



PROJECT TIME MANAGEMENT TECHNIQUES AND PERFORMANCE OF INFRASTRUCTURAL PROJECTS IN KIAMBU COUNTY, KENYA

¹Mwanduka Peggy Kavete, ²Dr. Mungai Anne-Marie Wairimu

¹ Degree of Master of Project Management at Jomo Kenyatta University of Agriculture and Technology

²Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

Time management within the project management defines how well each activity of the project can be carried out by the project managers and their team within the given deadline. Most of the construction projects undertaken in Kiambu County using the Constituency Development Funds (CDF) were either poorly completed or not completed at all. The general objective of the study will be to examine effect of project time management techniques on performance of infrastructural projects in Kiambu County, Kenya. The specific objectives were to examine effect of resource leveling, schedule control on performance of infrastructural projects in Kiambu County, Kenya. The study was guided by resources-based theory, and action theory. The study employed a descriptive research design. The study targeted 132 infrastructural projects in Kiambu County implemented in the past five years. The sample size was 198 project managers, project coordinators, and project stakeholder liaison officers from 66 infrastructure projects. The study used primary data collected using questionnaires. The pilot study was carried out among 10% of the sample, that is, 20 project staff. The study used content and construct validity. Reliability was tested using Cronbach's Alpha Coefficient. Data was analyzed using SPSS Version 28. Descriptive and inferential statistics were used. The descriptive statistics included frequency, percentage, and mean while inferential statistics include correlation and regression. Findings were presented in tables. The study examined the effects of project time management techniques on the performance of infrastructural projects in Kiambu County, Kenya. The findings indicated that time management techniques significantly impact project performance. Resource leveling (coefficient = 0.278, $p = 0.000$) enhances project performance through effective resource allocation, while schedule control (coefficient = 0.304, $p = 0.000$) was found to be the most influential factor, emphasizing the critical role of continuous monitoring and corrective actions. The study concludes that adopting these time management techniques enhances the overall performance of infrastructural projects. It is recommended that project managers ensure systematic resource leveling to optimize project timelines and outcomes.

Key Words: Project Time Management Techniques, Resource Leveling, Schedule Control, Performance, Infrastructural Projects

Background of the Study

Time management within the project management defines how well each activity of the project can be carried out by the project managers and their team within the given deadline. Maintaining time within the project can ensure the proper progress throughout the session in this context (Adams & Blair, 2019). Oburu (2020) defined project time management as the act of planning, scheduling and exercising conscious control over the limited amount of time spent on specific project activities, particularly to increase their effectiveness, efficiency or productivity. Time is a key aspect of project management and comprises skills such as planning, goals setting and prioritizing for a better project performance. According to The Project Management Institute (2018), effective time management requires a clear definition of the project activities, sequencing, estimation of how much resources each activity requires and finally coming up with schedules and controls. To identify the project activity, a manager can break down the activities into smaller pieces that are easily manageable and controllable.

Albusalih (2022) asserted that time management starts with a well-organized schedule. Developing a plan for how long it will take each employee to perform their tasks is a crucial component of a manager's job. To ensure that tasks are performed in a timely manner, it is recommended to list them first, and then set a deadline. Managers show up late to meetings, put in excessive hours at the office, struggle to focus on any one task, feel overwhelmed by their workload, and constantly moan about how they have little time to accomplish the things that bring them joy. Adetola (2021) asserted that management of project time provides an opportunity to decide on how to spend a valuable resource. It enables project stakeholders to get the most out of the best. It helps to organise and learn how to spend project time productively. Learning project time management methods is a skill similar to learning how to speak another language or figuring out how to word process. It is always good to ensure that sufficient time is devoted to execute important tasks properly, so that they do not become urgent.

Statement of the Problem

Successful infrastructural projects is an impetus to economic development for Kenya as enumerated in the Kenya Vision 2030 (GoK, 2007). Consequently, the county governments have invested infrastructural projects to enhance economic development. According to Ngugi and Kimani (2022), the county government of Kiambu faced several challenges during the implementation period of the first County Integrated Development Plan (CIDP) 2013-2027 and the same challenges were experienced in the second CIDP 2018-2022. The challenges included untimely disbursement of funds by the national government, inadequate financial resources, stalled projects inherited from the national government, under developed infrastructure, lack of proper coordination in the implementation of projects, weak Monitoring and Evaluation systems and failure to meet revenue targets. Since the advent of devolution, Kiambu County has implemented several infrastructural projects. Some of them are still ongoing; others failed to achieve the intended objective. More than 2000 projects have been implemented since devolution but 68% of the projects have experienced project failure (Ebole & Nyang'au, 2021).

