Int Journal of Social Sciences Management and Entrepreneurship 9(1): 642-656 2025

ISSN 2411-7323

www.sagepublishers.com

AGILE PROJECT MANAGEMENT STRATEGIES AND PERFORMANCE OF ROAD CONSTRUCTION PROJECTS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Despite the importance of road construction projects, the performance of these projects in Nairobi City County has been marred by several challenges. The main objective of this study was to examine the effect of agile project management strategies on performance of road construction projects in Nairobi City County, Kenya. The specific objectives are to examine the effect of; extreme strategy and incremental strategy on the performance of road construction projects in Nairobi City County, Kenya. The study was guided by Goal-setting theory, and the Incremental Theory of Decision Making. This research study used descriptive research design. The study targeted 29 road projects and 290 project management staff. The Yamane formula was used to get a sample of 168 respondents that were selected using stratified random sampling. Data was collected by use of semi-structured questionnaires. The pilot test was conducted with 17 individuals which represented 10% of the total study sample size. Content validity was confirmed through expert review, while construct validity was evaluated using factor loadings, all of which met the threshold (AVE > 0.5). Reliability analysis using Cronbach's Alpha showed strong internal consistency, with all variables scoring above 0.7. The overall reliability scale was 0.862, indicating that the questionnaire items were appropriate for data collection. Data was analyzed using SPSS Version 28. Data presentation was done using tables and charts. Pearson correlation was applied to assess the strength of the relationship between predictor and response variables, while multiple regression analysis was used to determine the influence of agile strategies on project performance. The regression analysis confirmed that agile project management strategies significantly influence the performance of road construction projects in Nairobi City County. Incremental strategy ($\beta = 0.357$, $p < 0.05$) had the strongest positive impact, emphasizing the importance of structured execution and phased implementation. Extreme strategy ($\beta = 0.288$, $p < 0.05$) highlighted the role of rapid decision-making. These findings confirm that agile strategies enhance efficiency, risk management, and stakeholder collaboration, leading to improved project outcomes. To optimize agile project management, the study recommends adopting digital monitoring tools, improving financial forecasting, streamlining stakeholder engagement, and investing in adaptive leadership training.

Key Words: Agile Project Management Strategies, Extreme Strategy, Incremental Strategy, Performance, Road Construction Projects

Background of the Study

Road construction is a critical element of infrastructure development, playing a pivotal role in facilitating economic growth, social development, and overall connectivity. The construction and maintenance of road networks are essential for enabling the efficient movement of goods and people, which in turn supports trade, industry, and access to essential services (Odeh, & Battaineh, 2020). As such, road infrastructure is often at the heart of national development agendas, contributing to the broader goals of poverty alleviation and regional development. The significance of road construction extends beyond mere transportation. Well-developed road networks help bridge the gap between urban and rural areas, promoting regional integration and ensuring that economic benefits are more evenly distributed. Improved roads can also enhance access to healthcare, education, and employment opportunities, thus contributing to the overall quality of life. Additionally, road infrastructure can attract investment by improving access to markets and reducing operational costs for businesses (Nyambura, 2019).

However, road construction projects are often fraught with challenges. Funding and budget constraints are common issues, leading to delays and, in some cases, compromising the quality of the work (Muute, 2019). Effective project management is another critical factor; poor planning, lack of skilled labor, and inefficient management practices can result in cost overruns, delays, and substandard construction. Environmental concerns also play a significant role, as road construction can lead to deforestation, soil erosion, and habitat disruption, all of which require careful management to minimize negative impacts. Corruption and mismanagement present additional challenges to road construction projects (Muute, & Rosemary, 2019).

Issues such as corrupt procurement practices, resource misallocation, and a lack of transparency can severely undermine the effectiveness and integrity of these projects. Ensuring accountability and implementing robust oversight mechanisms are essential to overcoming these obstacles and delivering quality infrastructure (Lancaster, Dodd, & Williamson, 2019). Agile Project Management Strategies refer to a set of principles and practices designed to manage and deliver projects more flexibly. Unlike traditional project management, which often follows a linear, sequential approach (often referred to as the "Waterfall" model), Agile emphasizes adaptability, collaboration, and continuous improvement throughout the project lifecycle (Kiiza, & Muiruri, 2022).

Statement of the Problem

Road construction projects play a critical role in Kenya's economy by facilitating the movement of goods, services, and people, thereby enhancing trade and economic growth (Kepha, Assumptah, & Omoke, 2019). Roads are a vital component of the national infrastructure, linking rural areas with urban centers and fostering regional integration. According to the Kenya National Bureau of Statistics (KNBS), the transport sector, of which road construction is a key part, contributes significantly to the country's GDP, accounting for about 7.8% in 2022. The government’s commitment to improving infrastructure is evidenced by the allocation of substantial budgetary resources to road construction and maintenance, which is seen as a driver of economic development and poverty reduction. The ongoing expansion and upgrading of road networks are expected to reduce transport costs, increase accessibility, and stimulate economic activities, particularly in remote and underserved areas (Muute, & Rosemary, 2019).

