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Influence of Resource Allocation on Performance of Kigali Infrastructure Project

Cherissa Irakoze[1] & Dr. Samuel Wabala[2]
[1]Master of Science in Project Management, University of Kigali, Rwanda
[2]Senior Lecturer, University of Kigali, Rwanda

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Abstract

The effectiveness of resource allocation can be measured in terms of the extent to which it influences project performance. Due to project management requirements to deliver projects within the specified time, budget and that satisfy client needs it is imperative that resources are well allocated to ensure high project performance. Therefore, there is need for project managers to know what they need to make a project successful so that they can effectively plan out the optimal way to use those resources towards better performance of the projects. Thus, the aim of this study was the assessment of how the allocation of resources influences the performance of Kigali Infrastructure Project. This study determined how factors like the identification, estimation, the allocation and monitoring of resources are influencing the success of Kigali Infrastructure Project. The study was guided by the theory of project management, theory of constraints, the resource-based view theory, and the theory of change. A inferential survey design was adopted in this research. The target population was 155 project stakeholders consisting of 90 contractor's staff, 20 consultant's staff, 11 staff from MININFRA, 19 staff from City of Kigali and 15 staff from RTDA who were engaged in the phase 1 project within Kigali Infrastructure Project for the period 2021-2022. Selection of the sample was done using stratified random sampling. Semi-structured questionnaires were utilized in gathering of primary data. Analysis of quantitative data was done using descriptive and inferential statistics with use of Statistical Package for Social Sciences. A multiple linear regression model aided in indicating links between resources allocation and performance of Kigali Infrastructure Project. Resource identification, resource estimation, resource allocation and resource monitoring were found to have a positive and significant effect on project performance. The study concluded that a key benefit to resource identification is that it helps organizations to fulfill task specifications efficiently. Successful resource estimation allows in different ways to solve problems related to resource availability and job efficiency. Efficient resource allocation allows project managers prepare to allocate resources to the task and effectively manage them. Reporting requires daily tracking of key elements of project performance in terms of inputs, actions, and outcomes. The study recommended that project identification should be such as to cope efficiently with the project's needs. On resource estimation, the project should begin with a specified planning strategy and this method is likely to change as the plan progresses and changes take place. The aim is to stay informed and agile and to resolve as quickly as possible all estimates' issues. On resource allocation, the study recommended that project managers should be mindful of the scope of the project they are operating on, because the greater the nature of the project, the more they will decide how to distribute the money. On resource monitoring, the study recommended that project management during the

execution of the plan and should include cost-control strategies, deadlines and deliverables techniques, quality standards approaches and more. The study suggests that further studies should be carried out on how project resource management practices affect the performance of road projects in other regions of Rwanda.

Keywords: *Resource Allocation, Resource Identification, Resource Estimation, Resource Prioritization, Resource Monitoring & Adjustment, and Performance.*

1. Introduction

Performance of road infrastructure projects is essential for the economic growth and development of any country. These projects play a critical role in the economy in terms of wealth creation and provision of employment opportunities (Jekale,2004). Infrastructure covers a range of services, from public utilities such as power, telecommunications, water supply, sanitation and sewerage, solid waste collection and disposal, and piped gas; to public works such as roads, dams and canal works, railways, urban transport, ports, waterways, and airports (World Bank, 2012). Massive investments are put into infrastructure projects.The poor performance of road infrastructure projects exemplified through delays, poor quality and even cost overruns among other key performance indicators negatively impact on both the social and economic benefits to nations that would have accrued if the projects performed as planned (Kagiri & Wainaina, 2017)

Resource allocation refers to the process of assigning and distributing various resources, such as labor, equipment, materials, and finances, to different activities and tasks within a construction project. Effective resource allocation requires careful planning, coordination, and optimization to ensure that the right resources are available at the right time and in the right quantities (Ehsani & Farzaneh, 2019). When it comes to road construction projects, resource allocation decisions can significantly impact project performance and outcomes. The influence of resource allocation on road construction project performance has attracted considerable attention from researchers, practitioners, and policymakers in the construction industry (PMI, 2017). Several studies have been conducted to investigate the relationship between resource allocation strategies and project performance indicators, such as project duration, cost, quality, and client satisfaction. These studies have identified various factors that can affect resource allocation decisions, including project characteristics, resource availability, project scheduling, and stakeholder preferences ((Liu & Fan, 2019).

The performance of road infrastructure projects under devolved units has been a challenging concern across many nation's world over (Zakayo, 2017) and a mixture of results has been observed across nations. In Italy, Calamai (2009) points out that devolved road infrastructure governance has been constrained by countless financial resources challenges coupled with disparities in financial disbursements for road infrastructure projects across different devolved governments which resulted to 15% of regions facing road infrastructural challenges while others enjoying sufficient supply. However, in the Czech Republic, access to improved physical infrastructure had increased under devolution because of implementing better fiscal decentralization structures which led to timely funding of infrastructure projects by devolved units (Hemmings, 2013).

