Resource Tracking and Implementation of Healthcare Projects in Makueni County, Kenya

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ABSTRACT

Resource tracking is the process of collecting and analyzing information about the use of resources over time and resource monitors are tools that track and manage the use of resources like storage, compute power, and other system components. The study examined the influence of resource tracking on implementation of healthcare projects in Makueni County, Kenya. The study was grounded on theory of change and adopted correlational research design to investigate relationships between variables without the researcher having the latitude to vary any of them, thus facilitating the possibility of predicting causal relationships. The first level target population of this study was six programs in which healthcare projects were being implemented in Makueni County, Kenya. The accessible population was made of project managers and project team members deployed across the programs and the complement was three hundred and twenty four (324), from which a sample of one hundred and twenty two (122) was derived using Nasiurma (2000) formulae. Proportionate stratified random sampling technique was used to select respondents and questionnaires were based on five-point Likert scale and were distributed through drop and pick-up method. Statistical Package for Social Sciences (SPSS) version 26 was used for data analysis. The study carried out standard bivariate regression analysis and derived descriptive and inferential statistics. F-test (ANOVA) was undertaken to determine the statistical significance of the study variables and also aid in making inferences for the study. The study determined that resource tracking had a significant influence on implementation of healthcare projects. The study recommended that project managers needed to monitor resource usage to identify any inefficiencies in the process.

Key words: Implementation of Healthcare Projects, Project Resource Planning, Resource Tracking

INTRODUCTION

Project resource planning is a strategic discipline that involves planning, allocating, and managing resources within an organization to ensure the successful execution of projects (Thomas & Amhana, 2024). These resources may include human resources, equipment, materials, budget, and more. The approach is designed to help businesses optimize resource utilization, enhance project efficiency, and ultimately improve their bottom line.

Resource tracking denotes all aspects of monitoring resource usage, availability, and performance during a project's lifecycle. It entails gathering and evaluating data on how resources are used in order to make informed decisions about resource allocation, scheduling, and optimization. It requires monitoring how team members allocate their time across projects and tasks, distinguishing between billable and non-billable hours, and comparing actual time spent to estimates. Project managers in the healthcare sector can have better resource allocation by enabling careful initiative prioritization, preventing overload, and promoting flexible completion timing to maximize value delivery (Schumacher & Schumacher, 2023).

The implementation phase involves putting project plans into action and the project manager coordinates and directs resources to meet the objectives of the project plan. As the project unfolds, it is the project manager's job to manage each activity and very step of the way. During implementation phase, the project team does the project work to produce deliverables which entail what is delivered by the project including all the products or

services that the project team performs for the client, including all the project management documents that are put together(Sunny *et al.,* 2024).

Statement of the Problem

Healthcare provision remains a pressing issue in Kenya, both because the available resources are insufficient in spite of government's fiscal effort with the consequence of inadequate resource allocation. Health expenditure in rural areas represents approximately 40% of government's spending on health, yet the majority Kenyans live in these rural areas (African Development Fund, 2023). Health projects have been identified as key in driving health growth in the health sector, and the millennium development goals (MDGs) can only be achieved if the healthcare systems are improved at all levels or regions in the country.

According to the Controller of Budget Report of the financial year 2023/2024, Makueni County received approximately 95% of the Transforming Health Systems for Universal Care allocated funds (THS-UC) which was transferred in two tranches, in the second and third quarters of financial year 2023/2024. The first tranche of Shs. 68.9 million was transferred from the National Treasury to the operations account at the end of the quarter and then to the projects account in early January 2023. The second tranche of Kshs.84 million was transferred to the operations account in the first half of March 2023. The County had to absorb funds within a short period of time and therefore the quality of implementation of projects was mostly compromised (Kyuvi, 2023).

Aubry *et al.,* (2023) evaluated governing major projects in healthcare. Musyoki (2023) examined organizational reporting systems and implementation of donor funded health projects in Makueni County, Kenya. Kamau *et al.,* (2024) studied drivers of universal health coverage in Makueni County, Kenya with lessons for the Global South. With a paucity of studies focusing of thematic elements of project resource planning, this study seeks to fill that gap by assessing the influence of resource tracking on implementation of healthcare projects in Makueni County, Kenya.

Research Objective

The overall objective of this study was to establish the influence of resource tracking on implementation of healthcare projects in Makueni County, Kenya..

Scope of the Study

The study's focus was healthcare projects that were being rolled out in six programs in Makueni County, Kenya as at end of 2024, and they formed the unit of analysis. The accessible population was made up of project managers and project team members whose compliment was three hundred and twenty four (324) and formed the unit of observation.

