

PROJECT MANAGEMENT INFORMATION SYSTEMS SCHEDULING TOOLS AND PROJECT TIMELINESS IN PUBLIC HOUSING PROJECTS IN HOMA BAY COUNTY, KENYA

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ABSTRACT

Timely completion remains an important dimension of construction project success because delays can affect project costs, resource utilisation, stakeholder satisfaction and the delivery of intended public benefits. Project Management Information Systems (PMIS) have increasingly been incorporated into construction management to support planning, scheduling, monitoring, reporting and coordination. However, empirical evidence on the specific relationship between PMIS scheduling tools and project timeliness remains limited in public housing projects in Kenya. This study examined the relationship between PMIS scheduling tools and project timeliness in Public Housing Projects in Homa Bay County, Kenya. The study was guided by the Technology Acceptance Model and the DeLone and McLean Information Systems Success Model. A descriptive correlational cross-sectional research design and quantitative approach were adopted. The target population comprised 110 stakeholders involved in public housing projects, from which a sample of 86 was selected using stratified random sampling. Data were collected using a structured questionnaire and analysed using descriptive statistics, Pearson correlation and regression analysis. The findings

showed that PMIS scheduling tools were highly utilised, with a composite mean of 4.05 (SD = 0.80). Pearson correlation analysis established a moderate, positive and statistically significant relationship between PMIS scheduling tools and project timeliness ($r = .596$, $p < .001$, $n = 80$). Simple linear regression further showed that PMIS scheduling tools explained 35.5% of the observed variance in project timeliness ($R^2 = .355$, adjusted $R^2 = .346$). The study concludes that PMIS scheduling tools are positively and significantly associated with project timeliness in Public Housing Projects in Homa Bay County, Kenya. The study therefore recommends that Public housing project managers should strengthen the systematic use of PMIS scheduling functions throughout the project life cycle, particularly for timeline development, milestone monitoring, real-time progress tracking, critical-task identification and task-dependency management.

Keywords: Project Management Information Systems, Scheduling Tools, Project Timeliness, Resource Utilization, Construction Projects.

INTRODUCTION

Construction projects operate within complex environments characterised by interdependent activities, multiple stakeholders, resource constraints, changing requirements and uncertainty. Consequently, effective project planning and scheduling are essential for coordinating

activities and ensuring that project deliverables are completed within their planned timeframes. Project scheduling provides a framework for determining activities, sequencing tasks, allocating resources, establishing milestones and monitoring progress throughout implementation. In public construction, effective schedule management is particularly important because delays can affect public service delivery, resource utilisation and the realisation of intended social and economic benefits (Mogoa & Muchelule, 2023; Cherwenyi et al., 2026). Recent Kenyan evidence indicates that activity sequencing, duration estimation, schedule development and schedule monitoring are positively associated with construction project performance, further demonstrating the importance of systematic schedule management in public-sector projects.

The increasing digitalisation of construction management has created opportunities for improving the way project schedules are developed, monitored and controlled. Project Management Information Systems (PMIS) have evolved from relatively simple computer-based planning applications into more integrated systems (DeLone & McLean, 2003; Raymond & Bergeron, 2008; Haloul et al., 2024). Contemporary PMIS may incorporate scheduling applications, dashboards, cloud-based collaboration, document management, progress tracking and other digital capabilities that allow project teams to access and process project information more efficiently (Haloul et al., 2024; Monteiro et al., 2025).

PMIS scheduling tools are particularly relevant to project timeliness because they provide mechanisms through which project teams can establish project timelines, identify milestones, sequence activities, monitor progress and identify activities that may affect the planned completion date. Scheduling applications can also facilitate the identification of critical tasks and task dependencies, allowing project managers to understand how changes in one activity may affect subsequent activities. These capabilities can strengthen project monitoring and managerial decision-making by providing timely information concerning schedule performance (Raymond & Bergeron, 2008; Haloul et al., 2024).