Despite the importance of road construction projects, the performance of these projects in Nairobi City County has been marred by several challenges. Budget overruns, time overruns, and poor quality of work are prevalent issues that have hindered the timely and cost-effective completion of these projects (Muute, & Rosemary, 2019). A report by the National

Construction Authority (NCA) in 2023 revealed that approximately 60% of road construction projects in Nairobi exceeded their original budgets, with some projects costing up to 50% more than initially planned. Additionally, time overruns are common, with an estimated 65% of projects failing to meet their deadlines, leading to increased costs and public inconvenience (Ochieng, 2023). The quality of completed road projects has also been questioned, with instances of premature road failures, potholes, and other defects becoming common. These challenges are compounded by inadequate project planning, poor stakeholder coordination, and inefficient project management practices, which collectively undermine the overall performance of road construction projects in the county (World Bank, 2023).

Agile project management strategies have been identified as a potential solution to these challenges, offering a flexible and iterative approach to project management that can enhance the performance of road construction projects (Nyambura, 2019). Unlike traditional project management methodologies, agile strategies emphasize collaboration, continuous improvement, and adaptability, allowing project teams to respond quickly to changes and unforeseen challenges. By breaking down projects into smaller, manageable phases, agile strategies enable better control over budget and timelines, reducing the risk of overruns. Moreover, the focus on stakeholder involvement and feedback throughout the project lifecycle can lead to higher-quality outcomes and greater satisfaction among project beneficiaries (Kioko, 2021). However, the extent to which agile project management strategies have been adopted in road construction projects in Nairobi City County, and their impact on project performance, remains under-researched. This study sought to fill this gap by examining how agile project management strategies influence the performance of road construction projects in Nairobi City County, Kenya.

Objectives of the Study

The main focus of this study was to examine the effect of agile project management strategies on performance of road construction projects in Nairobi City County, Kenya.

The objectives of the study were:

i. To assess the effect of extreme strategy on performance of road construction projects in Nairobi City County, Kenya

ii. To assess the effect of incremental strategy on performance of road construction projects in Nairobi City County, Kenya

LITERATURE REVIEW

Theoretical Review

Goal-Setting Theory

Goal-setting theory was developed by Edwin Locke in 1968. Locke came up with the goal-setting theory of motivation in the mid-1960s. The theory states that goal setting and task performing are essentially linked, it states that challenging and specific goals contributes to better task performance when put along appropriate feedback. This is because a goal indicates the direction given to employees and the amount of efforts required to achieve it. The most important features of this theory are: staff willingness to work towards goal attainment, better performance and greater output which are led by specific and clear goals. Goals should always be realistic but challenging at the same time. The more challenging the goal, the more reward and motivation and project managers should participate in setting goals because their participation makes goals more acceptable, but employees' participation is not always desirable for setting goals (Lunenburg, 2011).

It is the role of management teams to set the goals and tasks to achieve project goals. It is also their role to provide all the essential resources required to support the project teamwork. Therefore, the employees are motivated to work hard and perform beyond their potentials to achieve the goals and complete their projects successfully on time, within budget, and according to specifications. Project goals should be able to help individuals determine what actions are consistent or inconsistent with the overall project development goals. Project goals or targets define what the project is really about, so, without a goal, there is no point of conducting a project and waste time. Lack of shared project targets is also a major reason for disappointing performance. Thus, project goal clarity is necessary to set the objectives for project management and implementation and achieve project success (Haritha & Murali, 2019).

Clear goals are essential for effective project management because they provide a framework for planning, organizing, executing, and controlling a project. Project managers need to know what they are working towards, why it is important, and how success was measured. This information helps them to develop a clear project plan, allocate resources appropriately, and keep the project on track. Goal-setting theory is applied in the current study to support the variable on extreme strategy in the context of construction project teams. The project goal clarity relates to the extent of communication and understanding of a set of project mission and goals that guides the efforts of project managers and employees towards development.

The Incremental Theory of Decision Making

The incremental theory of decision making was developed by Charles Lindblom in the 1950s. A perspective on decision-making that argues our decisions are based on trial and error or 'muddling through'. According to Charles Lindblom, successive limited comparisons are better than a rational-comprehensive approach to decision-making that relies heavily on theory. It is a less risky method of decision-making, as we break things down into smaller parts, taking things stage by stage on the basis of experience of each previous stage and the techniques or ideas we test along the way. It is particularly suited to situations when goals are clear but the methods are uncertain, allowing us to experiment and learn during the process. It enables adjustments to be made easily and minimizes the cost of any failure (Dye, 2013).

