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PROJECT MANAGEMENT

TECHNOLOGICAL ADVANCEMENT AND ORGANIZATIONAL PERFORMANCE OF HOUSING CONSTRUCTION COMPANIES IN KENYA, KASARANI SUB-COUNTY, NAIROBI COUNTY

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ABSTRACT

Purpose of Study: The study examined the relationship between technological advancement and organizational performance of housing construction companies in Kasarani Sub-County, Nairobi County, Kenya.

Statement of the Problem: Technological advancement has become increasingly important in the construction industry because effective project delivery depends on timely information, accurate planning, coordinated site activities, and rapid managerial decision-making. Despite these benefits, adoption of technology among residential construction companies in Kenya remains uneven, particularly among small and medium-sized firms that face challenges related to cost, technical skills, implementation capacity, and integration of technology into routine project activities. This situation may limit the ability of construction firms to improve project efficiency and overall organizational performance.

Research Methodology: The study adopted a descriptive-correlational survey design within the broader dissertation study. The target population comprised 285 housing construction companies, from which 166 firms were selected using simple random sampling. A total of 148 usable questionnaires were returned, representing an 89.16% response rate. Data was collected using structured questionnaires and analyzed using descriptive and inferential statistics.

Results: Pearson correlation analysis established a strong, positive, and statistically significant relationship between technological advancement and organizational performance ($r = 0.60$, $p < 0.001$). Regression analysis further showed that technological advancement was a positive and statistically significant predictor of organizational performance ($\beta = 0.33$, $t = 5.42$, $p < 0.001$).

Conclusion: Technological advancement significantly influenced organizational performance among housing construction companies. The benefits of technology are greater when digital systems and tools are effectively integrated into routine project-management processes rather than being treated as stand-alone investments.

Recommendation: Housing construction companies should adopt a phased and strategic approach to technological investment, focusing on systems that are suitable for their operational needs and financial capacity.

Keywords: *Technological advancement, Technology adoption, Organizational performance, housing construction, Digital construction, Project management*

INTRODUCTION

Housing construction has traditionally depended on physical resources, technical expertise and close coordination among architects, engineers, contractors, suppliers, clients and regulators. That coordination is increasingly being mediated by technology. Digital project-management platforms, Building Information Modelling (BIM), mobile site applications, digital documentation, automated processes, prefabrication-related systems, 3D modelling and data-based monitoring tools are changing how building projects are planned, communicated, executed and controlled. In the literature reviewed in the dissertation, these technologies are associated with improved information exchange, better coordination, fewer design and execution errors and faster decision-making (Maruti et al., 2024; Rui et al., 2021). The strategic question for construction firms is therefore no longer whether technology exists, but whether it is adopted in ways that improve organizational outcomes. (Azhar, 2011; Bryde et al., 2013; Succar, 2009; Rui et al., 2021).

For housing construction companies, this issue is especially important because performance is visible in practical outcomes. Projects are expected to meet agreed timelines, control avoidable disruptions, maintain quality standards, satisfy clients and support the financial continuity of the firm. Weak coordination can cause materials to arrive late, site teams to work from outdated information, changes to be communicated slowly and rework to consume time and resources. Technology can help address these problems by making project information more accessible and by enabling managers to monitor activities more systematically. However, these benefits are not automatic. A technology that is poorly understood, weakly supported or disconnected from routine work processes may add cost without improving performance. (Azhar, 2011; Bryde et al., 2013; Rui et al., 2021; Oesterreich & Teuteberg, 2016).

The dissertation observed substantial variation in technology adoption across construction enterprises. Larger firms were more likely to use project-management software, computerized estimating tools and digital inventory monitoring, whereas smaller firms often relied on paper records, manual scheduling and informal communication with subcontractors. This variation is important because it shows that technological advancement is not a single event. It is a process through which firms move from manual and fragmented methods toward more integrated digital systems. The performance effect therefore depends on the depth of adoption, the relevance of the selected technology, the skills of users and the extent to which new tools are incorporated into day-to-day operations. (Nasila & Cloete, 2018; Maruti et al., 2024; Oesterreich & Teuteberg, 2016; Davis, 1989).