Mburu, Gwaya, and Diang'a (2021) found that most of the construction projects undertaken in Kiambu County using the Constituency Development Funds (CDF) were either poorly completed (30%) or not completed at all (50%) and only 20 percent were successfully completed. According to World Bank (2021), 60% of the county respondents complained that the infrastructure projects from the county did not satisfy their requirements while 35% argued that the projects failed to achieve the intended objectives. Mutugi and Kyalo (2020) found that project time management influenced implementation of road constructions projects in Kilifi Count. Muute (2019) revealed found that project time management positively and significantly affected performance of construction projects. There is study limitation on project time management and not study has been conducted in Kiambu County to assess effect of project time management and performance of infrastructural projects. This study hence sought

to fill the research gap by examining the effect of project time management techniques on performance of infrastructural projects in Kiambu County.

General Objective

To determine the effect of project time management techniques on performance of infrastructural projects in Kiambu County, Kenya

Specific Objectives

- i. To assess the effect of resource leveling on performance of infrastructural projects in Kiambu County, Kenya.
- ii. To establish the effect of schedule control on performance of infrastructural projects in Kiambu County, Kenya.

LITERATURE REVIEW

Theoretical Review

Resources-based Theory

The theory was developed by (Barney, 1991). The resource-based view is based on the assumptions that firm resource distributed heterogeneously and remained stable over time. A firm's resources include materials, skills, organizational processes and systems, plus information and data of the organization. This theory ties competitive advantage generation through focusing on fostering the internal resources that the organization owns which most probably are unique and special to the firm, in different words no two organizations have the same exact resources, either tangible or intangible. "If resources and capabilities of a firm are mixed and deployed in a proper way, they can create competitive advantage for the firm. Eventually, only companies themselves can achieve and sustain competitive advantage by innovation and strategically positioning in the market" (Mweru & Muya, 2015, p. 217). The theory is considered applicable to the variable on resource scheduling because it describes the financial, material, and technical resources needed to improve the performance of projects. The projects managers must ensure that resources are adequately provided to accomplish project within time.

Action Theory

Action Theory was founded by Talcott Parsons (1902–1979). The theory examines the behavior of an individual agent as the result of its interaction with a situation (Johnston et al., 2005). In the case of Critical Path Model (CPM), the agent can be the project manager, and the situation can be the project environment. Its two main models carry implications for the formulation and application of techniques centered on human activity, of which project planning and execution is only a small fraction. Action Theory is an integral part of many modern aspects of artificial intelligence, sociology, psychology, linguistics and other areas concerned with human action (Agre, 1997).

The plan is seen as the control mechanism that governs execution of the steps required to complete a project in the same way that a computer program can govern the sequence of calculations performed by a computer. Without a program, a computer will not produce any meaningful output; without a plan, actions cannot result in a built project. The sequence of events in the planning process begins, according to this model, when a person or group (an "agent") is put in charge of developing the plan. The agent collects all possible information about the project and constructs a symbolic model of the world in which the project will be performed. In the context of CPM planning, this model is the activity network, and the agent is the CPM scheduler. The agent then operates this model and simulates an acceptable sequence of actions to achieve the desired goal, on the assumption that the optimum output on the model can be translated into equivalent actions on the real world (Agre and Chapman, 1990). As the plan execution progresses, there will be differences between the conditions modeled in the plan and reality, which will be detected and reported by the execution actors using means

predetermined by the agent. Weekly progress reports or CPM schedule update reports are examples of such means in a project. The theory supports the objective on schedule control since it helps project managers to take quick actions in determining which activities are critical and should not be delayed.