In India, the devolution of major road infrastructure projects led to development of India from a LDC to middle developed country in the early 1980s.In his study on the state of development in Asian countries, Alsuwaidi (2011) argues that India's development was tied to decentralization of its development projects. However, he argues that there is differentiated rate of development in India from one devolved unit to another due to various reasons chief among them resources constraints.

In Nigeria, road projects under devolved units were also faced with the problem of project delays and completion rate. With the road infrastructure having been devolved, there arose overrun in the costs of projects with concomitant repercussions of high costs of finishing projects as compared to the earlier sums (Omoregie and Radford, 2016). According to authors, out of every ten projects within Nigeria, seven of them were affected with delays during their implementation. In Tanzania, even though various reforms leading to devolved units had resulted in significant identifying, funding, and implementation of road projects (Tsekpo & Hudson, 2015), major county governments had been left behind at their comfort zones of development leading to imbalances in regional project developments which was linked to insufficient finances.

According to Adek (2015), major projects in the devolved units in Kenya have failed or taken longer than they should. In Bomet and Kisumu counties, lack of sufficient funds from both the national and county governments left about 60% of development projects not implemented. In the cases of Kwale, Kilifi, Embu, Taita Taveta, Garissa, Kitui and Kisii counties, up to 52% of the planned roads failed due to among other factors, limited resources, corruption and or embezzlement of funds. According to Musyoki (2018), 21% of the projects within counties have realized efficient and effective implementation, 45% of them are still struggling while the rest have failed or have been abandoned.

The Rwandan construction industry has occasionally been blamed for general poor quality and there is absolutely lack of general quality assurance in the industry (Dindi, M.A. 2004). In the face of all these challenges, resource planning and allocation is now deliberated to be one of the frontiers for cost lessening to advance curativeness and efficiency (Kasim et al,.2005). The Construction business is progressively turning to be cutthroat and noble organization norms are vital for those who want to remain competitive. However, the essential and desired site resource characteristics (resources attributes) of correct worth, accurate amount, exact period and realistic price are manifestly unusual on construction projects in Rwanda (Dvir, 2013). Can the Rwandan contractor/developer adequately allocate resources for specified tasks on the site? The research assessed the relationships between extent of resources Planning and construction projects performance in Rwanda resources attributes (availability, right quality, reasonable cost, minimal surplus, and minimal wastage) for concreting resources (ballast, Sand, Cement, steel, and water) on construction projects performance in Rwanda. Costly labor delays experienced due to the required quantity and quality of resources not being available could lead to increased price show scamper and overall delay in constructions project and could also affect the quality of the constructed facility (Westerved,2013). At worst, for the contracted projects, it could also lead to protracted legal battles and arbitration due to price and period over shots, and inferior class of project (Carlos et al., 2014).

These studies provide valuable insights into resource allocation strategies and their effects on road construction project performance. However, there is still a need for further research to explore additional aspects, such as the integration of technology and innovative practices in resource allocation for road construction projects. The proposed study aims to address this research gap by investigating the influence of resource allocation on the performance of road construction projects. By analyzing real-world case studies, survey data, and employing quantitative and qualitative research methods, this study seeks to provide a comprehensive understanding of the factors affecting resource allocation decisions and their influence on project outcomes. The findings of this study will contribute to the development of effective resource allocation strategies for road construction projects, enabling improved project performance and successful project delivery.

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Problem statement

The economic development of nations particularly developing countries is hinged on the performance of infrastructural projects (Calderon, Cantu, & Chuhan-Pole, 2018). These projects highly contribute to economic productivity and industrialization, increased job opportunities and poverty alleviation among other benefits. Nevertheless, the benefits accruing from these projects have been watered down by project failures with the World Bank (2010) revealing more accustomed failures than successes when it comes to implementing projects particularly in developing nations. Effective resource allocation is critical for the successful execution of road construction projects. However, there is a lack of comprehensive understanding regarding the influence of resource allocation on project performance (Jekale, 2004). This study aims to address this knowledge gap by assessing the relationship between resource allocation and the performance of road construction projects.

Odeck (2006) study investigates the factors influencing project cost estimation in the construction industry of Norway. While it does not directly focus on resource allocation, it provides insights into the challenges and considerations related to resource estimation, which can be relevant to resource allocation in road construction projects. Bubshait, Abdulaziz and Jarkas (2001) study explores critical factors influencing project performance in the construction industry of Saudi Arabia. While it does not specifically focus on resource allocation, it highlights the importance of effective resource allocation as a factor contributing to project success. Zayed, Tarek, et al (2018) Although this study primarily focuses on time and cost trade-offs in the construction industry, it emphasizes the significance of resource allocation as a key factor influencing project performance. It discusses the trade-offs that need to be considered when allocating resources to optimize project outcomes.