The first step in using the incremental model of decision making is to identify the project goals. Once the problem has been identified, the next step is to gather information about the problem. This information can be gathered from a variety of sources, including research, interviews, and surveys. After the information has been gathered, it is then analyzed to determine the best course of action for the next increment. The next logical step is breaking down the goal into smaller, more manageable pieces (incremental). The third step is considering the costs and benefits of each option or recommendation. The project manager also needs to think about how each increment or recommendation will impact the goal. All the relevant factors are taken into consideration. Once the analysis is complete, a decision is made, and a plan is put in place to implement the decision. The project outcome is also recorded in the project decision log. The plan is then executed, and the results are evaluated (Harrin, 2022).

he incremental approach to making decisions is used when there is a need for a decision to be made, but there is uncertainty about the best course of action. This model can be used in many circumstances, and it can help to make changes little by little, rather than all at once. The theory supports the variable on extreme strategy since its applicable in public construction projects whereby it enables the project managers to effectively implement the road projects by ensuring that a single project phase is effectively accomplished before getting in to another project phase. This helps to keep tabs on the project resources and ensure that projects are delivered according to the plan.

Conceptual Framework

The conceptual framework shows the relationship between the independent variables and the dependent variable. In this case, the independent variables are extreme strategy and incremental strategy while the dependent variable is performance of road construction projects in Nairobi City County, Kenya

Independent Variables **Dependent Variables**

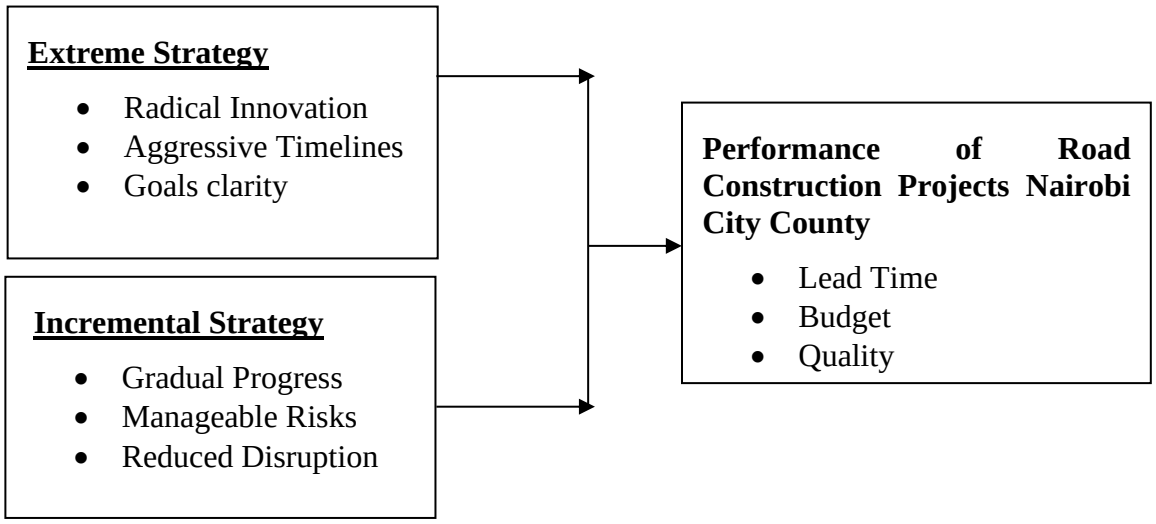

Figure 2. 1: Conceptual Framework

Extreme Strategy

Extreme strategy in project management is characterized by its highly adaptive, flexible, and fast-paced nature. It is particularly useful for projects operating in volatile, uncertain, complex, and ambiguous (VUCA) environments where conventional planning and execution strategies might not be effective. Extreme strategies rely on rapid decision-making, real-time adaptability, and proactive risk management (Gemino & Reich, 2021).

This strategy often integrates principles from Extreme Programming (XP) and Agile methodologies, allowing teams to respond to challenges dynamically while minimizing project delays and inefficiencies. Extreme strategy emphasizes stakeholder collaboration, frequent iterations, and continuous feedback loops, ensuring that project deliverables align with evolving requirements and constraints (Flyvbjerg, 2021).

According to Cobb (2023), project managers using extreme strategy must embrace uncertainty and be prepared to pivot quickly when necessary. Instead of rigid planning, extreme project management involves developing contingency plans, scenario analyses, and stress-testing project assumptions. This strategy is particularly beneficial for high-risk industries such as construction, IT, and product development, where unforeseen disruptions are common. The application of extreme strategies in project management has been found to improve project resilience, enhance decision-making speed, and increase stakeholder engagement. However, it requires a high level of expertise, strong leadership, and effective communication channels to succeed (Layton, Ostermiller, & Kynaston, 2020).

Incremental Strategy

Incremental Strategy is a strategic approach that involves making gradual, step-by-step changes to achieve long-term goals. Instead of attempting to achieve a significant transformation or major innovation in one large leap, incremental strategy focuses on small, manageable improvements that build over time (Ahmed, 2020). An incremental approach breaks

the software development process down into small, manageable portions known as increments. Each increment builds on the previous version so that improvements are made step by step (Kerzner, 2022).