Kasarani Sub-County provides an appropriate setting for examining this relationship. The area has experienced rapid urban development and sustained demand for residential housing. Housing construction firms must operate in a competitive environment in which delays, rising costs, coordination problems and quality expectations can directly affect organizational survival. Local firms consequently need management systems that improve visibility over project progress, strengthen communication between office and site teams, support resource planning and allow timely corrective action. Technology offers one route to achieving these outcomes, but locally grounded evidence on its firm-level contribution remains limited. (Kenya National Bureau of Statistics, 2019; Nasila & Cloete, 2018; Maruti et al., 2024; Ngiri & Njagi, 2022).

The broader construction sector in Kenya has been under pressure to deliver housing and related infrastructure more efficiently while responding to rapid urbanization and rising customer expectations. Within this environment, technology has become one of the mechanisms through which construction organizations can improve the way work is organized. The dissertation defined technological advancement as the use of modern technologies, processes and materials to improve efficiency, reduce costs, improve quality and encourage sustainable construction. This definition emphasizes application rather than novelty: a technology becomes strategically relevant when it solves operational problems and contributes to better organizational outcomes. (Kenya National Bureau of Statistics, 2019; Maruti et al., 2024; Nasila & Cloete, 2018; Oesterreich & Teuteberg, 2016).

Three dimensions were emphasized in the study. The first was digital technology, represented by the use of modern digital tools in project management, including digital documentation and information systems. The second was automation and robotics, which captured the movement from purely manual processes toward mechanized and automated construction activities. The third was project-management software, including systems that support planning, scheduling, resource allocation, progress tracking and control. Together, these dimensions represent both the technical and managerial sides of technological advancement. They affect not only how construction tasks are performed, but also how information moves through the organization and how managers make decisions. (Succar, 2009; Oesterreich & Teuteberg, 2016; Azhar, 2011; Rui et al., 2021).

Organizational performance was treated as a broader firm-level outcome rather than a single project indicator. The study assessed whether companies achieved project targets within set timelines, experienced consistent profitability, improved customer satisfaction and maintained high-quality workmanship standards. These indicators are appropriate for residential construction because firms must simultaneously deliver projects, protect margins, retain clients and maintain a reputation for acceptable workmanship. Technology can potentially influence each of these outcomes by improving planning accuracy, coordination, process visibility and response time. (Bryde et al., 2013; Marube & Ombui, 2021; Maruti et al., 2024; Ngiri & Njagi, 2022).

PROBLEM STATEMENT

Modern construction technologies are widely promoted as solutions to persistent industry challenges, yet the presence of technology does not necessarily translate into improved organizational performance. Many firms acquire software or digital tools without fully integrating them into site operations, procurement, scheduling or managerial decision-making. Others continue to operate hybrid systems in which some functions are digitized while key approvals, inventory records, subcontractor coordination or reporting remain manual. This fragmented use can reduce the potential return on technology investment.

The problem is more pronounced among small and medium-sized housing construction firms. The dissertation identified high initial investment costs, inadequate technical skills, limited access to experienced personnel and resistance to established work patterns as important constraints on adoption. These conditions can result in a gap between technology ownership and technology utilization. A firm may possess a project-management application, for example, but continue to rely on manual updates or informal communication if employees are not confident using the system. In such cases, the organization carries the cost of technology without capturing its operational benefits.

Existing studies reviewed in the dissertation provide evidence that BIM and digital technologies can improve coordination, information flow and project management, but much of that evidence focuses on large infrastructure, commercial construction or project-level performance. Residential construction firms operating at the sub-county level remain less studied. This creates a contextual and empirical gap: it is not sufficiently clear whether technological advancement is associated with broader organizational performance among housing construction firms in Kasarani Sub-County. The present article addresses that gap by isolating technological advancement as the focal independent variable and examining its relationship with organizational performance.

RESEARCH OBJECTIVE

To assess the influence of technological advancement on the organizational performance of housing construction companies in Kasarani Sub-County, Nairobi County.

RESEARCH HYPOTHESIS

H_0: Technological advancement has no statistically significant relationship with organizational performance among housing construction companies in Kasarani Sub-County.

LITERATURE REVIEW

Conceptualizing Technological Advancement in Construction

Technological advancement in construction can be understood as the progressive use of digital, automated and software-supported methods to improve project and organizational processes. The study operationalized the construct through modern digital technologies, automation and robotics, and software used for project planning and control. This operationalization recognizes that technology in construction is broader than a single platform such as BIM. It includes the systems used to create and share information, the tools used to reduce manual effort, and the software used to plan resources and monitor work.