LITERATURE REVIEW

Theoretical Review – Theory of Change

Weiss (1995) developed a methodology for planning, participation, adaptive management and evaluation that is applied in companies, philanthropy, not-for-profit organizations, international development, research, and government sectors to promote social change (Edeigba & Singh, 2022).

The theory defines long-term goals and maps backward to identify required preconditions, hence clarifying the process of change by delineating causal linkages in an initiative in terms of its shorter-term, intermediate, and longer-term outcomes (Belcher *et al.,* 2024).

The development of the theory of change is directly under the purview of the project manager, who also supervises the work of internal staff and external evaluators (Sibanda, 2022). Regardless of the degree of direct involvement, the project manager makes sure that decisions regarding the procedures utilized to create and present the theory of change, hence it aptly explains resource tracking as the independent variable of the study.

Conceptual Framework

The conceptual framework shows the relationship and linkage between the independent variable resource tracking and the dependent variable being implementation of healthcare projects in Makueni County, Kenya.

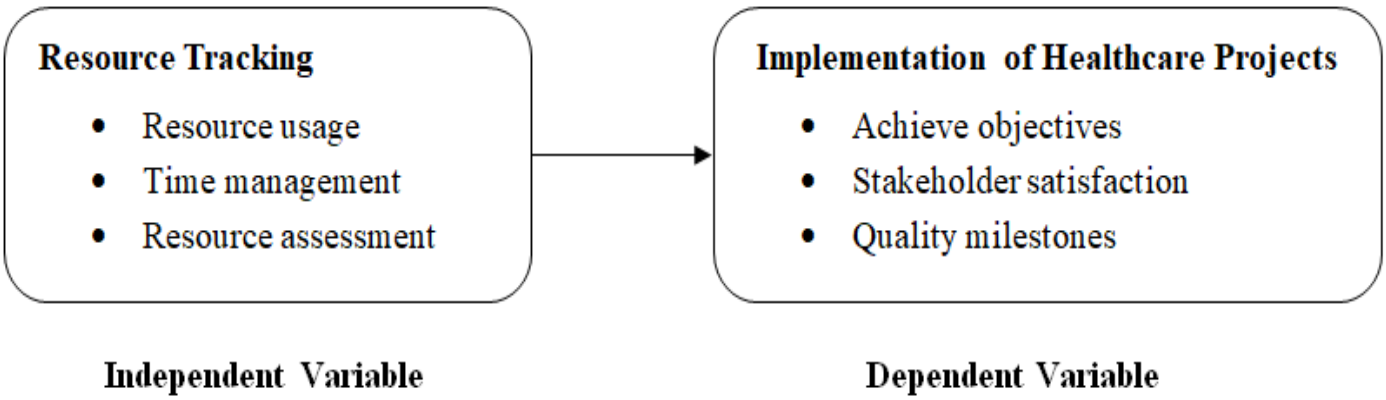

Figure 1: Conceptual Framework

Discussion of Study Variables – Resource Tracking

Resource tracking is the process of collecting and analyzing information about the use of resources over time and resource monitors are tools that track and manage the use of resources like storage, compute power, and other system components (Prasad *et al.,* 2023). Resource tracking can help project managers identify potential risks and take action to mitigate them. If a project is at risk of going over budget, resource tracking can identify where resources are being overused, and managers can adjust resource allocation to bring costs back in line.

By tracking the use of resources, project managers can identify areas where performance can be improved, such as where resources are being underutilized or where tasks are taking longer than expected (Iroha *et al.,* 2024). With this information, project and resource managers can make adjustments to improve project performance and achieve better outcomes. Resource reporting can provide valuable information for communicating with stakeholders.

Resource tracking helps in making informed decisions about where to allocate project resources and ensures that the best use of project assets is made and not overloading certain teams or individuals while others remain underutilized. By keeping a close eye on the team's workload, resource tracking can help in preventing employee burnout (Moran, 2022).

Implementation of Healthcare Projects

The implementation phase involves putting the project plan into action and it is here that the project manager coordinates and directs project resources to meet the objectives of the project plan (Mithileni, 2022). As the project unfolds, it is the project manager's job to direct and manage each activity, every step of the way. That is what happens in the implementation phase of the project life cycle where the plan is followed to put together and handle any problems that come up.

The steps undertaken to build each deliverable vary depending on the type of project being implemented, in this case healthcare projects. In other disciplines such as engineering and telecommunications projects focus on using equipment, resources, and materials to construct each project deliverable (Manata *et al.,* 2022).