The incremental approach is based on the principle that those involved in a project should at the outset focus on the key business objectives that the project is to achieve and be willing to suspend detailed consideration of the minutiae of a selected solution (Karlsson, 2016). The main advantages of incremental strategy are to reduce or eliminate uncertainty, increase efficiency, better understand project goals, and give a framework for work monitoring and control (Kerzner, 2017). In the initial stage, it is essential to understand the feasibility of the project to see if the project is viable from the economic, legal, operational, and technical aspects. Identifying problems will help to analyze whether the issues can be solved with appropriate solutions. Framing a financial plan helps a project manager to set the budget and deliver project deliverables without exceeding it. The final budget plan lists expenses on material, labor, and equipment. (Faten et al., 2020). Incremental development ensures that developers can make changes early on in the process rather than waiting until the end when the allotted time has run out and the money has been spent. Incremental management allows teams to achieve continuous progress, make quick adjustments, and deliver value at each stage. This approach is particularly useful in dynamic environments where requirements can change frequently, making it a favorite in software development, product design, and other iterative work settings (Saumya, 2023).

Literature Review

Extreme Strategy and Project Performance.

Extreme Strategy refers to a management or development approach that involves pushing processes, technologies, or organizational practices to their limits to achieve radical innovation, rapid progress, or significant change. This strategy is often associated with high-risk, high-reward scenarios where conventional methods may not be sufficient to meet ambitious goals (Flyvbjerg, Holm, & Buhl, 2019). Extreme project management focuses on so-called just-in-time development methodologies which imply using only the immediate requirements necessary for the current release. Flexibility of the developed modules can be affected by limitations; in case the future development was not taken into account. These problems are solved by extreme project management through refactoring which consists of revising earlier completed modules to adapt them to the new business functions. Refactoring involves the continuous creation of a replacement code to work with the new one while functioning faster, better and cost less. In case the team adopts such a standpoint, they create a test sample quickly, regardless of the result, experiment with alternative speed modes, and improve memory requirements or the system of relationships. This results to better project results and saves project costs (Boonstra & Reezigt, 2023).

In extreme project management, stakeholders become necessary. To them, sponsors, shareholders, partner companies, and customers are referred, i.e., all active participants of the particular project and all others who can influence the project without directly participating in it. This promotes faster completion of projects and enhances their innovative character for consumers (Sukhodoeva et al., 2020). Extreme project management highlights using brief daily meetings of the team for a general review of the elapsed day's achievements and setting directives for the current day. Consistent daily planning contributes to a reduction of the time needed for the development of the project and boosts each team member's productivity. Standup meetings are the preferable form of conducting meetings every morning as a means for information exchange among team members because formal meetings can become too long and distract from priorities. The said meetings must not last for over 15 minutes. Their objective

consists of resolving any dependencies between tasks and team members and reporting achievements of the previous day (Layton, Ostermiller, & Kynaston, 2020).

Sukhodoev and Yashkova (2023) examined extreme projects in business. According the scholars, the principal tasks of extreme project management are: ensuring the economic development of region's enterprises in general; forming the optimal structure of digital economy and its development program; ensuring social protection and improving the population's quality of life. In business extreme project management allows accelerating the project management process at the expense of involving the customer into the design process and borrowing some approaches and methods of human resources management from the IT sphere. The use of code refactoring, i.e., re-designing of the code, allows modifying the project quite promptly and efficiently. The extreme strategy also helps in identifying the flaws quickly and modifying projects without a complete overhaul of the project.

Mahmoud and Zainal, (2020) investigated the moderating effect of goal clarity on the relationship between management functions (planning, organizing, leading & controlling) and construction project success in Abu Dhabi. This study used a descriptive research design. The study sample consisted of 97 project managers from 26 authorized large construction companies in Abu-Dhabi. The instrument used was a structured questionnaire. The results showed significant positive relationships between goal clarity and project success. Also, the findings revealed that there is a significant effect of goal clarity together with the four project management functions on project success.

Vahabi, Nasirzadeh, and Mills (2020) studied the impact of project briefing clarity on construction project performance in Abu Dhabi construction companies, UAE. The results indicated that a clear project brief aids in reducing brief changes, design changes, and construction changes throughout project delivery, which can ultimately improve project cost and time performance. Despite the fact that the clear brief increases required budget and duration for the project briefing, it still represents good value to the project cost and time performance.

Incremental Strategy and Project Performance

Sreenivas and Maheswari. (2023) aimed to introduce and prioritize the agile enablers for the change management of construction projects. The study sample included 60 Iranian first-grade consultant and contractor companies in the field of construction. Data was collected using questionnaires and interview schedules. Results showed that the experts experienced in the area of change management in construction projects selected the most appropriate agility strategies for facing the prioritized changes. The most effective agility solutions in change management were identified as; continuous resource monitoring & improvement, flexible workflow, client participation, facilitated communication, and receiving requirements during the project which accelerate responding to the changes through a repetitive and incremental process based on continuous learning and short-term planning.