While there are studies examining various aspects of project management and construction performance, there is a lack of specific research on the influence of resource allocation on the performance of road construction projects. This study aims to fill this gap by focusing specifically on resource allocation in Kigali Infrastructure Project. By conducting empirical research, the study seeks to provide valuable insights into the relationship between resource allocation and project performance, leading to improved resource allocation and enhanced project outcomes.

Research objectives

The main objective of the study is to assess the influence of resource allocation on performance of Kigali Infrastructure Project

The study will be guided by the following specific objectives:

- To assess the influence of resource identification on the performance of Kigali Infrastructure Project.
- To determine the influence of resource estimation on the performance of Kigali Infrastructure Project.
- To examine the influence of resource prioritization and allocation on the performance of Kigali Infrastructure Project.
- To analyze the influence of resource monitoring and adjustment on the performance of Kigali Infrastructure Project.

2. Literature Review

This section reviews literature studies that have been undertaken and which highlight on ways of allocating resources in relation to their influence on the success of projects around the globe. The section is structured as guided by the study objectives.

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Resource Identification

Kasim et al,.2005 stated that the main factors impacting the projects performance is the undressed ways to identify the resources on the project, he concludes that it is significantly important to execute all available resources from the prepared stages to the constructions stage. Lowly identification of constructions resources impact all step of projects performance in term of schedule, financials, budgets, quality and productivities, the wastages of projects resources should be also reduced in the constructions activities in order to prevent the losses of income for constructions company (Nagapan et al., 2012).

More strategies of resource practices are highly appreciated in the fast tracks of constructions project to enhance and promote the service delivery of productivity (Hemsworth et al,.2006) who indicated that standardizations of resources of the project played a big role in the paying departments decisions. Resource managements are made challenging by resources shortage, delay in supplying, cost fluctuation, damaging and waste management, insufficient space for storing all materials (Kasim et al.,2005) therefore there is need of the well-developed strategies including more information technologies to manage resources in different constructions project.

A challenges faced constructions project is resource and materials poorly managed and delay of most of projects activities therefore there is a need of creation of decentralized, coordinated, controlled tracking and good monitoring system of resource managements in the companies and the site oriented, proper awareness and accountable system may be created within the companies with the respect of 3M(Money, Machine ,Manpower) in the constructions are very important(Meghani et al.,2011).

Resource Estimation

Plenert and Best (2012) investigated how resource level affects project success. A survey of construction companies was conducted as part of the study. Most of the JIT cost benefits happened when inflation surged, resulting in considerable increases in the cost of carrying inventory, according to the study. According to the report, businesses must be able to focus their estimation solely on the supplies required and when they are required. The study was unable to demonstrate a clear link between resource estimation and project success.

Kress (2014) used a survey design of chosen construction businesses to investigate the influence of resource estimation on project performance. The study focused on construction projects in London that were not completed on time. According to the findings, project management's primary purpose is to meet or surpass the resource consumption sponsors' expectations for the project. These expectations are typically articulated in three groups, according to the research: A project creates the best product with the fewest defects. The anticipated cost determines the ideal outcome of a project. Schedule: A project's goal is to achieve the intended result in the time allotted. Various factors engaged in and aiming to steer projects off course, on the other hand, were not considered in the study.

Telsang (2014) investigated the project estimation process and its impact on project performance. The study employed a descriptive research design. This research focused on initiatives in India. According to the findings, estimation defines the actions and activities, as well as cost and time targets and performance milestones, all of which contribute to successful project implementation and accomplishment of project objectives. According to the findings, the estimation must specify the human resources, equipment, materials, and facilities, as well as any other resources, needed to complete the project. Investing resources and planning of time does not necessarily ensure a favorable outcome. It rarely works that way because, no matter how precise the planning process was, the unexpected happens often.

According to Ibn-Homaid (2012), who conducted a comparative analysis of construction and manufacturing materials management, the project manager is responsible for the project's planning, organization, and supervision. In turn, the project manager is given power by the organization's management to mobilize the resources needed to finish a project. In terms of material management, the lack of material on site has been highlighted as one of the most common and significant causes of construction project delays. Vrijhoef studied the four functions of supply chain management in construction, while Koskela (2010) discovered that operations management consists of centralized plan design, revision, and implementation. This management paradigm assumes a strong causal link between management activities and organizational outcomes. Plan formulation becomes synonymous with action when people believe that putting a plan into action is just a question of issuing "orders."