The role of information systems in project management is also supported by the DeLone and McLean Information Systems Success Model, which conceptualises information-system success through dimensions including system quality, information quality, service quality, use, user satisfaction and net benefits (DeLone & McLean, 2003). From this perspective, PMIS can contribute to project outcomes when project information is accurate, accessible and useful to project stakeholders. Scheduling functions can therefore be viewed not simply as technological features but as mechanisms for generating and communicating information that supports project control and coordination (DeLone & McLean, 2003; Raymond & Bergeron, 2008).

Similarly, the Technology Acceptance Model (TAM) proposes that perceived usefulness and perceived ease of use influence the acceptance and use of information technology (Davis, 1989). The relevance of TAM to PMIS lies in the possibility that project stakeholders are more likely to use scheduling systems when they perceive those systems as useful for improving their work and relatively easy to operate (Davis, 1989). However, the availability of PMIS does not automatically guarantee improved project performance. The benefits derived from

information systems can depend on user capability, system quality, organisational support, infrastructure and the extent to which the system is integrated into project-management processes (DeLone & McLean, 2003; Raymond & Bergeron, 2008).

Recent literature has continued to demonstrate the growing relevance of PMIS and related digital technologies in construction management. Haloul et al. (2024), in a systematic review of PMIS applications in different construction contexts, demonstrated that PMIS technologies can support a range of project-management activities, including planning, scheduling, cost management and monitoring. Monteiro et al. (2025) similarly examined the effects of PMIS on project-manager performance and highlighted the importance of PMIS in supporting project-management processes. Taresh et al. (2025) further demonstrated the relevance of information systems to project-management success while considering the mediating role of project risk management.

Evidence from Kenya also suggests growing interest in the use of PMIS and digital technologies in construction. Ayier et al. (2022) examined determinants of PMIS adoption in public works projects in Kenya, while Mutwiri and Yusuf (2022) investigated PMIS integration and performance of public-school construction projects in Kajiado County. Thuku and Nyang'au (2021) examined PMIS attributes and performance of ICT projects in Nairobi City County. More recently, Macharia and Kwasira (2025) reported a positive and statistically significant relationship between PMIS integration in project planning and the performance of NG-CDF building construction projects in Kiambu County.

Project scheduling has also been examined independently of PMIS. Mogoa and Muchelule (2023) found that construction project teams in Mombasa County used task sequencing, task-dependency mapping, Gantt charts and critical-path considerations in project scheduling. Their findings underscore the importance of defining and sequencing construction activities before implementation and of communicating project schedules throughout the project life cycle. Similarly, recent evidence from Kenyan county-government construction projects indicates that schedule management has a positive and statistically significant relationship with project performance, with activity sequencing, duration estimation, schedule development and monitoring identified as important scheduling practices.

Despite this growing body of literature, a contextual gap remains concerning the specific relationship between PMIS scheduling tools and project timeliness in public housing projects. Existing studies have frequently examined overall PMIS adoption, general project performance, PMIS integration, project planning or construction scheduling, rather than isolating scheduling functionalities and relating them specifically to project timeliness. The distinction is important because the effectiveness of PMIS may differ across functions and project contexts. Consequently, evidence from roads, schools, ICT projects or private construction projects cannot automatically be assumed to apply to public housing projects in Homa Bay County. This study therefore focuses specifically on PMIS scheduling tools and project timeliness in Public Housing Projects in Homa Bay County, Kenya. The study conceptualises scheduling tools in terms of the use of scheduling applications, development of

timelines and milestones, real-time progress tracking, automated delay alerts, critical-task identification, timeline monitoring and task-dependency management.

Problem Statement

Timely implementation is a fundamental requirement for successful public construction projects because delays can postpone the delivery of public facilities, disrupt planned resource utilisation and increase pressure on project budgets. Effective schedule management enables project teams to define activities, establish milestones, sequence tasks and monitor implementation against planned timelines (Mogoa & Muchelule, 2023). Recent evidence from Kenyan county-government construction projects demonstrates that project schedule management is significantly associated with project performance, suggesting that realistic scheduling and continuous schedule monitoring can contribute to better project outcomes.