Digital technologies are particularly important because construction work is information intensive. Drawings, schedules, cost information, procurement records, site reports and client instructions must move between multiple participants. When these information flows are slow or fragmented, decision-making also slows. Maruti et al. (2024) reported that selected digital technologies can improve coordination, reduce errors, strengthen information flow and support faster decisions in construction projects. Rui et al. (2021) similarly linked BIM-based project management to stronger integration of project information. These findings suggest that the main contribution of technology is not simply speed; it is the ability to make relevant information available to the right users at the right time.

Automation and robotics represent another dimension of technological advancement. Their strategic value lies in reducing dependence on repetitive manual processes, improving consistency and supporting productivity where tasks can be mechanized. In the context of the dissertation, automation was considered alongside prefabrication techniques and automated equipment. Adoption remains uneven in Kenya, especially among smaller firms, because the financial and skills requirements can be substantial. The implication is that automation should be assessed in relation to organizational capability rather than viewed as a universal solution that every firm can adopt at the same level.

Project-management software connects the technical and managerial dimensions of technology. Scheduling platforms and related systems can support resource allocation, progress tracking, planning and control. Their value is strongest when they provide a common source of project information and reduce the time required to identify delays or coordination failures. For housing construction firms managing several subcontractors and suppliers, this can improve the ability of managers to sequence work, monitor milestones and communicate changes. However, software becomes valuable only when users update it consistently and managers use the resulting information in actual decisions.

Technology Acceptance Model

The study was anchored on the Technology Acceptance Model (TAM), initially developed by Davis (1986) and subsequently validated through the concepts of perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness concerns whether a user believes a technology will improve job performance, while perceived ease of use concerns whether the technology can be operated without excessive effort. The model is directly relevant to construction organizations because many digital systems require users to change established routines. Employees are more likely to adopt a new tool when its benefit is visible in the tasks they perform and when the system is manageable within practical workplace conditions. (Davis, 1986, 1989; Venkatesh & Davis, 2000).

In a housing construction firm, the logic of TAM can be illustrated through project-management software. A site manager is more likely to use a system that makes it easier to track subcontractor progress, identify delays and generate accurate reports. A quantity surveyor is more likely to use digital estimating or cost-control tools when they improve accuracy and reduce repetitive work. Conversely, a system may be abandoned when users find it complicated, when training is insufficient or when the information generated is not trusted. The model therefore helps explain why technically capable tools may produce different outcomes across firms. (Davis, 1989; Venkatesh & Davis, 2000; Rui et al., 2021; Bryde et al., 2013).

TAM also supports an important distinction between acquisition and assimilation. Acquisition refers to obtaining the technology, while assimilation refers to making it part of normal organizational practice. The dissertation stressed that the mere presence of BIM software, automated procurement platforms or other digital tools does not guarantee performance improvement. Firms are more likely to realize efficiency, cost, decision-making and delivery benefits when technology acquisition is accompanied by training, technical support and organizational incentives that encourage use. From this perspective, technological advancement is a socio-technical capability: the system and the people who use it must develop together. (Davis, 1989; Venkatesh & Davis, 2000; Nasila & Cloete, 2018; Oesterreich & Teuteberg, 2016).

The model nevertheless has limitations in the construction context. It gives substantial attention to individual perceptions and less attention to structural constraints such as firm size, affordability, subscription costs, internet reliability and ownership decisions. In small firms, employees may have little influence over which systems are purchased, while owners may determine adoption based on cost rather than user preference. TAM also says relatively little about long-term organizational change and competitive effects. These limitations mean that TAM is best used as an explanatory lens rather than a complete account of technology adoption. (Venkatesh & Davis, 2000; Davis, 1989; Nasila & Cloete, 2018; Oesterreich & Teuteberg, 2016).

Technological Advancement and Organizational Performance

A positive technology-performance relationship can occur through several mechanisms. The first is improved coordination. Residential construction projects involve multiple trades whose activities are interdependent. Digital platforms can improve the visibility of schedules and task status, allowing managers to identify conflicts and communicate changes more quickly. The second mechanism is improved information quality. When documentation is current and accessible, project participants are less likely to work from outdated instructions. The third mechanism is improved control. Software-supported planning and monitoring can make schedule deviations, inventory problems or emerging resource constraints visible earlier, creating more time for corrective action. (Bryde et al., 2013; Rui et al., 2021; Azhar, 2011; Maruti et al., 2024).

