selected level of significance (0.05) and therefore, the relationship was considered to be significant. These findings suggest that there was a significant relationship between the independent variables (project selection, resource allocation, portfolio control, and project evaluation) and the dependent variable (performance).

Regression Analysis

Influence of Project Selection and Prioritization on Organizational Performance

Univariate analysis was computed to determine the influence of project evaluation on the performance of water service boards in Kenya. The hypothesis tested was:

H₀₁: There is no significant influence of project selection and prioritization as a project portfolio management practice on the performance of water service boards in Kenya.

Table 7: Regression analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811 ^a	0.794	0.781	1.258

a. Predictors: (Constant), project prioritization

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.247	1	1.247	7.470	.019 ^b
	Residual	21.877	131	0.167		
	Total	23.124	132			

a. Dependent Variable: performance

b. Predictors: (Constant), project prioritization

Coefficients

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.412	0.412		3.427	0.013
	Project Prioritization	0.319	0.106	0.811	3.009	0.004

a. Dependent Variable: Financial performance

Adjusted R squared is the coefficient of determination that shows the variation in the dependent variable due to changes in the independent variable. From the findings, the value of adjusted R squared was 0.781, indicating that there was a variation of 78.1% on the performance of water service boards in Kenya due to project prioritization, at a 95 percent confidence interval. This shows that 78.1% changes in the performance of water service boards in Kenya could be

accounted for by project prioritization. R is the correlation coefficient which shows the relationship between the study variables. There was a strong positive relationship between the study variable as shown by 0.811.

From the analysis of variance (ANOVA), the study found out that the regression model was significant at 0.019 which is less than the value of significance (p-value) which is 0.05, thus indicating that the data was ideal for concluding the population parameters. The calculated value was greater than the critical value ($7.470 > 3.913$), an indication that project prioritization significantly influences the performance of water service boards in Kenya. The significance value was less than 0.05 indicating that the model was significant.

The regression equation was:

$$Y = 1.412 + 0.319 X_1$$

From the above regression equation, it was revealed that by holding project prioritization to a constant zero, the performance of water service boards in Kenya would be 1.412. A unit increase in the project prioritization would lead to an increase in the performance of water service boards in Kenya by 0.319. The p-value obtained (0.0004) was less than the selected level of significance, an indication that the influence was significant. We, therefore, reject the null hypothesis that “there is no significant influence of project selection and prioritization as a project portfolio management practice on the performance of water service boards in Kenya”.

Influence of Resource Allocation on Organizational Performance

Univariate analysis was computed to determine the influence of resource allocation on the performance of water service boards in Kenya. The hypothesis tested was:

H₀₂: There is no significant influence of resource allocation as a project portfolio management practice on the performance of water service boards in Kenya.

Table 8: Regression analysis

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.503 ^a	.254	.253	1.14213	

a. Predictors: (Constant), Resource Allocation

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.87	1	6.87	33.825	.002 ^b

Residual	56.461	131	0.431
Total	63.331	132	

a. Dependent Variable: performance

b. Predictors: (Constant), Resource Allocation

Coefficients^a

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	2.393	0.414		5.780	0.000
	Resource Allocation	0.405	0.065	0.503	6.231	0.002

a. Dependent Variable: performance

The R-squared for the relationship between resource allocation and performance of water service boards in Kenya was 0.254, which implies that resource allocation can explain 25.4% of the performance of water service boards in Kenya. Besides, the p-value for the F-statistic was 0.002, which implies that the model can be used in predicting the performance of water service boards in Kenya.

From the coefficients table, the following model was fitted;

$$Y = 2.393 + 0.405 X_2$$

The results show that resource allocation has a positive and significant influence on the performance of water service boards in Kenya as shown by a regression coefficient of 0.405. The p-value (0.002) was less than the significance level (0.05). We, therefore, reject the null hypothesis "There is no significant influence of resource allocation as a project portfolio management practice on the performance of water service boards in Kenya".

Moderating Effect of Portfolio Risk Management on Relationship between Project Portfolio Management and Organizational Performance

Step-wise multiple regression analysis was conducted to establish the moderating effect of portfolio risk management on the relationship between project portfolio management practices and performance of water service boards in Kenya.

The hypothesis tested was:

H₀₅: Portfolio risk management does not moderate the relationships between project portfolio management practice and performance of water service boards in Kenya

Table 9: Regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.881 ^a	.776	.772	0.13919
2	.884 ^b	.781	.780	1.15021

a. Predictors: (Constant), project selection, resource allocation, portfolio control, and project evaluation

b. Predictors: (Constant), project selection, resource allocation, portfolio control, and project evaluation, X1*M, X2*M, X3*M, X4*M,

From the second model, the moderated model (model 2), the findings show that the value of the adjusted R square is 0.780. This indicates that 78% of variations in the performance of water service boards in Kenya can be explained by changes in moderated independent variables. The findings show that after the introduction of the moderating variable (portfolio risk management) the amount of variation in the dependent variable that can be explained by changes in independent variables increased; from 0.772 to 0.780. The moderated variables are also seen to have strong positive relations with the performance of water service boards in Kenya as indicated by the correlation coefficient value of (R) 0.884.