The increasing availability of PMIS provides an opportunity to strengthen these scheduling processes. PMIS scheduling functionalities can support the development of project timelines, tracking of progress, identification of critical activities, management of task dependencies and detection of potential schedule deviations (Haloul et al., 2024; Raymond & Bergeron, 2008). Such functionalities are particularly relevant to public housing projects where implementation involves multiple actors, interdependent construction activities and accountability requirements. Nevertheless, the existence or adoption of a PMIS does not necessarily mean that its scheduling functionalities are effectively used or that their use translates into improved project outcomes (DeLone & McLean, 2003; Abubakar et al., 2025).

Empirical evidence from Kenya remains fragmented. Studies have investigated PMIS adoption and construction project performance (Ayier et al., 2022; Mutwiri & Yusuf, 2022), PMIS integration in project planning (Macharia & Kwasira, 2025), and broader project scheduling practices (Mogoa & Muchelule, 2023). However, these studies do not specifically establish whether PMIS scheduling functions are significantly associated with the timeliness of public housing projects in Homa Bay County. The distinction is important because PMIS encompasses multiple functions and the contribution of each function may differ across dimensions of project performance.

Objective of the Study

The study sought to examine the relationship between PMIS scheduling tools and project timeliness in Public Housing Projects in Homa Bay County, Kenya.

The corresponding null hypothesis was:

H₀₁: There is no statistically significant relationship between PMIS scheduling tools and project timeliness in Public Housing Projects in Homa Bay County, Kenya.

LITERATURE REVIEW

PMIS Scheduling Tools

PMIS scheduling tools refer to information-system functionalities used to develop, monitor and update project schedules, milestones, task dependencies and progress. In this study,

scheduling tools were operationalised through the reported use of timeline development, progress tracking, delay alerts, critical-task identification, milestone monitoring and task-dependency management. The development of integrated PMIS has expanded the capacity of project teams to manage schedules using centralised and continuously updated information. Traditional scheduling approaches can provide project teams with activity sequences and planned completion dates, but integrated digital systems can additionally facilitate real-time monitoring and information sharing among project stakeholders (Raymond & Bergeron, 2008; Haloul et al., 2024). Consequently, the value of PMIS scheduling tools lies not only in producing an initial project schedule but also in supporting continuous schedule control.

Gantt charts, critical path analysis, milestone tracking and task-dependency management are particularly important scheduling mechanisms because construction activities are interdependent. A delay in one activity may affect subsequent activities, especially where those activities lie on or near the critical path. Digital scheduling systems can help project teams visualise these relationships and identify activities that require close monitoring (Haloul et al., 2024; Mogoa & Muchelule, 2023).

Real-time progress tracking provides another important PMIS capability. Rather than relying exclusively on periodic manual reports, project teams can use digital systems to compare actual progress with planned schedules and identify deviations. Timely access to such information may enable corrective actions before deviations become substantial (Raymond & Bergeron, 2008; Monteiro et al., 2025).

Automated alerts can similarly support proactive project management by drawing attention to potential delays. However, the effectiveness of such functions depends on the quality and timeliness of the information entered into the system, user competence and organisational processes for responding to identified deviations. Thus, PMIS should be regarded as a managerial support mechanism rather than a substitute for managerial decision-making (DeLone & McLean, 2003; Haloul et al., 2024).

PMIS and Project Timeliness

Project timeliness concerns the extent to which project activities and deliverables are completed within their planned timeframes. In this study, timeliness was measured through respondents' assessments of completion within planned timelines and the early detection and addressing of project delays. Timeliness is closely related to effective schedule management because project delays can emerge from poor activity sequencing, inadequate monitoring, resource constraints, coordination problems and unforeseen changes. Effective schedule management therefore requires not only the creation of a baseline schedule but also continuous monitoring and updating throughout project implementation (Mogoa & Muchelule, 2023).