Resource Prioritization

Engwall and Jerbrant (2013) analyzed the resource allocation syndrome within the context of managing multiple projects. The study was anchored in qualitative case studies. Interdependencies among projects and lack of resources were pointed out as key concerns in multi-project environments. Competition between projects called for setting priorities and at times resource reallocations. It was established that many projects suffered from short run problem solving which significantly contributed to project delays. Due to inadequacy in allocation of resources, majority of them did not meet the project goals and many lagged their schedules. However, the study used qualitative case studies hence a gap in the method of study as the current will rely upon the design of descriptive survey.

Bulle and Makori (2015) explored the role of resource allocation in the performance of projects carried out by Kenya Urban Roads Authority. The research relied on a descriptive study design. As per the study, allocating financial, physical, and human resources to projects affected their performance. Resource allocation affected the speed and quality of project delivery ensuring that the cost specifications were observed as outlined in the project plans. The study laid emphasis on the sufficiency of resource allocations in enhancing and sustaining project performance. When the resources are appropriately allocated and utilized, there was an assurance of efficiency and effectiveness of projects resulting to superior project outcomes. However, the contextual background of this study looks on projects undertaken by KURA while this study highlights on road projects within Kigali Infrastructure Project.

Anunda (2016) assessed the issues that affected the success of projects of HIV/AIDS which were being executed by NGOs within Nairobi County. A descriptive research design was used. Allocating adequate funds and drawing many donors and partners impacted on the success of these endeavors. According to argument of this study, majority of NGOs implementing the projects under study lacked adequate financing. Dedicating sufficient allocations of monetary and non-monetary resources was a fundamental factor in successfully implementing project plans. It was learnt that many projects ran out of resources before they were completed. However, the contextual setting of this study varies and focuses on different projects from the ones considered in this current study.

Gashuga, Kule, and Ndabaga (2016) evaluated how the management of funds affected project performance in Rwanda focusing on a case of Dairy Community Processing Center Project Burera District. This study made use of the design of descriptive correlation. Findings indicated that funds allocation improved project delivery and hence project performance. The study noted that the allocation of funds minimized administrative costs, it resulted to enhanced prediction of project efficiency and reduced the minimized the general project risk. It was further discovered that the allocation of project funds enhanced the proper usage of resources.

However, the contextual setting and method used in the study varies from the one which will be employed in this study.

Murithi, Makokha, and Otieno (2017) assessed factors affecting timeliness in completing projects of construction of the public within the county of Trans-Nzoia in Kenya. A descriptive survey design of research was used. Results highlighted that allocation of resources within the project was significantly influencing the timely completion of public projects of construction. Allotting of sufficient resources affected project success. Challenges related to finances and payment of works that had been completed had really resulted to delayed projects. Lack of adequate resources led to delays in procuring construction materials. However, the contextual setting of this project varies from the one being focused and only looks at one aspect of project performance which is time performance contrary to the current one which looks at other aspects of delivery of projects such as cost and quality.

Mogaka (2017) analyzed the linkage between the procedures in disbursing funds and how health projects that were funded by donors in Nairobi County were being implemented. A descriptive survey design was adopted. It emerged that allocating resources positively and significantly impacted the execution of these projects. Resource allocation as argued in the study aided in assigning resources to tasks throughout the life of the project. The study underscored the urgency of sufficient allocation of project resources in implementing the projects. The study laid emphasis on adequate training of project personnel, disbursement of project resources on time. According to the study, when projects kick off, at times there can be cases of over-allocation of resources or even competition of resources among different projects and tasks. However, the projects considered in this study differ from the ones being examined in this current study.

Njiru (2018) evaluated the connection between project management practices and implementing projects within the firms of manufacture within the county of Nairobi. The study relied upon a descriptive design of research. There was a positively significant link between allocation of resources and project implementation. Allocating resources assisted project managers to marshal project teams with great productivity and efficiency in undertaking tasks which enabled them to assess project schedules and certainly appraise resource availability with immediate effect. However, the study focused on projects undertaken privately by manufacturing firms which are different from road projects within Kigali Infrastructure Project hence there cannot be any generalization of findings.

Resource Monitoring and Adjustment

Mosago (2013) assessed impacts of financial monitoring on success of programs undertaken by international NGOs in Kenya. A mixed methods research design was used. There was a positive link between financial monitoring and program performance for INGOs. The study underscored that the program performance for INGOs could be greatly improved if on site visits, financial desk reviews and periodic financial review meetings were conducted. Financial monitoring needed to be conducted frequently. Thorough monitoring, reorienting and intensifying monitoring greatly contributed to more cost-effective, socially effective, and successful programs. Financial monitoring reduced the chances of funds being misallocated as they were utilized for the core business of the program's existence. However, the contextual setting of this study varies as it focuses on projects which are different from the one being undertaken.