Conceptual Framework

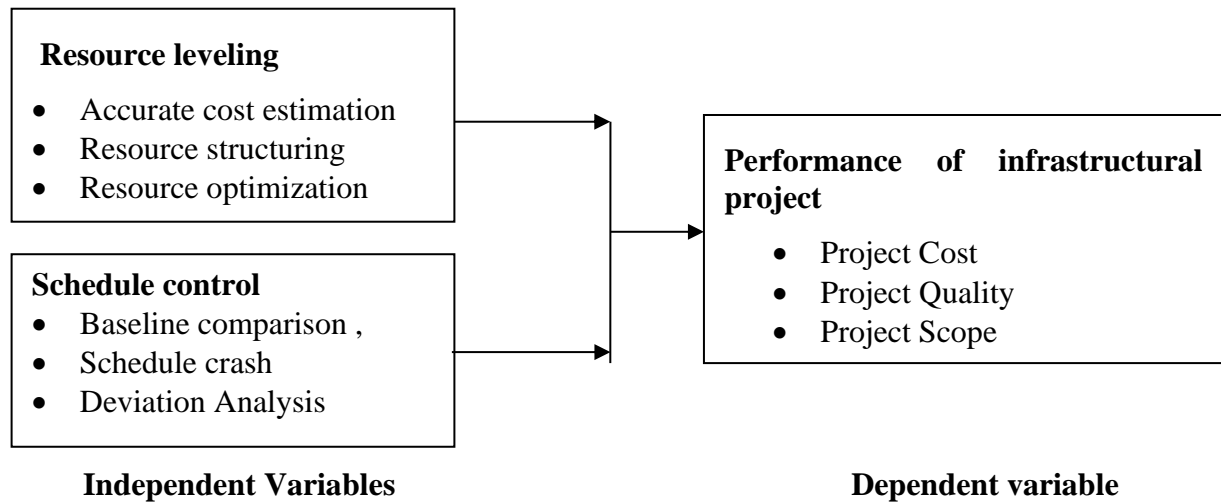


Figure 2. 1: Conceptual Framework

Resource Leveling

Leveling refers to the practice of adjusting a project's start and end dates to accommodate for limited resources. Resource leveling is basically reducing the variations resource use during the project execution. This means that if the resources are unlimited or infinite, then smoothing is performed to see the fluctuation. Resource leveling is required in the project to avoid difficulties with major differences in resource use in projects. When more resources are assigned to a task than the available resource, it is said to be over allocated and requires leveling (Eirgash, Toğan, & Dede, 2021).

Resource leveling is considered one of the key elements to resource management in the organization. An organization starts to face problems if resources are not allocated properly i.e., some resource may be over-allocated whilst others will be under-allocated. Both will bring about a financial risk to the organization (Khanzadi, Kaveh, Alipour, & Aghmiuni, 2016). When construction project activities are carried out simultaneously, resources not required for a project can be deployed to another. This would reduce the project costs and improve organisational cash flow, payback period, and performance. Fast tracking in effect is the rearranging of the predecessor relationships to shorten the schedule and can be used as a strategy to avoid too much risks or escalating costs to reduce duration of the project. In fact, the fast tracking can be used to reduce project deadlines without significant increase in cost (Mathwe, 2021).

Obegi and Kimutai's (2017) highlighted that effective resource scheduling is one of the central project success factors. The occasional monitoring of budget to assess expenses vis-à-vis project budgets, project changes during implementation, equipped project staff, and periodic project performance assessment. The project performance was influenced by resource scheduling because it ensured that the project was operating within budget and the changes are made to adapt to the dynamic nature of the projects, and the staff had what was needed for the job.

Schedule Control

Schedule control is defined as monitoring the status of the project to update the project schedule and manage changes to the schedule baseline. The key benefit of this process is that the

schedule baseline is maintained throughout the project, to measure the actual progress and compare it to planned progress on a timely and regular basis and to take corrective action immediately. This process is performed throughout the project (Del Pico, 2023).

Controlling schedule involves four steps; analyzing the schedule to determine which areas need corrective action, deciding what specific corrective action to be taken, revising the plan to incorporate the chosen corrective action, and recalculating the schedule to evaluate the efforts of planned corrective action. Skills needed in project schedule control includes, holding progress meetings with stakeholders and communicating schedule issues, knowing the status of the schedule, understanding influence factors that cause schedule changes, determining that the schedule has changed, and manage changes when they occur (Park, 2021).

Schedule control is essential to project management because it monitors and controls the project's progress. In the world of project management, a project that fails to meet its deadline is not a success. While many metrics determine whether a project is successful, adhering to the schedule is among the most fundamental. Schedule control is also valuable because it assists project managers with managing the expectations of project stakeholders. This process informs stakeholders about changes to the project and the implications to the overall project schedule. Reporting progress reports are used to evaluate the impact to the schedule and determine if the project is still on track or will be delayed. Monitor performance basically results in deciding if the variation of the schedule requires any corrective action (Oke, Hardouin Chen, & Shang, 2022).