The implementation phase keeps the project plan on track with careful monitoring and control processes to ensure the final deliverable meets the acceptance criteria set by the customer (Morris, 2023). This phase is typically where approved changes are implemented. Most often, changes are identified by looking at performance and quality control data. Routine performance and quality control measurements should be evaluated on a regular basis throughout the implementation phase.

Empirical Review

Smith (2023) examined computer vision-based asset management in project management using machine learning for real-time resource tracking, noting that the increasing complexity of project management necessitated the adoption of innovative technologies to streamline processes and enhance decision-making. The application of computer vision in tracking physical assets within project management was examined, emphasizing how machine learning models could provide real-time insights into resource allocation.

Zhao *et al.,* (2021) reviewed real-time resource tracking for analyzing value-adding time in construction and the purpose of the study was to test the applicability of a real-time tracking system for collecting data for production control in different types of construction projects. The findings showed that both location-based and time-based information of workers could be obtained in real time from the proposed system, but issues of accuracy and coverage needed to be considered when defining the data collection plan for each project.

Adjagba *et al.,* (2024) examined strengthening health financing at sub-national level in Kenya focusing on stakeholder and needs mapping through a mixed methods approach. The findings showed that organizations reportedly provided health financing support to counties with planning, budgeting and health financing advocacy being the most supported work streams by partners. While each county had more than one partner supporting health financing activities, the western counties had more partners compared to other regions of Kenya. Whereas partner support was well acknowledged at the county level, there was a lack of coordination and alignment of partner activities with county priorities.

Critique of Literature Review

Most of the reviewed studies were conducted in developed countries (Pratama *et al.,* 2023; Sravanthi *et al.,* 2023; Aghileh *et al.,* 2024; Isah and Kim, 2021) hence causing a paucity of studies that were carried out under local dynamics and most especially those focusing on project resource tracking and its influence on implementation of healthcare projects.

Ntinyari & Nyang'au (2024) studied project resource management practices and performance of donor funded health projects in Nairobi City County, Kenya. Karuga *et al.,* (2024) studied project staff scheduling and performance of road construction projects in Nairobi Metropolitan, Kenya. Adjagba *et al.,* (2024) examined strengthening health financing at sub-national level in Kenya focusing on stakeholder and needs mapping through a mixed methods approach. These studies amongst others were confined to various aspects of project performance but none was geared towards implementation of healthcare projects especially in Makueni County, Kenya.

There is a general lack of research references measuring the combined influence of various critical elements of project resource planning on implementation of healthcare projects, and the reviewed studies took a non-specific approach to examining the influence of project resource planning on performance of various projects across organizations (Isah *et al.,* 2021).

Research Gaps

Management of project resources has become a major component of project management as a core area in many countries around the world. It has long been held that promoting project quality for sustainable development requires incorporating all aspects that are geared towards managing project resources. However, sufficient research has not been done to ascertain the extent to which project resource tracking influences implementation of projects especially in the healthcare sector.

Based on the reviewed literature, project resource planning is becoming more and more crucial for advancing sustainable project management and overall project success. Researchers have emphasized the advantages of continuously better managing of project resources, especially with regard to the ways in which it fosters shared ownership, transparency, and responsibility.

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RESEARCH METHODOLOGY

Research design denotes the overall strategy for conducting a research study in order to scrutinize specific testable research questions. Fellows and Liu (2021) defined a research design as a framework and procedure for conducting research that encompasses the decisions from broad assumptions to detailed methods of data collection and analysis. This study adopted correlational research design which investigates relationships between variables without the researcher having the latitude to vary any of them, thus facilitating the possibility of predicting causal relationships.

Tskhadaia (2024) referred to a target population as the totality or sum of all the subjects, objects, or individuals who meet a given set of requirements. The first level target population of this study was six programs in which healthcare projects are being implemented in Makueni County, Kenya and formed the unit of analysis. The accessible population was made of project managers and project team members deployed across the programs and the complement was three hundred and twenty four (324), from which a requisite sample was derived forming the unit of observation.

A sample is a section of the population that is carefully chosen for research purposes to represent the entire population (Rahman, 2023). Additionally, a sample is defined as a part of the population of certain interest and it is important because it enables the understanding and appreciation of the attributes of the entire population based on the characteristics of the sample. In this study, Nasiurma (2000) formulae was used to determine the sample size and was adopted at 95% confidence level and $\alpha = 0.05$ as shown;

$n = (Ncv^2) / (cv^2 + (N-1)\ e^2)$

where:

n = Sample size

N = Population

cv = Coefficient of variation (take 0.7).

e = Tolerance at desired level of confidence (take 0.05 at 95% confidence level).