Ochieng (2014) investigated the degree to which resource management influenced the execution of projects undertaken by mobile communications firms within Kenya. Study relied upon the design of descriptive survey. Investigations revealed that enough efforts to monitor

and control the project resources ensured that project funds were spent appropriately as planned and with proper authorization. The study noted that the tools for monitoring progress and how often financial auditing and reporting were undertaken helped to eliminate waste and served as a performance monitoring tool. Financial auditing was found to be very important in assessing the process and system used in capturing and reporting project costs. However, the study focused on projects undertaken privately by mobile communications firms which are different from Kigali Infrastructure Project hence the findings of the study cannot be automatically generalized to fit the case under study.

Kamwana and Muturi (2014) evaluated the level of success of projects which were financed by World Bank in particular KPLC projects was impacted by financial monitoring. A descriptive study design was applied. It was established that the monitoring of financial resources channeled to these projects was positively and significantly influencing success of the projects. It was highlighted that monitoring the funds enhanced their wise usage for the envisioned purposes and enhanced the creation of value for the beneficiaries. Financial resource monitoring ensured that cases of diversion of project resources to other purposes and interests outside the project scope and work plans were minimized. Monitoring how the resources were used ensured that projects were implemented in accordance with the set budget and time frames. The study underlined the role of unexpected audits where there was suspicion of resource misuse by financiers. However, the contextual setting of this study varies and focuses on different projects from the ones considered in this current study.

Jha and Iyer (2016) assessed the significant dynamics that affected the quality projects in the industry of construction within India. The study made use of the design of descriptive survey. It emerged from the research that appropriate monitoring of project resources and provision of feedback that was timely regarding assisted in the supervision of the level of workmanship in executing the projects which improved their quality. Ensuring that all cases of inappropriate use of project resources, whether material, labor, plant and machinery or finances were monitored well, and reporting done on time, the anticipated project quality was attained. However, the study was carried out in a different setting and focuses on different projects from those considered in this study hence a contextual gap.

2.1 theoritical framework

Theories forming the basis of the study are discussed in this section. These theories consist of the theory of project management, theory of constraints theory of resource-based view. The main premises of the theories are highlighted and their relevance to the study outlined.

Theory of Constraints

This is a theory by Goldratt (1984), which maintains that a system is faced by constraints that limit it from achieving its objectives. Some of these limiting factors emanate from production, planning, production control, managing a project, logistics, accounting, and measurement of performance and other paths of business which might impact on performance. In this theory, constraints define the output of a given system whether they are recognized. The aim of the top management is finding appropriate ways to minimize the constraints of a system in the organization. This way the organization can effectively be able to realize its goals and maximize profits.

This theory describes the causes of the system constraints and sheds light on the best ways to deal with these constraints (Goldratt, 2006). An organization operates with the help of systems.

A system can be described as a collection of independent and interrelated process which works together in generating outputs from inputs when pursuing certain goals. The limitation for this system is a constraint which prevents the system from its efforts of achieving organizational goals (Noreen, Smith,& Mackey, 2008).

Theory of constraints is applicable in this study since the identification, estimation, allocation and monitoring of project resources are constraints that face project teams when carrying out road infrastructure projects. The best way to handle such kind of a problem is to find ways of countering these challenges to remove barriers in implementing road projects (Ruhl, 2011). Resource allocation is an important aspect in executing road projects and should be undertaken in an effective manner to improve success of these endeavors. Among the impediments affecting success of projects are inadequate resources that are poorly allocated to project tasks. These limitations highly contribute to failure of project completion resulting into inefficiencies and delays which might result in increased costs of projects. However, the supporters of this theory; Noreen et al. (2012) put more emphasis on the significance of project teams identifying the limitations and establishing effective ways to deal with these limitations at early stages to reduce their impact on road projects.

Within this study, this theory guides not only the overall study objectives but also the specific ones as well. First, this theory is crucial in addressing the dependent variable which is project performance. For Kigali Infrastructure Project to perform well, it is necessary to lessen the constraints that can otherwise diminish the project outcomes such as the quality of roads constructed. These constraints may pertain to how the project resources are allocated in terms of their identification, estimation, allocation, and monitoring, among others. This theory underlines the necessity of the project management to identify these project constraints that are likely to limit the projects' performance and taking the necessary measures on solving these constraints. This theory therefore will guide the assessment of the issues pertaining to resource allocation that might affect the success of Kigali Infrastructure Project.