Empirical Review

Resource Leveling and Project Performance

Nagaraju and Reddy (2022) studied resource management in construction projects. Results revealed that resource scheduling is crucial in construction projects, especially due to their high stakes nature that needs efficient resource utilization. The project managers have to make complex scheduling decisions under the varied scheduling needs such as resource constraints and smooth resource utilization along with the inherent uncertainty in construction projects. The study findings highlight that resource scheduling is critical since the nature of construction projects is unique and is marked by complex deployment patterns of resources leading to uncertainty and increased risks. As such, the success of the project needs state-of-the-art resource management, and resource allocation should be done prudently to ensure the projects' timely completion

Ronoh and Kirui (2020) investigated the influence of resource scheduling on the performance of residential construction projects in Nairobi City County, Kenya. The study adopted a descriptive survey research. Simple random sampling was used to sample 79 gated community residential construction projects. Data was collected using questionnaires. Results showed a significant relationship between resource scheduling and project performance. The study concluded that the proper allocation of project equipment facilitates smooth operations and successful project completion. The study recommended that project managers, contractors, and supervisors should ensure they clearly set roles for the individuals, teams, tasks, or departments to improve the performance of the project.

Kimutai and Kirui (2020) investigated the impact of resource schedule on the implementation of residential building projects in Kenya. Task allocation and time management were used to assess resource allocation. The design employed was descriptive research. The population constituted of 79 residential projects and the respondents were the project managers, project supervisors, and contractors. Questionnaires were used in collecting data. The study discovered a strong correlation between resource scheduling and project implementation.

Ochieng (2018) investigated the impact of management of resources on the implementation of mobile communications companies' projects in Kenya. Task scheduling and time allocation were used to assess resource management. The target population consisted of fifty project team

members from Kenya's four major GSM companies. The study revealed that technology is still poorly managed, and databases are managed manually and project management software is rarely used

Schedule Control and Project Performance

Amjad (2018) sought to find the impact of project Control on project success with the mediation impact of project Governance. The study sample was 400 and data was collected using questionnaires. The results indicated that project control improves project success both directly and through an enhanced project governance process. Mario (2019) studied the monitoring/control tools in project management. Results showed that monitoring/control tools and techniques give project managers access to real-time data including activity sensitivity, project completion percentages, actuals and forecasts. During monitoring and tracking, the project manager use all the information collected during project implementation to estimate project completion timelines.

Bagshaw (2021) studied concept of project evaluation review technique and Critical Path Method in project management. The review found that while both quantitative decision-making approaches are effective in achieving success in project management, the relationship and connectivity of activities involved in a project life cycle are key aspects. The paper concluded that the project evaluation review technique is more effective when the duration of the project is uncertain, while the critical path method is effective when the project's end time is certain. The paper, therefore, recommends that to achieve maximum operative efficiency in utilizing resources in project management, prior to commencing the execution of a project, all required resources to cover every activity must be assembled and prioritized to eliminate interruptions that could bring delay and unnecessary cost implications.

Mutugi and Kyalo (2020) examined the influence of time management on the implementation's road constructions projects in Kilifi County. The study adopted cross sectional research design. Data was collected using questionnaires from 120 engineers/project managers, supervisors/inspectors and technicians/foremen from 12 construction companies. Findings showed that activity control significantly and positively predicts implementation of road constructions projects in Kilifi County. The regression analysis showed that a unit improvement in activity control would significantly lead to an improvement in implementation of road construction projects in the county.

RESEARCH METHODOLOGY

The study employed a descriptive research design. According to the County Quantity Surveyors Department offices, 132 infrastructure projects. were in 6 sub-counties counties in the past 5 years 2019-2023. The infrastructure projects were unit of analysis. The unit of observation was project managers, project coordinators, and Projects stakeholder liaison officers from every project. The target population was hence comprise of 396 project staff. Taro Yamane's 1967 sampling formula was used to calculate the sample size of was 198 respondents. To ensure representation across all sub-counties, a stratified random sampling technique was used. The study used primary data collected using questionnaires. The pilot study was carried out among 10% of the sample as recommended by Orodho (2014). The sample size was hence 20 project staff. Data was analyzed using SPSS Version 28. Descriptive and inferential statistics were used. The descriptive statistics included frequency, percentage, and mean while inferential statistics included correlation and regression.