Hassanen and Abdelalim (2022) studied the effect of risk identification on the performance of Mega Industrial Projects in Egypt. This study was based on an extensive literature review. The study showed that there is a problem in allocating risks in the Mega projects and the top-ranked risk factors were procurement problems, subcontractors' failure to comply with the schedule, unclear responsibility matrix, indecisive management, compliance risks, and delay due to permit and consent from statutory bodies. These risk factors demonstrated that the current risk allocation practice in construction projects were inefficient and led to several other problems, such as claims, disputes, and aggressive relationships. The conclusion was that being vigilant about priority risk factors and implementing risk mitigation measures through the terms of the contract can contribute to satisfactory results for the project.

Ali and Chege (2024) studied the effects of risk mitigation practices on the performance of road construction projects in Garissa County, Kenya. The study adopted a descriptive research design. The target included 8 road construction projects within Garissa County comprising of 14 road engineers, 4 road supervisors, 8 road inspectors, 12 road surveyors and 146 project contractors. The study sample size was 145 respondents. The study adopted a stratified random sampling technique. The researcher used questionnaires to collect data. The study findings indicated that there existed a strong positive relationship between the performance of road projects in Garissa County, Kenya and risk identification. In addition, risk identification strategies included recognizing the type of risk that improved the building and construction value-chain

RESEARCH METHODOLOGY

A Research design provides a framework for the collection and analysis of data (Bryman, & Bell, 2019). This research study used a descriptive research design. This study was conducted in Nairobi County. The unit of analysis was 29 road projects implemented by Kenya Urban Roads Authority (KURA, 2024) in the FY 2022/2023, The study target is presented in Table 3.1.

Table 1: Target Population

Category	Target Population
Project Managers	29
Project Team Members	203
Contractors/Subcontractors	29
Government Officials (KURA)	29
Total	**290**

Yamane formula (1967) was used to determine the sample size since the population is less than 10,000 (Yamane, 1967). The study sample was therefore 168. The sampling technique that was used in this study was stratified random sampling. With simple random sampling, each unit of the population has an equal probability of inclusion in the sample (Creswell, 2014). Data was collected by use of semi-structured questionnaires. Quantitative data collected was analyzed using descriptive statistics which included percentages, means, and standard deviations. Content analysis was used to test data that was collected from the open-ended questions and findings were tabulated. This study also conducted inferential statistics through correlation analysis and regression analysis. Pearson correlation analysis was used to test the strength and the direction of the relationship between the independent and the dependent variables.

RESEARCH FINDINGS AND DISCUSSION

The study aimed to collect data from 168 respondents, including project managers, project team members, contractors/subcontractors, and government officials from Kenya Urban Roads Authority (KURA). A total of 137 questionnaires were successfully completed and returned, yielding an overall response rate of 81.5%. A response rate above 70% is considered acceptable and reliable for survey-based research (Mugenda & Mugenda, 2003). The high response rate in this study was achieved through follow-ups and reminders to respondents, ensuring maximum participation.

Descriptive Analysis

This section presents the descriptive analysis of the study variables, focusing on the mean and standard deviation of responses for each statement in the questionnaire. The analysis helps determine the extent to which respondents agree or disagree with the various aspects of extreme, and incremental strategies in road construction project management. The study

employed a 5-point Likert scale to measure respondents' perceptions, where 5 = Strongly Agree (SA), 4 = Agree(A), 3 = Neutral(N), 2 = Disagree(D), and 1 = Strongly Disagree (SD). To facilitate interpretation, the mean values were categorized into five levels: 1.00 – 1.50 (Strongly Disagree), 1.51 – 2.50 (Disagree), 2.51 – 3.50 (Neutral), 3.51 – 4.50 (Agree), and 4.51 – 5.00 (Strongly Agree). A mean closer to 1.00 indicates a high level of disagreement, while a mean closer to 5.00 signifies strong Agreement with the statement. The standard deviation values further indicate the level of consensus among respondents, where a low standard deviation (near 0) suggests uniform responses, while a higher standard deviation (above 1.5) reflects significant variation in perceptions.

Extreme Strategy

The first objective was to assess the effect of extreme strategy on performance of road construction projects in Nairobi City County, Kenya. Table 2 summarizes the findings on extreme strategy, which emphasizes rapid decision-making, risk-taking, and efficient resource allocation.