Resource Based View Theory

This is a theory by Barney (1991) which indicates that the possession of resources which are strategic provides a given organization with a superb chance of creating a competitive advantage over their rivals. This competitive edge can aid the organization in enjoyment of unassailable profits as when compared to similar competing groups. Managers of projects have a role of utilizing resources which are made available throughout the cycle stages of a project in ensuring their success as compared to implementation of projects of other institutions as follows; identification and classification of the resources within the firm, estimation of capabilities and vulnerabilities in relation to their rivals, identification of opportunities in ensuring that resources are utilized in a better way, identification of capabilities of the firm, assessing the ability of resources to generate rent and how capable they are in terms of maintaining sustainability, selection of a the best resource exploitation strategy within the firm in relation to its rivals and identification of gaps in the resources that need to be bridged (Johnstone & Brenman,1996). This theory is an exploration of the desire for the right form of planning and implementation of projects based on availability of resources. Based on this, management makes use of the readily obtainable resources and utilizing them for maximum success of projects in place. This theory is thus fundamental as it stresses on the correct form of identification, estimation, allocation and monitoring of project resources towards ensuring that projects are successful.

Resource Dependence Theory

This study was based on resource dependence theory by Pfeffer and Salancik (1978). The theory describes projects as being exposed not only to internal but also to external contingencies. The contingencies arise because projects depend on the resources of its environment which are necessary for the project organization to exist and excel in successful completion of projects. External factors can control these resources to a certain degree which can influence the behavior of project team members and build external dependence.

To increase control of power over resources and ensure successful completion of projects, project organizations try to minimize their own dependence or increase the dependence of others on themselves (Ulrich & Barney, 2014). In doing so, resource dependence theory proposes theoretically and empirically that project organizations concentrate more on resources which are critical for their long-term survival. A good portion of the work by Pfeffer and Salancik (1978) concentrates on how a project organization can manage resource dependence on its environment to ensure a successful outcome.

The theory is important because an organization's ability to gather, alter and exploit raw materials faster than competitors can be fundamental to success. Resources are often controlled by organizations not in the control of the organization needing them, meaning that strategies must be carefully considered to maintain open access to resources

Theory of Change

Huey Chen, Peter Rossi, Michael Quinn Patton, and Carol Weiss created the idea of change in 1995. The focus of this idea is on how to bring about change and who should be held accountable for it. The general logic is employed in an intervention using logical models, which are frequently used to illustrate program theory. The theory belongs to the field of applied development evaluation and theory of change. For numerous years, the proponents of this idea focused on how to connect program theories to evaluation, according to Weiss. For many years, program theory has been a useful instrument in monitoring evaluations; the theory is known for its conclusive mechanism for resolving difficulties, and it addresses the need to supplement the findings with our assessments.

It also gives you the tools you need to keep an eye on the most important aspects of your evaluation (Sethi and Philippines, 2012). Human service programs are created to build societal demands, and they are dynamic and subject to change based on predetermined scenarios in a number of organizations' transactions. As a result, logical framework technique is used in the program theory. A more complete form of the logic model is the program theory. To link to the logical concept, it was given as a pictorial scale. The logical model aids stakeholder interaction, senior management, and outcome evaluation (Hosley, 2009). The theory is expected, as is a realistic example of how a hypothetical program would work (Bickman, 2007). It is a proposition, according to Lipsey (2011), in terms of input to output transformation. The transformation is measured by comparing the input and predicted output. It depicts how the program's components are meant to influence the outcomes.

According to Rossi (2012), the theory comprises of an organizational plan on how to deploy resources and arrange program activities to ensure that the planned service system is developed and maintained. The idea also helps with budgeting and analyzing how the target folks receive the necessary assistance. The interconnectivity of service delivery systems allows this to happen. Finally, the theory explains how specific target people's intended activities match to expected social gains. Uitto (2010) demonstrates the benefits of using a theory-based

framework in monitoring and assessment. It requires being able to link project outcomes to specific projects or activities, as well as identifying expected and undesired program outcomes. As a result, theory-based evaluations enable the evaluator to have a deeper understanding of why and how the program is working (Rossi, 2012).

3. Research methodology

The study adopted correlation design in order to collect and interpret data. Therefore, both quantitative (questionnaire) and qualitative (interview) research techniques were used by the researcher in order to collect data (information) related to the objectives of the study and for data analysis.

The target population of this study was 155 project stakeholders consisting of 90 contractor's staff, 20 consultant's staff, 11 staff from MININFRA, 19 staff from City of Kigali and 15 staff from RTDA who were engaged in the phase 1 project within Kigali Infrastructure Project. Getting the views of various parties engaged in the execution of Kigali Infrastructure Project will enable the researcher to gather objective data related particularly to the allocation and success of Kigali Infrastructure Project which are pertinent issues touching on Kigali Infrastructure Project. A table by Krejcie and Morgan for establishing the size of the sample by applying a 5% degree of accuracy or 95% confidence level was used. Using the Krejcie and Morgan table as shown in Appendix I, 73 contractor's staff, 19 consultant's staff, 11 staff from MININFRA, 18 staff from City of Kigali and 14 staff from RTDA were sampled. Both primary and secondary data sources were utilized, with primary data collected through questionnaires and key informant interviews. Secondary data were obtained through a documentary review process.