RESEARCH FINDINGS AND DISCUSSION

The study targeted 198 project managers, project coordinators, and stakeholder liaison officers from 66 infrastructural projects in Kiambu County. Out of the 198 distributed questionnaires, 165 were returned and found complete and usable for analysis, yielding a response rate of

83.3%. According to Sekaran and Bougie (2016), a response rate above 70% is considered excellent, indicating a high level of engagement and reliability of the data collected for this study.

Descriptive Analysis

This section presents the descriptive statistics of the study variables, focusing on how the respondents rated various statements related to resource leveling, schedule control, and project performance. They used a 5-point Likert scale where 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree. The means and standard deviations were used to interpret the findings where a mean value of 1-1.4 was strongly disagree, 1.5-2.4 disagree, 2.5-3.4 neutral, 3.5-4.4 agree and 4.5-5 strongly agree. Standard deviation greater than 2 was considered large meaning responses were widely spread out and not tightly clustered around the mean.

Resource Leveling

The first objective of the study was to assess the effect of resource leveling on performance of infrastructural projects in Kiambu County, Kenya. Respondents were asked to evaluate the impact of resource levelling on project performance. Table 1 presents summary of findings obtained.

Table 1: Descriptive Statistics on Resource Leveling

Statements	Mean	Std. Dev.
Project resources are scheduled systematically before construction begins.	4.073	0.758
There is rescheduling of activities within the limits of available float for better resource usage.	3.924	0.821
A systematic procedure for leveling resources was developed.	3.996	0.685
Effective methods were utilized to assess resource requirements for projects.	4.018	0.812
Daily resource requirements over the project duration are constant for all complete schedules.	3.862	1.043
Each work element is quantified in terms of time or other resource requirements.	3.779	0.934
Effective allocation and division of work among available personnel affect project performance.	4.064	0.742
Aggregate Score	3.960	0.828

The findings in Table 1 indicate that respondents generally agreed that resource leveling positively influences project performance, as shown by an aggregate mean of 3.960 (SD = 0.828). There was strong agreement that project resources are systematically scheduled before construction begins (M = 4.073, SD = 0.758) and that effective allocation and division of work among available personnel significantly affect project performance (M = 4.064, SD = 0.742), highlighting the importance of structured resource planning. Respondents also agreed that systematic procedures for leveling resources were developed (M = 3.996, SD = 0.685) and effective methods were used to assess resource requirements (M = 4.018, SD = 0.812), suggesting that formal processes are key to managing resources effectively. However, slightly less agreement was noted on maintaining constant daily resource requirements (M = 3.862, SD = 1.043) and quantifying work elements in terms of time or other resource needs (M = 3.779, SD = 0.934), indicating potential variability in resource demand across projects.

Respondents generally agreed on the effectiveness of resource leveling, underscoring that systematic scheduling, assessment, and allocation of resources are crucial for optimizing project performance. This suggests that systematic scheduling of resources before the onset of construction is critical for project success. These findings align with Nagaraju and Reddy

(2022), who emphasized the importance of resource leveling in managing complex construction projects, highlighting that systematic resource allocation mitigates project risks. Ronoh and Kirui (2020) also found that proper resource scheduling significantly improves project performance by facilitating smooth operations and timely project completion.

Schedule Control

The two objective of the study was to establish the effect of schedule control on performance of infrastructural projects in Kiambu County, Kenya. Respondents were asked to indicate their level of agreement with statements related to schedule control. Table 2 presents summary of findings obtained.

Table 2: Descriptive Statistics on Schedule Control

Statements	Mean	Std. Dev.
Performance reports are made for every activity as per the schedule.	4.032	0.811
Corrective actions are taken for variances between actual and planned schedules.	4.118	0.749
Progress is measured based on predefined criteria identified during the planning stage.	3.964	0.826
Schedule variances affect the overall performance of the project, including cost and quality.	3.901	0.895
Lessons learned during project work are properly registered and documented.	3.812	0.901
Aggregate Score	3.965	0.836

The findings in Table 2 indicate that respondents generally agreed that schedule control significantly impacts project performance, as reflected by an aggregate mean of 3.965 (SD = 0.836). There was strong agreement that corrective actions are taken for variances between actual and planned schedules (M = 4.118, SD = 0.749), highlighting the importance of promptly addressing schedule deviations to maintain project timelines. Respondents also agreed that performance reports are consistently made for every activity according to the schedule (M = 4.032, SD = 0.811) and that progress is measured based on predefined criteria identified during the planning stage (M = 3.964, SD = 0.826), underscoring the role of systematic monitoring in effective schedule control. Additionally, respondents acknowledged that schedule variances significantly affect project performance, including cost and quality (M = 3.901, SD = 0.895), emphasizing the need for careful schedule management. Although slightly less agreement was seen on the proper registration and documentation of lessons learned (M = 3.812, SD = 0.901).