Recent Kenyan research supports the importance of scheduling. A study of county-government building construction projects found that project schedule management had a statistically significant positive effect on project performance ($\beta = .323$, $p < .001$), with effective activity sequencing, duration estimation, schedule development and monitoring identified as important

practices. Another Kenyan study examining construction projects in Mombasa County found that project teams used task sequencing, task-dependency mapping, Gantt charts and critical-path considerations as part of schedule management. The relationship between scheduling and timeliness can therefore be understood through the ability of project teams to anticipate, monitor and respond to schedule deviations. (Haloul et al., 2024; Monteiro et al., 2025).

THEORETICAL FRAMEWORK

Technology Acceptance Model

The Technology Acceptance Model developed by Davis (1989) proposes that perceived usefulness and perceived ease of use influence individuals' acceptance and use of information technology. Perceived usefulness refers to the extent to which an individual believes that using a particular technology will improve job performance, while perceived ease of use concerns the extent to which the individual believes that using the technology will be free of significant effort (Davis, 1989).

TAM provides a useful theoretical lens for understanding why project stakeholders may adopt and utilise PMIS scheduling tools. When project managers and other stakeholders perceive scheduling tools as useful for monitoring progress, identifying delays and coordinating project activities, they may be more likely to use those tools consistently (Davis, 1989). However, this study did not independently measure perceived usefulness or perceived ease of use. TAM therefore provides theoretical underpinning rather than a direct statistical test of the model.

DeLone and McLean Information Systems Success Model

The DeLone and McLean Information Systems Success Model identifies system quality, information quality, service quality, use, user satisfaction and net benefits as interrelated dimensions of information-system success (DeLone & McLean, 2003). The model is relevant to PMIS because the usefulness of scheduling tools depends partly on the quality, accessibility and usefulness of the information produced by the system.

Within a construction project, scheduling information has value when it supports decisions concerning activity sequencing, progress monitoring, delay identification and resource coordination. Thus, effective use of PMIS scheduling tools may generate net benefits through improved project-management processes (DeLone & McLean, 2003; Raymond & Bergeron, 2008). As with TAM, this study did not empirically test every dimension of the DeLone and McLean model. Instead, the model provided a theoretical basis for examining whether PMIS functions were associated with project performance.

TAM and the DeLone and McLean Information Systems Success Model provided theoretical underpinning for the study; however, their individual constructs were not independently measured or statistically tested in this study.

Empirical Review

Obeidat and Aldulaimi (2016) examined the role of PMIS in construction projects in the United Arab Emirates and reported a positive and statistically significant relationship between PMIS-related measures and project performance ($r = .72$). The study also found that project managers perceived PMIS as useful for planning, scheduling and monitoring project timelines. Although the study provides evidence supporting the importance of PMIS, its relatively small sample and broad PMIS measure limited its ability to establish the unique contribution of individual scheduling functions (Obeidat & Aldulaimi, 2016).

Haloul et al. (2024) conducted a systematic review of PMIS applications across different types of construction projects. Their review identified a range of PMIS capabilities supporting project planning, scheduling, cost management, monitoring and information management. The review provides conceptual support for examining scheduling functions as a distinct PMIS capability, although it does not provide a direct statistical test of the relationship between scheduling tools and timeliness in a particular public housing context (Haloul et al., 2024).

Monteiro et al. (2025) examined the effects of PMIS on project-manager performance and considered the moderating role of the project management office. Their work reinforces the broader proposition that information systems can strengthen project-management processes when they are effectively integrated into organisational project-management practices (Monteiro et al., 2025).

Taresh et al. (2025) similarly examined the impact of information systems on project-management success while considering project risk management as a mediating variable. Their findings contribute to the broader literature showing that information systems can influence project-management processes, although their study was not specifically concerned with PMIS scheduling tools and project timeliness.

Collectively, the international evidence suggests that PMIS can contribute to project-management effectiveness, but it also demonstrates the need for context-specific research. Information-system capabilities may produce different outcomes depending on organisational context, user capability, project complexity and the specific functions being examined (DeLone & McLean, 2003; Haloul et al., 2024).