Table 2: Descriptive Statistics for Extreme Strategy

Statement	Mean	Std Deviation
There is a consistent daily planning which reduces time needed for project activities	4.188	0.915
Project managers foster an environment that encourages risk-taking, experimentation, and disruptive thinking.	4.000	0.889
Adequate resources and time is allocated to explore new technologies and exploit existing ones	3.938	0.897
Project managers investigate tools or specialist contractors that can help complete tasks earlier.	4.125	0.932
There is mandatory overtime to meet the project deadline	3.875	0.942
Project goals are specific, measurable, achievable, relevant, and time-bound objectives that guide project planning and execution	4.250	0.856
There are specific metrics to measure the success of projects and teams at each phase and milestone	4.062	0.891
The project is broken down to logical segments that help to discover activities that are not dependent on each other and can be implemented separately	3.937	0.934
Aggregate Score	**4.059**	**0.904**

The findings indicate that goal clarity and structured project planning had the highest mean score (M = 4.250, SD = 0.856), emphasizing that well-defined objectives significantly contribute to the success of road construction projects. This suggests that clear, measurable targets help guide decision-making and ensure efficient resource utilization. Consistent daily planning follows closely (M = 4.188, SD = 0.915), highlighting the role of structured routines in enhancing project coordination and execution speed. Additionally, project managers' ability to investigate tools or specialist contractors to expedite tasks (M = 4.125, SD = 0.932) further supports the role of proactive leadership in extreme strategy adoption. The study also found that risk-taking and experimentation (M = 4.000, SD = 0.889) are moderately practiced, indicating a balance between innovation and caution in project management. Adequate resource allocation for new technologies (M = 3.938, SD = 0.897) and establishing mandatory overtime to meet deadlines (M = 3.875, SD = 0.942) received slightly lower ratings, suggesting that while some projects embrace innovation, financial and labor constraints may limit full implementation. Similarly, breaking projects into independent, logical segments (M = 3.937,

SD = 0.934) reflects efforts to improve efficiency, though there may be challenges in ensuring seamless integration of these components.

With an aggregate mean score of 4.059, the findings suggest that extreme strategies are actively applied in road construction projects, particularly in goal-setting, structured planning, and risk-taking approaches. However, challenges in resource allocation, technological adoption, and independent project segmentation highlight areas for improvement. The findings align with Mahmoud and Zainal (2020), who established that goal clarity significantly enhances project success by improving planning and execution strategies, reinforcing the observed emphasis on structured planning and risk-taking in road construction projects. Similarly, Sukhodoeva et al. (2020) found that extreme project management promotes rapid project completion through daily planning and structured stakeholder engagement, supporting the role of goal-setting and risk-taking in improving project efficiency. However, Flyvbjerg et al. (2019) highlighted that resource allocation challenges and insufficient technological adoption often limit the full potential of extreme strategies, which aligns with the observed constraints in resource availability, independent project segmentation, and digital transformation in road construction projects. These findings suggest that while extreme strategies enhance speed and innovation in project execution, their effectiveness can be further strengthened through better financial planning, increased investment in technology, and improved segmentation strategies to ensure smooth project integration.

Incremental Strategy

The second objective of the study was to assess the effect of incremental strategy on performance of road construction projects in Nairobi City County, Kenya. Table 3 presents the results for incremental strategy, which involves structured planning, budgeting, and risk management.

3: Descriptive Statistics for Incremental Strategy

Statement	Mean	Std Deviation
Project plans clearly define the roles of project team members	4.188	0.915
The project managers have a clear Work Breakdown Structure	4.062	0.891
There project managers can effectively manage project risks	3.937	0.934
The project managers effectively manage external disruptions that affect project implementation	4.312	0.875
Adequate budget is allocated for the projects	4.250	0.856
There is effective and efficient cost control of project resources	4.000	0.889
Estimation of the project budget helps in easier facilitation of project activities.	3.875	0.942
The project team achieves continuous progress in every project phase	4.125	0.897
Aggregate Score	**4.093**	**0.900**

The findings indicate that project managers' ability to manage external disruptions had the highest mean score (M = 4.312, SD = 0.875), suggesting that incremental strategies effectively help project teams mitigate unforeseen challenges. This highlights the importance of structured, step-by-step implementation in ensuring resilience and adaptability in road construction projects. Clear project work breakdown structures (M = 4.062, SD = 0.891) and defined project team roles (M = 4.188, SD = 0.915) further reinforce the structured nature of incremental project execution, ensuring accountability and better task distribution.

The study also found that budget allocation and financial planning (M = 4.250, SD = 0.856) play a significant role in incremental strategy adoption. This suggests that well-phased funding

ensures smooth project execution and reduces financial constraints. Cost control mechanisms (M = 4.000, SD = 0.889) were also highly rated, demonstrating the effectiveness of incremental budgeting in managing expenses. However, estimation of project budgets (M = 3.875, SD = 0.942) was among the lower-rated aspects, indicating that while financial control exists, initial budget planning may require more refinement. Ensuring continuous progress in every project phase (M = 4.125, SD = 0.897) supports the idea that breaking down projects into smaller, manageable phases enhances efficiency.