The findings indicate that respondents agreed on the effectiveness of schedule control, with an aggregate mean of 3.965 (SD = 0.836). The findings overall suggest that rigorous schedule control practices are crucial for ensuring project success. The findings resonate with Amjad (2018), who found that effective schedule control enhances project success through timely identification of variances and implementation of corrective actions. Mario (2019) also highlighted the role of monitoring and control tools in providing project managers with real-time data to adjust project schedules, thus improving overall project outcomes.

Project Performance

The general objective of the study was to determine the effect of project time management techniques on performance of infrastructural projects in Kiambu County, Kenya. Respondents provided their views on various aspects of project performance. Table 3 presents summary of findings obtained.

Table 3: Descriptive Statistics on Project Performance

Statements	Mean	Std. Dev.
The project was successfully completed within the expected time.	3.954	0.872
The project successfully met the expected goals and objectives.	4.002	0.746
The project successfully completed within the expected budget.	3.874	0.932
The project successfully met stakeholders' expectations.	3.932	0.811
The project successfully met required performance standards.	3.998	0.761
Aggregate Score	3.952	0.824

The findings in Table 3 indicate that respondents generally agreed that infrastructural projects in Kiambu County performed well, as evidenced by an aggregate mean of 3.952 (SD = 0.824). There was strong agreement that projects successfully met their expected goals and objectives (M = 4.002, SD = 0.746) and required performance standards (M = 3.998, SD = 0.761), suggesting that project teams are effective in delivering results that align with initial project expectations. Respondents also agreed that projects were successfully completed within the expected time (M = 3.954, SD = 0.872) and met stakeholders' expectations (M = 3.932, SD = 0.811), highlighting the importance of meeting deadlines and satisfying stakeholder needs as critical measures of project success. Although there was slightly less agreement on projects being completed within the expected budget (M = 3.874, SD = 0.932). The overall findings imply that the projects generally achieved their performance targets, reflecting effective project management practices in meeting time, quality, and stakeholder expectations.

As shown in Table 3, respondents generally agreed that the infrastructural projects in Kiambu County performed well, with an aggregate mean of 3.952 (SD = 0.824). This implies that project objectives are often achieved, aligning with the overall positive impact of time management techniques on project success. These findings are consistent with Azhari et al. (2021), who found that the use of CPM methods and efficient schedule management positively influence project completion times and overall performance. Similarly, Kaburame (2018) emphasized that critical time management techniques significantly improve highway project performance in terms of timely delivery and meeting project specifications.

Correlation Analysis

Correlation analysis was conducted to determine the relationship between the independent variables (resource leveling, and schedule control) and the dependent variable (project performance). If the correlation values are $r = \pm 0.1$ to ± 0.29 then the relationship between the two variables is small, if it is $r = \pm 0.3$ to ± 0.49 the relationship is medium, and when $r = \pm 0.5$ and above there is a strong relationship between the two variables under consideration. Significance was tested at 0.05 level of significance. Table 4 presents the findings obtained.

Table 4: Correlation Results

Variables		Project Performance	Resource Leveling	Schedule Control
Project Performance	Pearson Correlation	1.000		
	Sig. (2-tailed)			
	N	165		
Resource Leveling	Pearson Correlation	.689**	1.000	
	Sig. (2-tailed)	.000		
	N	165	165	
Schedule Control	Pearson Correlation	.732**	.577	1.000
	Sig. (2-tailed)	.000	.410	
	N	165	165	165

Correlation is significant at the 0.05 level (2-tailed).

The study found a strong positive correlation between resource leveling and project performance ($r = 0.689$, $p < 0.05$). This relationship suggests that proper resource allocation and leveling are critical for achieving project success, as highlighted by Ronoh and Kirui (2020), who found similar results in residential construction projects.