Table 10: ANOVA for Moderated Regression Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	111.24	4	27.81	21.515	.000 ^b
	Residual	165.504	128	1.293		
	Total	276.744	132			
2	Regression	102.232	8	12.779	9.659	.000 ^c
	Residual	164.052	124	1.323		
	Total	266.284	132			

a. Dependent Variable: Performance

b. Predictors: (Constant), project selection, resource allocation, portfolio control, and project evaluation

c. Predictors: (Constant), project selection, resource allocation, portfolio control, and project evaluation, X1*M, X2*M, X3*M, X4*M,

This tested the significance of the moderated model. The significance was tested at a 5% level of significance. The findings presented in Table 10 show that the models had a significance level of 0.000; both models the un-moderated and the moderated models. From the findings, the F-calculated for the first model was 21.515 and for the second model was 9.659. Since the F-calculated for the two models were more than the F-critical, 2.442 (first model) and 2.014

(second model), the two models were a good fit for the data and hence they could be used in predicting the moderating effect of portfolio risk management on relationship between project portfolio management practices and performance of water service boards in Kenya.

Table 11: Coefficients for Moderated Regression Analysis

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	0.920	0.081		11.358	0.000
1 Project Selection	0.388	0.084	0.032	4.619	0.029
Resource Allocation	0.784	0.127	0.429	6.173	0.007
(Constant)	0.625	0.085		7.353	0.001
Project Selection	0.272	0.074	0.099	3.676	0.029
2 Resource Allocation	0.664	0.178	0.363	3.730	0.025
X ₁ *M	0.346	0.032	0.094	10.813	0.000
X ₂ *M	0.235	0.033	0.087	7.121	0.003

a. Dependent Variable: Performance

From the coefficients table, the following model was fitted;

$$Y = 0.625 + 0.346X_1 * M + 0.235X_2 * M + \varepsilon$$

The findings also show that moderated project selection ($X_1 * M$) has a positive significant influence on the performance of water service boards in Kenya ($\beta=0.346$, $p=0.000$). This suggests that the moderated variable has a significant influence on the performance of water service boards. The p-value was less than the selected level of significance (0.05) suggesting significance. We, therefore, reject the null hypothesis: “*Portfolio risk management does not moderate the relationships between project selection and performance of water service boards in Kenya*”.

The findings also show that moderated project allocation ($X_2 * M$) has a positive significant influence on the performance of water service boards in Kenya ($\beta=0.235$, $p=0.003$). This suggests that the moderated variable has a significant influence on the performance of water service boards. The p-value (0.003) was less than the selected level of significance (0.05) suggesting significance. We, therefore, reject the null hypothesis: “*Portfolio risk management does not moderate the relationships between project allocation and performance of water service boards in Kenya*”.

CONCLUSIONS

The first research objective was to determine the influence of project evaluation on the performance of water service boards in Kenya. The study found that a unit increase in the project prioritization would lead to an increase in the performance of water service boards in Kenya. The study also established that the influence was significant. Based on these findings, the study concludes that there is a significant influence of project selection and prioritization as a project portfolio management practice on the performance of water service boards in Kenya.

The second research objective was to determine the influence of resource allocation on the performance of water service boards in Kenya. The study found that resource allocation has a positive influence on the performance of water service boards in Kenya. The study also established that the influence of resource allocation was significant. From these findings, the study concludes that there is a significant influence of resource allocation as a project portfolio management practice on the performance of water service boards in Kenya.

The final objective of the study was to establish the moderating effect of portfolio risk management on the relationship between project portfolio management practices and performance of water service boards in Kenya. The study found that moderated project selection has a positive significant influence on the performance of water service boards in Kenya. The study also found that moderated project allocation has a positive significant influence on the performance of water service boards in Kenya. From the study findings, the study concludes that portfolio risk management does moderate the relationships between project portfolio management practice and the performance of water service boards in Kenya.

RECOMMENDATIONS

Project selection was found to positively and significantly influence performance. Therefore, companies should consider adopting various project prioritization methods. This includes the ranking method, scoring model, Analytic Hierarchy Process (AHP) Technique. Also, project prioritization should instead be an on-going process where project scores are reviewed and updated during project development and at designated stage gates.

Resource allocation was found to have a positive influence on performance. The study thus recommends water service boards to adopt proper ways of resource allocation. This can be achieved by project managers understanding the scope of their project, identifying resources, tracking time, also after allocating the resources, it is important to keep track of them. Also, it's crucial to avoid over-allocation; this is because it will cause team burnout and the result is a significant drop in their productivity. The companies are also encouraged to adopt time tracking software that will help the company in proper allocation of time and budget.

SCOPE FOR FURTHER STUDIES

This study used a small sample size; there is a need to conduct a study using a larger sample size to obtain more comprehensive data findings. The study explained 77.2% variation in performance of water service boards; there is a need for a study to be conducted on other factors that influence performance such as leadership style. The study focused on performance of water service boards; the study can be replicated in other organizations such as the Kenya Wildlife Service Board.

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