With an aggregate mean score of 4.093, the results confirm that incremental strategies are widely applied in road construction projects, particularly in risk management, financial planning, and structured project execution. However, budget estimation, progressive financial monitoring, and risk forecasting remain areas requiring improvement to optimize incremental project management.

Project Performance

This section presents the descriptive analysis for project performance, which is the dependent variable in this study. The analysis evaluates key performance indicators such as adherence to time and budget, quality of project outcomes, and overall stakeholder satisfaction. These indicators help assess the effectiveness of agile project management strategies in enhancing the performance of road construction projects. Table 4 presents the descriptive statistics for project performance.

Table 4.: Descriptive Statistics for Project Performance

Statement	Mean	Std Deviation
The projects meet the time objective	4.250	0.856
Projects are implemented within the set budget	4.125	0.915
There are fewer complaints from project financiers and the public regarding the quality of road projects	3.938	0.897
The project realizes its benefits	4.312	0.875
Project beneficiaries are satisfied	4.062	0.889
Aggregate Score	**4.137**	**0.886**

The findings indicate that project benefit realization had the highest mean score (M = 4.312, SD = 0.875), suggesting that road construction projects in Nairobi City County generally achieve their intended objectives. This implies that despite various challenges, most projects contribute positively to transportation efficiency and economic development. Time objective achievement (M = 4.250, SD = 0.856) and budget adherence (M = 4.125, SD = 0.915) also scored highly, indicating that many projects are completed within the allocated timeframe and financial constraints. However, the number of complaints from project financiers and the public regarding project quality (M = 3.938, SD = 0.897) suggests that quality concerns remain an issue, possibly linked to construction defects or inadequate maintenance. Stakeholder satisfaction (M = 4.062, SD = 0.889) was rated moderately, implying that while projects generally meet their goals, some aspects of implementation may require further stakeholder engagement and alignment with user expectations.

With an aggregate mean score of 4.137, the findings confirm that project performance in Nairobi City County is relatively strong in terms of achieving objectives, budget control, and timely completion. However, quality issues and public concerns remain areas for improvement. The findings align with Sreenivas and Maheswari (2023), who emphasized that incremental strategies in construction improve project agility through continuous resource monitoring, flexible workflow, and short-term planning, reinforcing the observed strengths in risk management, financial planning, and structured project execution in road construction projects.

Similarly, Ali and Chege (2024) found that risk mitigation practices significantly enhance road project performance by improving construction value chains, supporting the role of incremental strategies in reducing uncertainties and ensuring structured implementation. However, Hassanen and Abdelalim (2022) highlighted that inefficiencies in risk allocation and budget estimation often result in financial mismanagement and delays, which aligns with the identified gaps in budget estimation, progressive financial monitoring, and risk forecasting in road construction projects. These findings suggest that while incremental strategies enhance project stability and structured execution, their impact can be further optimized through better financial forecasting, enhanced risk assessment methodologies, and improved budget monitoring mechanisms to ensure long-term project sustainability.

The descriptive analysis reveals that all four agile strategies—extreme, and incremental—are actively utilized in road construction projects, with aggregate mean scores ranging between 4.059 and 4.093. This suggests that project managers apply agile methodologies effectively, with adaptive and incremental strategies being the most widely adopted. The findings highlight the importance of flexibility, structured planning, and stakeholder involvement in enhancing project performance.

Correlation Analysis

This section presents the Pearson correlation analysis, which assesses the strength and direction of the relationships between Extreme Strategy, and Incremental Strategy with Project Performance. Pearson's correlation coefficient (r) ranges from -1 to +1, where: Strong positive correlations ($r \geq 0.5$) indicate a significant association, suggesting that higher levels of agile project management strategies enhance project performance. Moderate correlations ($0.3 \leq r < 0.5$) imply a reasonable connection, though other external factors may also influence project outcomes. Weak correlations ($r < 0.3$) suggest limited impact, indicating that agile strategies alone may not fully drive project success. Negative correlations ($r < 0$) indicate an inverse relationship, suggesting that certain strategies, if poorly implemented, may hinder project performance. Table 5 presents the Pearson correlation coefficients (r-values) for each variable, indicating the strength of association between agile project management strategies and project performance.

Table 5: Correlation Matrix

Variables		Project Performance	Extreme Strategy	Incremental Strategy
Project Performance	Pearson Correlation	1.000		
	Sig. (1-tailed)			
	N	137		
Extreme Strategy	Pearson Correlation	0.638*	1.000	
	Sig. (1-tailed)	0.000		
	N	137	137	
Incremental Strategy	Pearson Correlation	0.673*	0.451	1.000
	Sig. (1-tailed)	0.000	0.064	
	N	137	137	137

Significance Level: $p < 0.05$

The Extreme Strategy ($r = 0.638$, $p < 0.05$) demonstrated a moderately strong correlation with project performance. This indicates that risk-taking, rapid decision-making, and innovative management approaches contribute to better project outcomes. These findings align with

Flyvbjerg et al. (2019), who noted that extreme project management accelerates execution and enhances adaptability in dynamic environments.