The research instruments were tested for validity and reliability. Questionnaires, as a primary data collection method, were designed to align with the research objectives, utilizing a mix of close-ended and open-ended questions, primarily based on a Likert scale. Documentary review supplemented the primary data collection process, enhancing the depth of information acquired. For reliability, the Cronbach's alpha values for various variables were calculated, all surpassing the acceptable threshold of 0.7, indicating strong internal consistency. Editing, coding, and tabulation processes were employed to ensure data quality, consistency, and organization.

Data analysis involved Statistical Package for Social Science (SPSS V 21.0) for quantitative analysis. Inferential statistics, including Pearson correlation analysis and multiple regression analysis, were conducted to establish relationships between resource allocation and performance of Kigali Infrastructure Project. Ethical considerations were a priority, ensuring confidentiality by avoiding the disclosure of respondents' identities and maintaining strict confidentiality of sensitive information throughout the study.

4. Findings

This section shows the findings of this research by presenting it from analysis. Where this is required, interpretations are provided after each table, always taking into consideration the initial research questions. This section thus establishes the ground up on the research questions were answered before drawing conclusion. The analysis was made on the responses obtained from 135 project stakeholders.

Correlation analysis Results

The correlation matrix presented below provides valuable insights into the complex interrelationships among Resource identification, Resource estimation, Resource allocation,

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Resource monitoring. This matrix quantifies both the strength and direction of the connections between these crucial variables, offering a clearer understanding of their interconnected nature.

Table 1: Correlations

		Resource identification	Resource estimation	Resource allocation	Resource monitoring
Resource identification	Pearson Correlation	1	.679**	0.117	0.137
	Sig. (2-tailed)		0	0.16	0.1
	N	145	145	145	145
Resource estimation	Pearson Correlation	.679**	1	.325**	0.124
	Sig. (2-tailed)	0		0	0.138
	N	145	145	145	145
Resource allocation	Pearson Correlation	0.117	.325**	1	.803**
	Sig. (2-tailed)	0.16	0		0
	N	145	145	145	145
Resource monitoring	Pearson Correlation	0.137	0.124	.803**	1
	Sig. (2-tailed)	0.1	0.138	0	
	N	145	145	145	145

Source: Field data (2023)

The results in Table 1 indicates that resource identification strongly correlates with resource estimation as shown by the Pearson r value of 0.679(67.9%). This means that identification of resources leads to better estimation of the resources and vice versa. This agrees with Shadrack (2018) study that discovered that even though resource identification in the industry was used to a great extent, much of it was non-structured. Li et al. (2008) study revealed that resource estimation was fundamental in providing project estimates that were effective besides enhancing efficiency in using project resources.

The Pearson r value of 0.803(80.3%) indicates that resource allocation and prioritization is strongly correlated with resource monitoring. Therefore, it can be concluded that better allocation and prioritization of resources leads to effective monitoring. Gashuga et al. (2016) study that noted that the allocation of funds minimized administrative costs, it resulted to enhanced prediction of project efficiency and reduced the minimized the general project risk. Ochieng (2014) study revealed that enough efforts to monitor and control the project resources ensured that project funds were spent appropriately as planned and with proper authorization.

Regression Analysis

The study also wanted to establish the relationship between resource allocation and performance of Kigali Infrastructure Project. Multiple regression analysis was used to identify the coefficient of model, the analysis of variance (ANOVA) of the model, The section also presents the coefficient of determination.

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Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.835[a]	0.712	0.687	0.781

a.Predictors: (Constant), resource identification, resource estimation, resource prioritization and allocation and resource monitoring

The adjusted R^2, also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. Therefore, the four independent variables (resource identification, resource estimation, resource allocation and prioritization and resource monitoring) that were studied, explain 68.7% of the performance of KIP as represented by the adjusted R square. This therefore means that other factors not studied in this research contribute 31.3% of the project performance. The results also show a significant R square change ate 0.112 and F-change at 4.447 which shows a significant improvement of the prediction. The model is also significant at p value of 0.002 which is less than 0.005.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.806	4	2.702	4.427	.002[a]
	Residual	85.442	140	0.61		
	Total	96.248	144			

a. Dependent Variable:Performance of a project

b. Predictors: (Constant), Resource identification, Resource estimation, Resource prioritization and allocation and Resource Monitoring

The p-value is 0.002[a] which is less that 0.05 thus the model is statistically significance in predicting how resource identification, resource estimation, resource allocation and prioritization and resourcemonitoring influenced the performance of KIP. The F calculated at 5% level of significance was 4.427. Since F calculated is greater than the F critical (p value =2.702), this shows that the overall model was significant.