The substituted values in determining the sample size from the target population are;

$n = 324\ (0.7)^2 / 0.7^2 + (324-1)\ 0.05^2$

$n = 158/1.3$

$n = 122$

Questionnaires were used to collect data in order to confirm the evidence gleaned from the qualitative and quantitative data analysis and to evaluate whether or not to reject hypotheses. Questionnaires as research instruments are used to gather information from a large sample with their goal being to express the research objectives as specific questions, and the information provided by the answers to each question used to test hypotheses.

The questionnaire was divided into two sections where Part A requested respondents to identify themselves by providing details such as designation, experience working with healthcare projects and the duration of the projects they are overseeing. The principal areas of the study were covered in Part B through closed-ended questions with the intention being to elicit specific information that would reduce the likelihood of information bias and make data analysis simpler. The Likert scale was adopted since it is among the most widely used tools for gauging sentiment because it is simple to use.

An approval letter authorizing the study was sought from the management of Jomo Kenyatta University of Agriculture & Technology who also issued a request letter to participating respondents in the research process by filling out questionnaires. This was done to ensure that the study complied with all ethical issues relating to the research engagement. The researcher also wrote a supporting letter requesting respondents to voluntarily fully participate in data collection.

Completed questionnaires were cleaned and thereafter examined for consistency, wholeness, and completeness. Making sense of the text and image of the data was recommended as part of the data analysis process, and entailed getting the data ready for analysis, exploring it further, presenting it, and interpreting it to extract more meaning. In order to prove or disprove the study's hypotheses, quantitative analysis was done.

RESEARCH FINDINGS AND DISCUSSION

Response Rate

A total of one hundred and twenty-two (122) questionnaires were distributed to respondents identified to take part in the study, and one hundred and five (105) questionnaires were filled and collected representing 86% of the distributed questionnaires. Wu *et al.,* (2021) indicated that a response rate of 50% is considered to be average, 60% to 70% is considered sufficient and a response rate of above 70% is regarded as excellent.

General Information

The descriptive statistics of the study showed that respondents holding bachelor's degree were represented by 41% of the respondents, followed by postgraduate holders at 34%, then diploma qualification holders were 25%. This indicated that most staff in the healthcare projects had fairly good educational qualifications thus assuring for the quality of responses in the questionnaires.

Implementation of Healthcare Projects

Respondents gave their views on the statements under implementation of healthcare projects and results are shown in Table 1;

Table 1: Descriptive Statistics for Implementation of Healthcare Projects

Statement	n	Mean	Std. Deviation
We always seek to deliver healthcare projects within the approved budgets.	105	3.77	.800
We always work towards project completion within the agreed time.	105	3.78	.747
Our project team ensures that the prescribed scope is attained for all projects.	105	3.82	.782
In the projects we carry out, we always strive to achieve high quality standards.	105	4.12	.631
We ensure that the projects we undertake always satisfy the needs of stakeholders.	105	3.95	.764
Our projects deliver products that meet the intended objectives.	105	3.90	.803
In the projects we undertake, we ensure optimal use of resources.	105	3.94	.770
Valid N (listwise)	105		

Table 1 has mean and standard deviation values for all the items under implementation of healthcare projects which were towards the mean and less than two (<2) respectively demonstrating that there was convergence in opinion by respondents and it was most prominent on the item about in projects being carried out, teams strive to achieve high quality standards (M = 4.12, SD = .631). The results agree with Cannavacciuolo *et al.,* (2023) who reviewed digital innovation and organizational changes in the healthcare sector through multiple case studies of telemedicine project implementation.

Resource Tracking and Implementation of Healthcare Projects

Respondents gave their opinions on the questionnaire statements about resource tracking and the findings are shown in Table 2;

Table 2: Descriptive Statistics for Resource Tracking

Statement	n	Mean	Std. Deviation
Top management in our projects always ensure the efficient utilization of resources.	105	3.76	.872
Our project managers monitor resource usage to identify any inefficiencies.	105	3.72	.778
In our project organization, resource tracking always involves documenting and analyzing resource data.	105	3.78	.808
Our project managers undertake resource tracking to facilitate accountability and transparency within the project team.	105	4.04	.706
In our organization, resource tracking always enhances project outcomes and improves decision-making.	105	3.86	.790
Our project managers track time for all project activities.	105	3.88	.768
Our project managers usually assess the available resources against the demands of projects.	105	3.90	.771
Valid N (listwise)	105		

Results in Table 2 indicate that the mean scores were fairly high and standard deviation values for the statements were below two (< 2), pointing to the fact that there was general convergence of sentiments towards the mean. The item on project managers undertaking resource tracking to facilitate accountability and transparency within the project team returned the highest mean score (M = 4.04, SD = .706). The results agree with Bouchrika (2024) who assessed what resource management was in terms of definition, types and techniques and noted that to prevent the emergence of additional lags in the project timeline, resource managers must be on top of their game.