Technology can also influence quality and customer satisfaction. Better design coordination may reduce errors before work reaches the site, while digital records can improve accountability for changes and approvals. Faster communication can help firms respond to client concerns more effectively. In addition, the use of systematic planning and monitoring tools can support more reliable completion dates, which are central to client experience in housing projects. These pathways help explain why technological advancement may be reflected not only in operational efficiency but also in broader organizational performance. (Azhar, 2011; Bryde et al., 2013; Maruti et al., 2024; Rui et al., 2021).

The relationship is not automatically positive. Technology can create new costs, learning requirements and process complexity. Where staff continue to use manual systems alongside digital platforms, duplicate work may increase rather than decrease. Where data are entered inconsistently, managers may distrust system outputs and return to informal decision-making. Technology may also create dependency on connectivity, technical support and vendor systems. Therefore, the performance question is not whether more technology is always better, but whether the technology is appropriate, usable and integrated with the firm's operational routines. (Oesterreich & Teuteberg, 2016; Nasila & Cloete, 2018; Venkatesh & Davis, 2000; Davis, 1989).

RESEARCH METHODOLOGY

Research Design

The underlying dissertation used a descriptive survey design and incorporated correlational analysis to examine relationships among study variables. It also included qualitative interviews to provide context to the quantitative findings. The present article reports the quantitative component relevant to technological advancement and organizational performance. A descriptive-correlational approach was appropriate because the article sought to describe the level of technology adoption and determine the strength and direction of its association with organizational performance without manipulating the study environment.

Study Area, Population and Unit of Analysis

The study was conducted among construction enterprises operating in Kasarani Sub-County, Nairobi County. The unit of analysis was the construction company, while managerial staff, particularly chief executive officers and project managers, served as the principal units of observation. The target population comprised 285 building and construction entities drawn from large, medium, small and specialized construction categories. This range was important because technology adoption can differ markedly according to organizational scale and capability.

The target population consisted of 43 large construction companies, 94 medium construction companies, 120 small construction companies and 28 specialized firms, representing 15%, 33%, 42% and 10% of the population respectively. Small and medium-sized firms therefore formed the majority of the study population. This composition is relevant to the technology question because smaller firms are often more exposed to cost and skills barriers when attempting to adopt advanced digital and automated systems.

Sample Size and Sampling Procedure

Using Yamane's sample-size approach as applied in the dissertation, 166 construction companies were selected from the population of 285. Simple random sampling was used so that eligible firms had an equal opportunity of selection. The final sample comprised 25 large companies, 55 medium companies, 70 small companies and 16 specialized companies. One manager was targeted from each selected firm, resulting in 166 questionnaires issued for the main study.

Data Collection Instrument and Measurement

Primary quantitative data was collected through a structured self-administered questionnaire. The technological advancement section used a five-point response scale and assessed three core statements: whether the company adopted modern digital technologies in project management, whether automation and robotics were applied in construction processes, and whether software was used to enhance project planning and control. These items captured the degree to which technology had moved beyond isolated ownership into operational use.

Organizational performance was also measured through a five-point scale. The indicators included achievement of project targets within set timelines, consistency in profitability, improvement in customer satisfaction and maintenance of high-quality workmanship standards. The use of multiple indicators was important because construction-firm performance cannot be represented adequately by a single financial or project measure. The selected indicators combine delivery, financial, customer and quality perspectives.

Validity, Reliability and Pilot Testing

Content validity was strengthened by submitting the draft questionnaire to the academic supervisor and experienced practitioners in the built environment, including representatives associated with the National Construction Authority and experienced project managers. Their feedback was used to improve clarity, relevance and alignment between questionnaire items and the study objectives before full administration. A pilot study was conducted in Roysambu Sub-County, which borders Kasarani. Pilot data was excluded from the final analysis and were used to identify ambiguities and structural weaknesses in the instrument.

Internal consistency was assessed using Cronbach's alpha. The technological advancement scale achieved an alpha coefficient of 0.78, above the 0.70 threshold adopted in the study, while organizational performance achieved 0.73. These values indicate that the items within each construct were sufficiently consistent for composite analysis. For technological advancement specifically, the coefficient supports the use of the three items covering digital platforms, automated processes and technical innovation as a common measure of the underlying construct.