Table 4 Regression Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.522	0.635		4.604	0
	X1= Resource identification	0.765	0.155	4.049	1.417	0.001
	X2= Resource estimation	0.887	0.206	1.237	1.881	0
	X3= Resource allocation and prioritization	0.766	0.081	3.317	2.045	0.003
	X4= Resource monitoring	0.565	0.08	1.305	2.08	0.001

a.Dependent Variable: Y= Performance of Kigali Infrastructure Project

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The established regression equation by the study was:

$$Y = 0.376 + 0.828X_1 + 0.678X_2 + 0.703X_3 + 0.503X_4$$

Where Y = Project Performance

X_1=Resource Identification

X_2=Resource Estimation

X_3=Resource Allocation

X_4=Resource Monitoring

From the above regression model, holding all the independent variables studied constant, performance of KIP would be 0.522. As shown in table 4 resource identification, resource estimation, resource allocation and prioritization and resource monitoring had a positive and significant effect on performance of KIP as indicated by t-values. The relationships ($p < 0.05$) are all significant with resource identification ($t= 1.417$, $p < 0.05$), resource estimation ($t = 1.881$, $p < 0.05$), resource allocation and prioritization($t = 2.045$,$p < 0.05$) and resource monitoring ($t = 2.080$, $p < 0.05$). Resource estimation was found to have a greater (88.7%) on the performance of road projects in KIP compared to resource allocation (76.6%), resource identification (76.5%) and resource monitoring(56.5%).

The study established that resource identification had a positive and significant effect on project performance by beta value ($\beta= 4.049$, $p < 0.05$). This is in line with Kumari and Vikranth (2012) study found that these projects suffered from underutilized resources which were attributed to lack of detailed and thorough identification and absurd decision making in site management.

The study revealed that that resource estimation had a positive and significant effect on project performance by beta value ($\beta= 1.237$, $p < 0.05$). This is in agreement with Dong *et al.* (2008) study that revealed that resource estimation was fundamental in providing project schedules that were effective besides enhancing efficiency in using project resources.

The study established that resource allocation and prioritization had a positive and significant effect on project performance by beta value ($\beta= 3.317$, $p < 0.05$). This is supported by Engwall and Jerbrant (2013) study which established that many projects suffered from short run problem solving which significantly contributed to project delays.

The study established that resource monitoring had a positive and significant effect on project performance by beta value ($\beta= 1.305$, $p < 0.05$). This is in agreement with Ochieng (2014) study that revealed that enough efforts to monitor and control the project resources ensured that project funds were spent appropriately as planned and with proper authorization.

5. Conclusion

The study concludes on resource identification that a key benefit to resource identification is that it helps organizations to fulfill task specifications efficiently. Project managers should recognize skill shortages or criteria for learning, helping to mitigate potential possible asset tensions or negative effects. Identification requires people to be assigned to work based on a number of specific factors such as their capacity, expertise and position for project managers will always be certain that they have the right person for the right job.

The study concludes on resource estimation that successful resource estimation allows in different ways to solve problems related to resource availability and job efficiency. The

allocation of capital lets you coordinate all things to prepare and complete the project efficiently. Efficient use of assets to accomplish the project on time and within the allotted budget is an important aspect of any project estimation management.

The study concludes on resource allocation and prioritization that efficient resource allocation allows project managers prepare to allocate resources to the task and effectively manage them. Allocation of resources allows you to realize who is overwhelmed and who at that moment is available. Without much workload, you can assign tasks to the available resource. Proper allocation of resources will help you identify the role of group member (s) or employee(s) in a specific task and make it easier for you to delegate assignments based on their availability.

In terms of resource monitoring, the study concludes that reporting requires daily tracking of key elements of project performance in terms of inputs, actions, and outcomes. Good evaluation helps to know whether the expected goals are being accomplished as anticipated, which steps are needed to achieve the intended results during the implementation of the project, and whether these measures have a positive impact on the execution of the project.

6. Recommendations

In the data analysis and interpretation as shown in above discussion, the study sought to come up with the following recommendations in line with the research objectives as given below.

The study recommends on resource identification that according to job and efficiency requirement, more workers during busy hours, and fewer staff at slower times, different approaches to task scaling and planning on asset allocation, project managers should be mindful of the scope of the project they are operating on, because the greater the nature of the project, the more they will decide how to distribute the money, project management during the execution of the plan and should include cost-control strategies, deadlines and deliverables techniques, quality standards approaches and more.

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