Evidence from Africa indicates increasing adoption of digital technologies in construction, although adoption and effective utilisation remain distinct issues. Abubakar et al. (2025), for example, examined PMIS adoption among construction professionals in Kano State, Nigeria. The study reported a moderate level of PMIS adoption despite generally positive attitudes towards PMIS, suggesting a potential difference between willingness to use digital systems and actual implementation (Abubakar et al., 2025).

This distinction is important because the mere availability of PMIS does not necessarily imply that scheduling functions are systematically incorporated into project-management processes. Effective utilisation requires appropriate organisational support, user competence,

technological infrastructure and integration of the system into routine project-management activities (DeLone & McLean, 2003; Abubakar et al., 2025).

Kenyan research has increasingly examined PMIS and digital project-management practices. Ayier et al. (2022) examined determinants of PMIS adoption in State Department for Public Works projects, demonstrating the relevance of organisational and technological factors in PMIS utilisation. Mutwiri and Yusuf (2022) examined PMIS integration and performance of public school construction projects in Kajiado County, while Thuku and Nyang'au (2021) examined PMIS attributes and the performance of ICT projects in Nairobi City County.

Macharia and Kwasira (2025) provide more recent evidence from public construction. Their study examined PMIS integration in project planning and the performance of NG-CDF building construction projects in Thika Town Constituency, Kiambu County. The study reported a positive and statistically significant relationship between PMIS integration in project planning and project performance, with a standardised coefficient of $\beta = .646$ and $p < .001$.

Akwale and Yusuf (2023), however, reported more mixed evidence in ECDE construction projects in Uasin Gishu County. Respondents reported relatively high agreement that PMIS provided calendars, reminders and schedule-change tracking, but the study reported a non-significant relationship between its time-management measure and project performance. This contrasting finding demonstrates why the relationship between digital scheduling functions and project outcomes should not be assumed to be universally positive.

Mogoa and Muchelule (2023) found evidence of systematic scheduling practices in construction projects in Mombasa County, including task sequencing, dependency mapping, Gantt charts and critical-path considerations. Their findings suggest that conventional scheduling practices remain important even as construction organisations increasingly adopt digital systems.

More recent Kenyan evidence further reinforces the importance of schedule management. Cherwenyi et al. (2026) reported that project schedule management had a positive and statistically significant relationship with county-government building construction project performance ($\beta = .323$, $p < .001$). Their study specifically identified activity sequencing, duration estimation, schedule development and monitoring as important components of effective scheduling.

RESEARCH METHODOLOGY

Research Design

The study adopted a descriptive correlational cross-sectional research design and quantitative approach. The design was appropriate because the study sought to establish the statistical relationship between PMIS scheduling tools and project timeliness at a particular point in time. Correlational analysis allowed the researcher to determine the direction and strength of

association between the variables, while regression analysis was used to estimate the amount of variation in reported timeliness associated with PMIS scheduling tools.

Population and Sampling

The target population comprised 110 stakeholders involved in Public Housing Projects in Homa Bay County undertaken between 2021 and 2026. The stakeholders included project managers, clerks of works, contractors/site agents, county housing officers and consultants. A sample of 86 respondents was determined using Yamane's formula, while stratified random sampling was used to ensure representation across the stakeholder categories. Using Yamane's formula, the study determined a sample of 86 respondents. Proportionate allocation produced the following planned sample:

Table 1: Sampling table

Stakeholder category	Population	sample
Project managers	10	8
Clerks of works	40	31
Contractors/site agents	25	20
County housing officers	15	12
Consultants	20	15
Total	110	86

The sampling approach enabled representation of the principal professional groups involved in planning, supervision, implementation and oversight of public housing projects. Of the 86 questionnaires administered, 80 usable questionnaires were returned, producing a response rate of 93.0%. The high response rate provided a strong basis for the planned statistical analysis.