The strongest positive correlation was observed between schedule control and project performance ($r = 0.732$, $p < 0.05$). This indicates that consistent schedule monitoring and timely corrective actions significantly enhance project outcomes, in line with findings by Mario (2019), who emphasized the importance of real-time monitoring tools in managing project schedules effectively.

Regression Analysis

The beta coefficients provide insights into the individual impact of each independent variable on project performance.

Table 5: Beta Coefficients

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
(Constant)	1.204		3.762	0.000
Resource Leveling	0.278	0.269	4.012	0.000
Schedule Control	0.304	0.332	4.562	0.000

Resource leveling has a coefficient of 0.278 ($p = 0.000$), indicating a significant positive effect on project performance. For every unit increase in resource leveling practices, project performance improves by 0.278 units. This finding is in line with Kimutai and Kirui (2020), who noted that resource leveling is crucial for ensuring smooth project operations and timely completion in residential building projects.

The coefficient for schedule control is the highest at 0.304 ($p = 0.000$), highlighting its significant impact on project performance. A unit increase in schedule control measures leads to a 0.304 unit increase in project performance, suggesting that maintaining control over schedules is critical to project success. This result corroborates the findings of Mutugi and Kyalo (2020), who observed that schedule control measures are vital in enhancing the implementation of road construction projects.

$$\text{Project Performance} = 1.204 + 0.278 (\text{Resource Leveling}) + 0.304 (\text{Schedule Control})$$

Conclusions

The study concludes that resource leveling plays a crucial role in the success of infrastructural projects. Proper scheduling and allocation of resources help to avoid delays, reduce costs, and ensure smooth project operations. The findings highlight the need for systematic resource management practices to be embedded within project planning processes to mitigate risks and enhance project performance.

The study concludes that schedule control is the most influential factor affecting project performance. Effective control measures, including monitoring progress, addressing variances, and documenting lessons learned, are essential for maintaining project quality, cost, and timelines. The results underscore the importance of proactive schedule management in achieving successful project outcomes.

Recommendations

Resource leveling should be prioritized as part of project planning to optimize the use of available resources. It is recommended that project teams develop systematic procedures for resource scheduling and continuously assess resource requirements throughout the project lifecycle. Project managers should utilize software tools that support resource leveling to

improve decision-making and enhance project performance, ensuring that resources are allocated in the most efficient manner possible.

Project managers should strengthen schedule control mechanisms to ensure projects remain on track. This includes implementing regular performance reviews, real-time monitoring, and taking corrective actions promptly when deviations occur. Documentation of lessons learned should be enhanced to capture best practices and improve future project planning. Investment in training project staff on advanced schedule control tools and techniques is recommended to enhance their ability to manage project schedules effectively.

Future studies should delve deeper into specific external factors affecting infrastructure projects in Kenya. For example, researchers could conduct quantitative analyses to measure the impact of stakeholder engagement on project timelines and cost overruns, using case studies from ongoing projects in sectors like transport or energy. This could include designing frameworks to assess how stakeholder input at different project phases affects overall project success.

Additionally, research could focus on assessing the adoption and effectiveness of advanced project management tools, such as Building Information Modeling (BIM) and AI-driven scheduling, within Kenyan infrastructure projects. Studies could involve experimental designs or field surveys that compare projects using these technologies against those relying on traditional methods, examining metrics like time savings and project efficiency.

Comparative studies between counties could be made more concrete by specifically examining the variations in regulatory compliance, project funding mechanisms, and local governance structures. Researchers could use comparative case study methodologies to identify patterns and correlations between county-level practices and project outcomes, generating insights that can inform policy harmonization efforts.