Incremental Strategy ($r = 0.673$, $p < 0.05$) was also positively correlated with project performance, confirming that structured project execution, phased implementation, and risk mitigation lead to better project success. This is consistent with Sreenivas and Maheswari (2023), who found that incremental strategies improve risk management and resource allocation, reducing project inefficiencies.

Regression Analysis

Table 6 presents the unstandardized and standardized regression coefficients, which provide insights into the influence of each agile strategy on Project Performance.

Table 6: Regression Coefficients

Variable	Unstandardized B	Std. Error	Standardized B (β)	t-Statistic	Sig. (p-value)
Constant	0.022	0.508		0.044	0.965
Extreme Strategy	0.288	0.056	0.290	5.101	0.000
Incremental Strategy	0.357	0.057	0.364	6.249	0.000

Based on the regression coefficients, the fitted regression equation predicting Project Performance (Y) from the four agile project management strategies is:

Project Performance = 0.022 + 0.28 Extreme Strategy + 0.357 Incremental Strategy

The Extreme Strategy ($B = 0.288$, $p < 0.05$) also had a significant impact, meaning that a unit increase in extreme strategy results in a 0.288 improvement in project performance. This aligns with Flyvbjerg et al. (2019), who highlighted that high-risk, high-reward project strategies accelerate construction execution and improve efficiency.

The Incremental Strategy ($B = 0.357$, $p < 0.05$) had the strongest positive influence on project performance, suggesting that a unit increase in incremental strategy improves project performance by 0.357. This confirms findings by Sreenivas and Maheswari (2023), who noted that structured phase execution minimizes risks and improves overall project stability.

Conclusions

Extreme strategies contribute to better decision-making and risk management but are sometimes limited by financial and resource constraints. While structured planning and proactive leadership are essential in road construction projects, the ability to take calculated risks must be balanced with sustainable financial planning.

Incremental strategies enhance project stability and financial planning, ensuring that projects are executed in structured phases. While incremental approaches help in mitigating risks and optimizing resources, improvements in budget estimation and financial monitoring are necessary to prevent potential constraints.

Recommendations

Extreme Strategy

To enhance the effectiveness of extreme strategies in road construction projects, project managers should focus on improving risk-taking and resource allocation mechanisms. Since extreme strategies involve rapid decision-making and innovation, projects should allocate dedicated contingency funds to cater to unforeseen circumstances that require urgent

interventions. Government agencies should streamline fund disbursement processes to enable faster responses to project demands without bureaucratic delays.

Further, risk management training for project managers and contractors should be implemented. Many road construction projects in Nairobi City County face challenges related to rapid urbanization, fluctuating material costs, and environmental uncertainties. Training project teams on strategic risk anticipation and mitigation techniques can enhance their ability to handle extreme conditions without compromising project efficiency.

Additionally, technology-driven solutions such as predictive analytics and artificial intelligence (AI) models should be incorporated into extreme project management. AI-powered risk assessment tools can help project managers predict possible challenges and prepare proactive solutions in advance.

Incremental Strategy

Incremental strategies have proven to be highly effective in ensuring phased execution of road construction projects, but improvements can still be made. To address challenges related to financial planning and budget estimation, road construction agencies should implement more robust financial forecasting models. This involves using historical data and predictive analytics to improve cost estimates and allocate resources more efficiently over project phases.

In addition, progressive financial monitoring systems should be introduced to track budget utilization throughout different project phases. Financial accountability mechanisms such as quarterly expenditure reviews and automated cost-tracking software should be adopted to ensure efficient resource use and prevent budget overruns. Another key recommendation is the standardization of phased implementation models for road construction projects in Nairobi City County. Establishing a clear roadmap for phased project execution—including well-defined milestones, resource allocation schedules, and quality assessment checkpoints—will ensure that projects progress smoothly without delays caused by uncoordinated execution.

Finally, a structured knowledge-sharing platform should be established where project managers from different road construction sites can exchange best practices, lessons learned, and challenges encountered when implementing incremental strategies. This initiative will facilitate continuous improvement in how projects are executed and managed.

Suggestions for Further Research

While this study provides valuable insights, further research is recommended to explore additional factors that influence project execution and performance. Future studies could examine the role of digital transformation in agile project management, particularly the impact of artificial intelligence and automation on project monitoring and decision-making. Research on government policies and regulatory frameworks could also provide insights into how institutional factors influence the effectiveness of agile strategies.

Comparative studies between agile and traditional project management methodologies in construction would be beneficial in identifying the most effective approaches for different types of infrastructure projects. Additionally, research on the long-term sustainability of agile strategies in large-scale construction projects could provide further guidance on optimizing project execution models.

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