Data Collection and Ethical Considerations

Research authorization and ethical clearance were obtained before field data collection. The questionnaire was hand-delivered to selected participants, and respondents were given adequate time to complete it. Participation was voluntary, informed consent was obtained and confidentiality was maintained. The dissertation further emphasized integrity in data handling and reporting, including the use of collected information only for the stated research purpose and the objective presentation of findings.

Data Analysis

Completed questionnaires were checked for completeness, coded and analyzed using IBM SPSS Statistics version 26. Descriptive statistics included frequencies, percentages, means and standard deviations. Pearson's correlation coefficient was used as the primary inferential statistic for this focused article because it directly measures the strength and direction of the association between technological advancement and organizational performance. The dissertation's original multiple-regression coefficient for technological advancement is reported as supplementary evidence of the variable's adjusted contribution within the broader thesis model; coefficients for the other predictors are intentionally omitted because they fall outside the scope of this article.

Normality was assessed using the Kolmogorov-Smirnov test. A significance value greater than 0.05 was interpreted in the dissertation as evidence that the normality assumption was not violated. For the two variables retained in this article, technological advancement recorded $p = 1.000$ and organizational performance recorded $p = 0.637$. These results supported the use of parametric analysis in the original study.

RESULTS AND DISCUSSION

Response Rate

Of the 166 questionnaires distributed, 148 were completed and returned, representing a response rate of 89.16%. Eighteen questionnaires were not returned, equivalent to 10.84% of the intended sample. The achieved response rate provided a substantial dataset for the analysis of technological advancement and organizational performance.

Respondent Profile

The respondent profile indicates that the study captured views from managers with varied demographic and professional backgrounds. Male respondents accounted for 55.4% and female respondents for 44.6%. Half of the respondents had a bachelor's degree, 35.1% held diploma qualifications and 14.9% had postgraduate qualifications. Professional experience was also substantial: 41.9% had six to ten years of experience and 31.1% had more than eleven years. This profile suggests that a large proportion of participants had sufficient organizational exposure to comment meaningfully on technology use and company performance.

Table 1: Respondent Demographic and Professional Profile

Characteristic	Category	Frequency	Percentage
Gender	Male	82	55.4
Gender	Female	66	44.6
Age	18-25 years	20	13.5
Age	26-35 years	58	39.2
Age	36-45 years	46	31.1
Age	46+ years	24	16.2
Education	Diploma	52	35.1
Education	Degree	74	50.0
Education	Postgraduate	22	14.9
Experience	0-5 years	40	27.0
Experience	6-10 years	62	41.9
Experience	11+ years	46	31.1

Reliability and Normality

The reliability and normality results for the variables retained in the focused article are presented in Table 1. The Cronbach alpha value of 0.78 for technological advancement indicates acceptable internal consistency, while the organizational performance scale recorded 0.73. The Kolmogorov-Smirnov significance values were above 0.05 for both variables, and the dissertation therefore treated the data as satisfying the normality assumption for parametric analysis.

Table 2: Reliability and Normality Results

Measure	Technological advancement	Organizational performance
Cronbach alpha	0.78	0.73
Kolmogorov-Smirnov significance	1.000	0.637

Descriptive Findings

Technological advancement recorded a mean of 4.05 and a standard deviation of 0.58. The mean indicates that respondents generally perceived the level of technology adoption in their companies as relatively high. However, the dissertation interpreted this result as evidence of progress rather than complete digital transformation. Many firms had incorporated digital instruments and technical solutions, but further investment in automation, advanced platforms and integrated systems remained possible. Organizational performance recorded a mean of 4.08 and a standard deviation of 0.60, indicating generally positive perceptions of firm performance.

Table 3: Descriptive Statistics for Technological Advancement

Variable	Mean	Standard deviation	Interpretation
Technological advancement	4.05	0.58	Relatively high adoption
Organizational performance	4.08	0.60	High performance

The descriptive findings are important because they show that the sampled firms were not starting from a position of complete technological absence. Instead, the sector appears to be in a stage of partial or progressive adoption. This creates an important managerial distinction between basic digitalization and deeper integration. Firms may already use communication applications, planning software or digital documentation, but the performance potential of technology is likely to depend on whether these systems are connected across planning, procurement, site operations, reporting and control.