Data Collection Instrument

Data were collected using a structured questionnaire. Project timeliness was measured using two indicators: completion within planned timelines and early detection and addressing of project delays. These indicators were measured through respondents' assessments on a five-point Likert scale. Responses were recorded on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The questionnaire was piloted among 11 respondents in Kisumu County who did not participate in the main study. Face, content and construct validity procedures were applied, while internal consistency was assessed using Cronbach's alpha. The instrument demonstrated strong internal consistency. The PMIS scheduling tools scale demonstrated strong internal consistency, with a Cronbach's alpha coefficient of .913.

Data Analysis

Data were analysed using SPSS Version 30. Descriptive statistics included means and standard deviations, while Pearson product-moment correlation was used to establish the direction and strength of the relationship between PMIS scheduling tools and project timeliness. Simple linear regression was then conducted to estimate the proportion of variance in timeliness associated with PMIS scheduling tools.

RESULTS

Descriptive Results for PMIS Scheduling Tools

Respondents generally reported high utilisation of PMIS scheduling tools. The composite mean was 4.05 (SD = 0.80), indicating a high level of agreement with the scheduling-tool statements.

Table 2: Descriptive Statistics for PMIS Scheduling Tools

PMIS scheduling tool indicator	Mean	SD
Use of PMIS scheduling tools such as Gantt charts and critical path analysis	4.00	1.01
Development of clear project timelines and milestones	4.11	1.01
Real-time tracking of project progress against the schedule	4.11	0.95
Automated alerts for potential schedule delays	3.90	1.07
Identification of critical tasks affecting project completion	4.13	0.99
Effective monitoring of project timelines and milestones	4.09	0.97
Effective management of task dependencies	4.04	0.95
Composite PMIS scheduling tools	4.05	0.80

Respondents generally reported high utilisation of PMIS scheduling tools, with a composite mean of 4.05 (SD = 0.80). The highest-rated indicator was identification of critical tasks affecting project completion (M = 4.13, SD = 0.99), followed by development of clear project timelines and milestones and real-time tracking of project progress (both M = 4.11). Effective monitoring of timelines and milestones also received a high rating (M = 4.09). The lowest-rated indicator was automated alerts for potential schedule delays (M = 3.90, SD = 1.07).

The findings suggest that respondents perceived PMIS scheduling tools as generally available and useful within the public housing projects. However, the comparatively lower score for automated delay alerts may indicate that some more advanced or automated scheduling functionalities were less consistently utilised than basic planning and monitoring functions.

Project Timeliness

Table 3: Descriptive Statistics for project timeliness in public housing projects

Statement	Mean	SD
Public Housing Projects in Homa Bay County are generally completed on time.	3.48	1.28
Delays in Public Housing Projects are often detected early and addressed promptly.	3.71	1.25

Completion within planned timelines recorded a mean of 3.48 (SD = 1.28), while early detection and addressing of project delays recorded a mean of 3.71 (SD = 1.25). The findings indicate that respondents perceived early identification and response to project delays more positively than completion strictly within planned timelines.

Correlation Between PMIS Scheduling Tools and Project Timeliness

Pearson correlation analysis established a moderate, positive and statistically significant relationship between PMIS scheduling tools and project timeliness ($r = .596$, $p < .001$, $n = 80$). The positive coefficient indicates that higher reported utilisation of PMIS scheduling tools was associated with better reported project timeliness. The null hypothesis was therefore rejected.

Regression Analysis

Simple linear regression was undertaken to further assess the relationship between PMIS scheduling tools and project timeliness.

Table 4: Regression results

Model	R ²	Adjusted R ²	F	B	SE	t	p
Scheduling → Timeliness	.355	.346	42.89	.835	.127	6.55	< .001

Simple linear regression showed that PMIS scheduling tools explained 35.5% of the observed variance in project timeliness ($R^2 = .355$, adjusted $R^2 = .346$). The regression model was statistically significant, $F = 42.89$, $p < .001$. The unstandardised regression coefficient was $B = .835$ ($SE = .127$), with $t = 6.55$, $p < .001$. The positive coefficient indicates that higher reported PMIS scheduling-tool scores were associated with higher reported project-timeliness scores. The fitted model can therefore be expressed as:

$$\text{Project Timeliness} = \alpha + 0.835(\text{PMIS Scheduling Tools}) + \varepsilon$$

The positive coefficient indicates that higher PMIS scheduling-tool scores were associated with higher reported project-timeliness scores.