Regression Analysis

Regression analysis was used to establish the relationship between the dependent variable being implementation of healthcare projects and the independent variable being resource tracking, and the bivariate regression model adopted was;

$Y = \beta_0 + \beta_1 X_1 + \varepsilon$

Where;

Y = Implementation of Healthcare Projects

β_0 = Constant term

β_1 = Beta Coefficient

X_1 = Resource tracking

ε = Error term

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.895[a]	.801	.793	.18361
a. Predictors: (Constant), Resource Tracking				
b. Dependent Variable: Implementation of Healthcare Projects				

From the results in Table 3, the correlation coefficient (r) = .895 indicated a strong positive relationship between resource tracking and implementation of healthcare projects, with r square = .801 indicating that 80.1% of the variation in implementation of healthcare projects in Makueni County, Kenya was explained by the regression model. Adjusted r square of .793 meant that 79.3% variation in implementation of healthcare projects could be explained by the model after accounting for the predictor variable and the remaining 20.7% could be attributed to other factors not considered in this model. The standard error of .18361 indicated the deviation from the line of best fit.

Table 4: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.041	1	13.041	420.677	.000[b]
	Residual	3.241	103	.031		
	Total	16.282	104			
a. Dependent Variable: Implementation of Healthcare Projects						
b. Predictors: (Constant), Resource Tracking						

In establishing the influence of resource tracking (X_1) on implementation of healthcare projects (Y), the regression model was found to be significant (F (1, 103) = 420.677, p – value = 0.000) indicating that resource tracking was a valid predictor in the model.

Table 5: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.246	.361		3.452	.000
	Resource tracking	.811	.204	.895	3.975	.000
a. Dependent Variable: Implementation of Healthcare Projects						

The regression equation was represented as;

$$\mathbf{Y = 1.246 + .811X_1}$$

Where;

Y – Implementation of Healthcare Projects

X_1 – Resource Tracking

As shown in Table 5, the beta coefficient for resource tracking was significant ($\beta_1 = .811$, t = 3.975, p-value = 0.000) inferring that for every single unit increase in the index of resource tracking, there was an improvement index of .811 in implementation of healthcare projects.

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The objective of the study was to examine the influence of resource tracking on implementation of healthcare projects in Makueni County, Kenya. Descriptive statistics showed that 52.4% of the respondents had worked on healthcare projects for five to ten years, 37.1% had worked for over ten years, while 10.5% had worked for less than five years. This was a fair distribution of experience across the levels indicating that majority were very experienced hence better responses were derived from the questionnaires. Demographic statistics also showed that forty six respondents were from projects that had been in existence for between five and ten years, while thirty seven were from projects that had in existence for over ten years, and lastly, twenty two were from those projects that had been in existence for less than five years. This showed that majority of the healthcare projects had been in existence for long hence information gathered about them was likely reliable for the study.

Descriptive analysis of the study findings revealed that project managers undertook resource tracking to facilitate accountability and transparency within the project team. The study also found that project managers usually assessed the available resources against the demands of projects, as well as noting that project managers tracked time for all project activities.

The study concluded that resource tracking had a positive and significant influence on implementation of healthcare projects in Makueni County, Kenya. It was noted that project managers undertook resource tracking to facilitate accountability and transparency within the project team to ensure that all team members pursued their work allocation with zeal and commitment to ensure overall project success.

There is need to embrace project resource planning as a significant mechanism for seamless project delivery throughout the project life cycle and especially embracing resource tracking is a crucial contributor to implementation of healthcare projects. This study recommends that project managers need to monitor resource usage to identify any inefficiencies in the process.

The study centered on the implementation of healthcare projects in Makueni County, Kenya. It is recommended that additional research be conducted to assess the implementation of other types of projects in other sectors based on the general prism of project resource planning, and most especially resource tracking as a variable of consideration. These should also be critical projects in sectors that require significant attention to resource tracking in order to be implemented effectively in Kenya and even beyond through applying similar techniques.

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