Relationship between Technological Advancement and Organizational Performance

Pearson correlation analysis established a strong positive relationship between technological advancement and organizational performance ($r = 0.60$, $p < 0.001$). The positive direction indicates that firms reporting greater use of digital technologies, automation and project-management software also tended to report higher organizational performance. The magnitude of 0.60 represents a substantial relationship in the context of organizational research and provides direct evidence against the null hypothesis of no relationship. The coefficient also implies approximately 36% shared variance between the two constructs ($r^2 = 0.36$). This value is a descriptive transformation of the reported correlation and should not be treated as a causal estimate or as the R^2 of the dissertation's full regression model. It nevertheless illustrates that the observed relationship is practically meaningful: technology and performance move together to a considerable degree across the firms studied.

Table 4: Technological Advancement and Organizational Performance

Test	Statistic	Significance	Interpretation
Pearson correlation: technology and performance	$r = 0.60$	$p < 0.001$	Strong positive, statistically significant relationship
Technology coefficient in the original thesis regression	$\beta = 0.33$; $t = 5.42$	$p < 0.001$	Positive and statistically significant adjusted predictor

The dissertation's original regression output provides supplementary evidence. Technological advancement retained a positive standardized coefficient of $\beta = 0.33$ with $t = 5.42$ and $p < 0.001$ when considered within the broader strategic-management model. This indicates that the relationship was not only visible at the bivariate level but that technological advancement also made a statistically significant adjusted contribution in the original analysis. Because this article is deliberately limited to one focal independent variable, the coefficients for the other thesis predictors are not reproduced. On the basis of the correlation result and the supporting regression coefficient, the null hypothesis was rejected. The study therefore concludes that technological advancement has a statistically significant positive relationship with organizational performance among the housing construction companies surveyed in Kasarani Sub-County.

Discussion

Level of Technological Advancement

The mean score of 4.05 indicates that technological advancement is already a meaningful feature of operations among the firms studied. This finding is consistent with the broader transition of construction from predominantly manual systems toward digital project management, electronic documentation and software-supported planning. However, the result should not be interpreted as evidence that firms have reached full digital maturity. The dissertation noted continued variation in adoption by firm size and identified limited investment in automation and advanced platforms as areas where further progress was needed.

This pattern is understandable in a market containing many small and medium-sized firms. Technology adoption often occurs incrementally. A company may first adopt digital communication and scheduling tools, then move into more integrated systems for procurement, inventory, estimating or project monitoring as capacity grows. Such staged adoption can still produce value, particularly when it addresses immediate operational weaknesses. The risk arises when firms accumulate disconnected tools without a clear process for integration, data ownership, training or use in management decisions.

Technological Advancement as a Performance Enabler

The correlation coefficient of 0.60 provides strong evidence that technological advancement is associated with organizational performance. The result is consistent with the argument that technology acts as an operational enabler. Digital project-management systems can improve the speed and accuracy of information flows; automated processes can reduce repetitive manual effort; and planning software can help managers track schedules, resources and project progress. These improvements can translate into fewer coordination failures, quicker decisions and better control over project execution.

The relationship also makes practical sense when considered against the performance indicators used in the study. Timely achievement of project targets depends on visibility over schedules and emerging delays. Profitability can be protected when firms reduce avoidable rework, idle labour and inefficient resource allocation. Customer satisfaction can improve when communication is timely and project progress is more predictable. Quality workmanship can be supported when teams have access to current information and when errors are identified earlier. The technology-performance relationship therefore reflects multiple pathways rather than one isolated mechanism.

The findings align with Maruti et al. (2024), who linked selected digital technologies to improved coordination, reduced errors, stronger information flows and faster decision-making in Nairobi construction projects. They are also compatible with Rui et al. (2021), whose BIM-focused work emphasizes the role of integrated information in construction project management. Nasila and Cloete (2018) similarly demonstrate that BIM has important potential within the Kenyan construction industry while highlighting barriers to adoption. The present study adds a firm-level perspective by showing that broader technological advancement is associated with organizational performance among residential construction companies in Kasarani.

Interpretation through the Technology Acceptance Model

TAM provides a useful explanation for why technological advancement is positively related to performance but still uneven across firms. When employees see clear benefits in a technology and find it manageable to use, adoption is more likely to move beyond formal acquisition into routine practice. This matters because performance gains occur through actual use. A scheduling platform improves performance only when project teams update activities and managers act on the information. A digital documentation system reduces errors only when users rely on current records rather than parallel paper versions. An automated process improves productivity only when staff understand how to operate and maintain it.