DISCUSSION OF FINDINGS

The study established a moderate, positive and statistically significant relationship between PMIS scheduling tools and project timeliness ($r = .596$, $p < .001$). This finding indicates that respondents reporting greater utilisation of PMIS scheduling functionalities also tended to report better project timeliness. The result is consistent with the view that digital scheduling tools can support project teams in developing timelines, monitoring milestones, tracking progress, identifying critical tasks and managing task dependencies.

The finding is consistent with the broader argument that information systems can strengthen project planning, monitoring and decision-making by improving the availability and accessibility of project information (DeLone & McLean, 2003; Raymond & Bergeron, 2008). Scheduling tools can provide project teams with structured information concerning planned activities, milestones, dependencies and progress, thereby supporting more systematic monitoring of implementation.

The result also aligns with Obeidat and Aldulaimi (2016), who found a strong positive relationship between PMIS and construction project performance in the United Arab Emirates. Although their study examined PMIS more broadly rather than isolating scheduling tools, the positive relationship supports the proposition that information-system use can contribute to project-management effectiveness.

The finding is further consistent with Haloul et al. (2024), whose systematic review demonstrated the broad application of PMIS across construction project-management functions. Their review identified scheduling, planning, monitoring and other project-control capabilities as important areas in which PMIS can support construction management. This study extends this literature by providing empirical evidence concerning the specific

association between scheduling functions and project timeliness in a Kenyan public housing context.

The result is also consistent with recent Kenyan evidence concerning project schedule management. Mogoia and Muchelule (2023) found that construction teams in Mombasa County used task sequencing, dependency mapping, Gantt charts and critical-path considerations in project scheduling. Similarly, Cherwenyi et al. (2026) found that project schedule management was positively and significantly related to performance in county-government building construction projects, highlighting the importance of activity sequencing, duration estimation, schedule development and schedule monitoring.

The present finding is particularly relevant because the PMIS scheduling construct included several of the same underlying scheduling mechanisms. Respondents reported relatively high utilisation of project timelines, milestone monitoring, real-time progress tracking, critical-task identification and task-dependency management. These functionalities provide mechanisms through which project managers can monitor the relationship between planned and actual implementation.

The regression finding strengthens this interpretation. PMIS scheduling tools explained 35.5% of the observed variance in project timeliness ($R^2 = .355$, $p < .001$). This represents a substantial proportion of variation for a single predictor, although the remaining 64.5% indicates that project timeliness is influenced by other factors not captured by the model. Such factors may include resource availability, contractor capacity, procurement processes practices.

The result also complements Macharia and Kwasira's (2025) findings from NG-CDF building projects in Kiambu County. Their study found a positive and statistically significant relationship between PMIS integration in project planning and project performance, with $\beta = .646$ and $p < .001$. Although the constructs and project contexts differ, both studies point toward a positive association between digital project-information practices and construction project outcomes.

However, the present findings differ from the more mixed evidence reported by Akwale and Yusuf (2023). Their study of ECDE construction projects in Uasin Gishu County found relatively high agreement with some PMIS scheduling functions, including calendars, reminders and schedule-change tracking, but reported a non-significant relationship between its time-management measure and project performance. This contrast suggests that the benefits of PMIS scheduling may be context-dependent and may depend on the maturity of implementation, user competence, organisational support and the extent to which scheduling information is acted upon.

The lower mean for automated delay alerts in this study is particularly noteworthy. While respondents generally agreed that PMIS scheduling tools were utilised, automated delay alerts received the lowest mean among the seven indicators ($M = 3.90$). This may suggest that public housing projects have made greater progress in basic digital scheduling and monitoring than in

more advanced automated schedule-control capabilities. Such a pattern is consistent with literature emphasising that technological adoption and effective utilisation are not necessarily equivalent (Abubakar et al., 2025).