REFERENCES

- Adams, R. & Blair, E. (2019). Impact of time management behaviors on undergraduate engineering students' performance. *Sage Open*, 9(1), p.215
- Adetola, A. (2021). Strategies for Effective Project Time Management. *International Journal of Innovative Business Strategies*, 7(1)487-496
- Ahmed, F (2018). Impact of Critical Path Method (CPM) Of Scheduling On On-Time Completion Of Transportation Projects. (Master's thesis).
- Albusalih, M. (2022). *The Impact Of Quality Management And Human Resource Management On Project Management: An Empirical Study On Construction Projects Contractors In Iraqi*. Karabuk University
- Alvarenga, J. C. & Branco, R. (2020). The project manager core competencies to project success. *International journal of managing projects in Business*, 13(2), 277-292.
- Amjad, S.(2018). Impact of Project Control on Project Success with mediating role of Project Governance and Moderating role of Project Leadership. Capital University Of Science & Technology Islamabad
- Assaf, S. Hassanain, M. & Mughal, H. (2022). Effectiveness of Project Teams and their Impact on the Performance of Saudi Construction Projects. *Research Journal of Applied Sciences, Engineering and Technology*. 7(24):5148-5156
- Bagshaw, K. (2021). PERT and CPM in Project Management with Practical Examples. *American Journal of Operations Research*, 11, 215-226
- Del Pico, W. J. (2023). *Project control: Integrating cost and schedule in construction*. John Wiley & Sons.
- Dino, A. (2022). *The Relationship Between Time Management Practices And Project Success: (A Case Study On Telecom Expansion Project, Ethiotelcom)*. Addis Ababa University

- Ebole, H. & Nyang'au, S. (2021). Effect of Risk Management Practices on the Performance of Infrastructure Projects In Kiambu County, Kenya. *International Journal of Recent Research in Commerce Economics and Management*, 8(3)28-36
- Egbelakin, T., Ogunmakinde, O.E., Teshich, B. & Omotayo, T. (2021). Managing Fast-Track Construction Project in Qatar: Challenges and Opportunities. *Buildings* 11, 640
- Kansumba, E. & Chibomba, K. (2019). The Assessment of The Critical Path Analysis In Construction Projects In Kitwe. *The International Journal of Multi-Disciplinary Research*
- Kebede, K. (2019). *Assessment of the Impact of Project Scope Management on Project Performance of construction Projects: the case of 40/60 saving house condominium project Bole Ayat 2 sites*. Addis Ababa University,
- Muute, N. (2019). *Project Planning Practices and Performance of Construction Projects In Nairobi City County, Kenya*. Kenyatta University.
- Nagaraju, S. K., & Reddy, B. S. (2012). Resource Management in Construction Projects– a case study. *Resource*, 2(4)
- Nestsiarovich, K., & Pons, D. (2020). Team Role Adoption and Distribution in Engineering Project Meetings. *Behavioral sciences (Basel, Switzerland)*, 10(2), 57. <https://doi.org/10.3390/bs10020057>
- Ngugi, W. & Kimani, G. (2022). Effect of Organisation Structure on Performance of County Governments Development Projects in Kenya: A Case of Kiambu County Government. *International Journal of Research and Innovation in Social Science*, 6(8)634-640
- Nitansh, N. (2022). Slack time in project management: all you need to know. <https://www.getflow.com/blog/slack-time-in-project-management>
- Obegi, D. O. & Kimutai, G. J. (2017). Resource scheduling and project performance of international not-for-profit organizations in Nairobi City County, Kenya. *International Academic Journal of Information Sciences and Project Management*, 2(2), 199-217
- Oburu, A. O. (2020). Effective project time management. *International Academic Journal of Information Sciences and Project Management*, 3(6), 47-55
- Oke, A., Hardouin, L., Chen, X., & Shang, Y. (2022). Scheduling and control of high throughput screening systems with uncertainties and disturbances. *Production & Manufacturing Research*, 10(1), 450-469.
- Park, J. E. (2021). Schedule delays of major projects: what should we do about it?. *Transport Reviews*, 41(6), 814-832.
- Peszko, A. (2020). The Role of the Team in Project Implementation. *Decision Making in Manufacturing and Services*, 14(2) 165–180
- Ronoh, K. & Kirui, C. (2020). Influence of Resource Scheduling On the Performance of Residential Construction Projects in Nairobi City County, Kenya. *International Journal of Research and Innovation in Social Science*, 6(12)409-414
- Rukayat, P., Odukaiye, W. & Olateju, I. (2023). Work Breakdown Structure and Timely Delivery of Project. (A Study of Lagos State University).
- Shehu, S. (2021). A Review Of Time Management Factors In Construction Project Delivery. *Journal of Project Management Practice*. 1(2)34-45.
- Shrouder, P. (2021). *The frontiers of project management research* (chap. 20). Newtown Square, PA: Project Management Institute
- Sogaxa, A., Simpeh, E. & Ndiokubwayo, R. 2021. Assessment of time management practices of small medium sized contractors in project delivery in the Eastern Cape Province, South Africa. *Acta Structilia*, 28(1), 117-141