The dissertation identified high initial costs, insufficient technical skills and resistance to change as barriers that can interrupt this process. These constraints fit the logic of TAM while also showing where the model needs to be supplemented by organizational considerations. Perceived usefulness may be high, but adoption can still fail if the firm cannot finance the system or support users. Perceived ease of use may improve after training, but usage can still decline if managers do not require the system to be part of normal reporting and decision-making. Technology acceptance therefore needs managerial reinforcement.

The practical implication is that technology strategy should combine hardware or software investment with capability development. Training should be linked to the exact task's users perform. Technical support should be available after initial implementation, when real operational problems arise. Managers should define how the new system replaces or improves existing processes instead of allowing permanent duplication. These steps help convert technology from an administrative add-on into an embedded organizational capability.

Barriers to Converting Technology into Performance

The positive relationship should not obscure the adoption barriers identified in the dissertation. The first is cost. Advanced systems may require licensing, hardware, connectivity, implementation support and training. For smaller firms, these costs compete with immediate project needs. The second barrier is skills. A system that exceeds the technical capability of users can produce low usage, poor data quality or dependence on a small number of specialists. The third barrier is resistance to established work patterns. Construction teams often rely on familiar informal methods, and changing these routines requires more than a one-off training session.

A fourth barrier is fragmentation. Firms may purchase technology for isolated functions without designing a shared information process. Scheduling software may not communicate with procurement records; site reporting may remain manual; management decisions may continue to be made outside the system. In such a setting, the organization does not obtain the full value of digitalization because information remains siloed. Integration is therefore as important as acquisition.

The dissertation's conclusion that technology is currently underused should be read in this broader sense. Underuse does not necessarily mean that firms have no technology. It can mean that available systems are not fully exploited, that advanced functions are not used, that automation remains limited or that technology is not consistently linked to operational decisions. The performance opportunity lies in deepening effective use rather than simply increasing the number of tools owned by the firm.

CONCLUSION

The article concludes that technological advancement is positively and significantly associated with the organizational performance of housing construction companies in Kasarani Sub-County. The sampled firms reported a relatively high level of technology adoption, and firms with higher technological advancement also tended to report better organizational performance. The correlation result of $r = 0.60$, $p < 0.001$ demonstrates a strong positive relationship, while the technology coefficient reported in the original thesis regression ($\beta = 0.33$, $t = 5.42$, $p < 0.001$) provides additional evidence that technological advancement remained an important performance predictor within the broader dissertation analysis.

The central conclusion is that technology creates organizational value when it is translated into everyday operating capability. Digital project-management tools, automated processes and software-supported planning can strengthen coordination, information flow, decision-making and project control. However, acquisition alone is insufficient. Performance benefits depend on user competence, technical support, management commitment and the integration of technology into routine work processes. Technology should therefore be viewed as an operational capability that combines systems, people and organizational practices.

RECOMMENDATIONS

Housing construction firms should prioritize fit-for-purpose technologies that address clearly identified operational problems. Investments should focus first on areas where information delays, manual coordination or weak monitoring directly affect project delivery, including scheduling, procurement, inventory control, site reporting and communication. Firms should adopt a phased technology strategy. Where resources are limited, management should begin with reliable digital systems that provide immediate operational value before moving into more complex automation or large-scale digital transformation. Each stage should be evaluated according to actual use and measurable improvements in project processes.

Technology investment should be accompanied by continuous staff training. Training should be practical, role-specific and integrated into daily work rather than delivered only as an introductory workshop. Firms should also maintain technical support and designate responsible internal users who can assist colleagues when difficulties arise. Management should reduce parallel manual and digital systems once new tools are stable. Keeping duplicate processes for long periods weakens adoption, increases workload and creates inconsistent information. Clear procedures should define which system is the authoritative source for scheduling, reporting, procurement or other relevant functions.

Construction-sector stakeholders should strengthen digital capacity-building for small and medium-sized firms. Practical training, demonstrations of affordable technologies and partnerships that reduce implementation barriers can help broaden adoption and reduce the gap between early adopters and firms that remain dependent on manual systems. Firms should periodically evaluate whether adopted technologies are improving the outcomes for which they were introduced. Technology strategy should therefore include simple performance reviews covering user adoption, time saved, reduction in rework, improvement in coordination and contribution to project delivery. Systems that do not create operational value should be redesigned, better supported or replaced.

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