From a theoretical perspective, the finding is compatible with TAM because project stakeholders may continue to use scheduling functions when they perceive them as useful for managing project timelines (Davis, 1989). The finding is also compatible with the DeLone and McLean model because scheduling functions may generate useful project information that contributes to project-management benefits (DeLone & McLean, 2003).

Conclusion

The study concludes that PMIS scheduling tools are positively and significantly associated with project timeliness in Public Housing Projects in Homa Bay County, Kenya. The correlation analysis established a moderate positive relationship ($r = .596$, $p < .001$), while simple linear regression showed that PMIS scheduling tools explained 35.5% of the observed variance in reported project timeliness ($R^2 = .355$). The findings indicate that scheduling functionalities such as timeline development, milestone monitoring, real-time progress tracking, critical-task identification and task-dependency management are important components of digital project-management practice. However, given the cross-sectional and self-reported nature of the data, the findings should be interpreted as associations rather than definitive causal effects.

Recommendations

Public housing project managers should strengthen the systematic use of PMIS scheduling functions throughout the project life cycle, particularly for timeline development, milestone monitoring, real-time progress tracking, critical-task identification and task-dependency management.

Public housing authorities should strengthen the use of automated schedule-monitoring and delay-alert functions. The relatively lower mean recorded for automated delay alerts ($M = 3.90$) suggests that this functionality may require greater attention.

Project managers, clerks of works and other relevant project personnel should receive appropriate training on the effective use and interpretation of PMIS scheduling information to support routine monitoring and timely identification of schedule deviations.

Implications of the Study

Practical Implications

The findings provide project managers and contractors with empirical evidence that stronger utilisation of PMIS scheduling functionalities is associated with better reported project timeliness. Project teams can therefore use scheduling systems as an ongoing management tool rather than simply as a mechanism for producing an initial project schedule.

Policy Implications

Public-sector housing authorities can consider incorporating minimum PMIS scheduling requirements into project-management guidelines. Such requirements could include digital baseline schedules, milestone tracking, periodic progress updates, critical-path monitoring and documentation of schedule deviations. This would be consistent with recent evidence supporting systematic schedule-management practices in Kenyan public construction.

Theoretical Implications

The findings provide contextual support for the proposition that information-system utilisation can generate project-management benefits, consistent with the DeLone and McLean framework (DeLone & McLean, 2003). They also provide practical support for the relevance of perceived usefulness within TAM (Davis, 1989), although neither theoretical model was directly tested.

Limitations and Directions for Future Research

The study has several limitations that should be considered when interpreting its findings. First, the cross-sectional design captures PMIS use and project timeliness at one point in time and therefore cannot establish temporal ordering or causality. Longitudinal studies could examine whether increased PMIS utilisation precedes measurable improvements in schedule performance.

Second, the study relied on self-reported questionnaire responses. Although the questionnaire demonstrated strong internal consistency, respondents' perceptions may differ from independently verified project outcomes. Future studies should combine questionnaire responses with objective project records, including planned versus actual completion dates, schedule variance, Schedule Performance Index (SPI), baseline schedule revisions and documented delay durations.

Third, the study focused exclusively on Public Housing Projects in Homa Bay County. Although the context-specific focus provides useful evidence, findings should not automatically be generalised to other counties, private construction projects or other categories of public infrastructure.

Fourth, the study examined PMIS scheduling as a composite construct. Future studies could disaggregate scheduling functions to determine whether real-time tracking, automated alerts, critical-path analysis, milestone monitoring or task-dependency management has the strongest association with project timeliness.

Finally, future research could examine moderating factors such as project complexity, user competence, organisational support, digital infrastructure and project-management-office capability. Such analysis would help explain why PMIS scheduling may produce stronger outcomes in some project environments than others.

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