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Understanding How AI Chatbots Influence Project Performance in Project Management Information Systems: The Mediating Role of Process Efficiency

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ABSTRACT

The increasing complexity of project environments has intensified the need for intelligent and efficient Project Management Information Systems (PMIS). This paper examines how chatbots in PMIS can influence project performance, with a particular focus on the mediating role of project management process efficiency (PME). Drawing on the Technology Acceptance Model (TAM), particularly perceived usefulness (PU), and process-based project management theory, a conceptual model was developed linking chatbot capabilities (PU, AUT, and RTR) to project performance through PME. The study used a quantitative, cross-sectional design, and data were collected from 300 project professionals. SPSS was used to conduct regression and mediation analyses with the PROCESS macro. Despite growing interest in AI-chatbot project management, empirical evidence explaining how chatbot capabilities translate into project outcomes remains limited. This study addresses this gap by examining the mediating role of project management processes. The findings reveal that chatbot capabilities significantly affect PME, with real-time reporting showing the largest impact ($\beta = 0.3889$, $p = 0.001$). PME, in turn, is significantly and positively related to project performance ($\beta = 0.7389$, $p < 0.001$). The regression model explains 26.1% of the variance in project performance ($R2 = 0.261$, $p < 0.001$). Mediation analysis shows that PME fully mediates the relationship between chatbot capabilities and project performance, and that the indirect effects are significant. These results indicate that integrating chatbots improves project outcomes primarily by enhancing process efficiency. Beyond operational efficiency, the study contributes to understanding how AI-enabled conversational systems reshape human decision support and information coordination in project environments.

INTRODUCTION

The increasing complexity of today's work environments has intensified the demand for Project Management Information Systems (PMIS) that can support real-time coordination, monitoring, and decision-making (Adamopoulou, 2020). PMIS tools such as Jira and Microsoft Project are widely used for planning, scheduling, and tracking project activities. However, many conventional systems still rely heavily on manual input, fragmented communication, and delayed reporting, which can slow down decision-making and project execution (Greco & Corvello, 2024).

A key limitation of traditional PMIS is their dependence on manual updates from project teams. Routine activities such as task updates, reporting, and communication require continuous human involvement, which often leads to delays, inconsistencies, and administrative burden (Brandtzaeg & Følstad, 2017). In large multi-stakeholder projects, these inefficiencies become more pronounced, affecting coordination and timely access to project information (Adam *et al.*, 2021). Furthermore, many PMIS platforms still lack real-time responsiveness, making it difficult for managers to monitor risks, progress, and performance indicators effectively (Ahuja, 2024).

Recent advances in artificial intelligence (AI), particularly natural language processing and conversational agents, have created new opportunities to enhance PMIS functionality. Chatbots, in particular, can automate routine tasks, support information retrieval, generate reports, and enable real-time interaction between users and systems (Haenlein *et al.*, 2019). Consequently, insufficient evidence exists regarding the mechanisms through which chatbot-enabled PMIS create organisational value and improve project performance (Akram *et al.*, 2024). Although these investigations offer insights into user attitudes and behavioral intentions towards chatbots, they neglect the structural and functional aspects of integrating chatbots in PMIS (Simelane & Kittur, 2026). In particular, there is a lack of empirical research on the potential of chatbots to improve key project management processes, including communication, time and risk management, and project performance assessment (Yi, 2025). From a project management standpoint, communication is a key success factor that impacts collaboration, coordination, and stakeholder management. Existing communication channels in PMIS tend to be asynchronous and disjointed, resulting in information gaps and decision-making delays (Ingason *et al.*, 2025).

Furthermore, the understudied area is project risk management. Risk is an inherent element in projects, and timely detection, tracking, and response to risks are critical for project success. Existing PMIS systems offer limited support for tracking risks but cannot detect them in real time and generate alerts (Chen *et al.*, 2024). The integration of chatbots with PMIS can leverage real-time data to detect abnormalities, raise risk warnings, and

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generate early alerts for project managers, thereby helping the organization manage risks proactively (Kanishka *et al.*, 2026; Müller *et al.*, 2024).

Project management information systems (PMIS) suffer from manual workflows, lagging communication, and poor real-time monitoring, leading to inefficiencies and diminished project performance. While chatbot technologies promise automation and real-time interaction features, their integration with PMIS and influence on fundamental project management processes, communication, scheduling, risk management, and monitoring are poorly understood. Existing studies on AI-powered chatbots have predominantly concentrated on user adoption, acceptance intentions, and technology implementation issues (Akram *et al.*, 2024; Chen *et al.*, 2024). While these studies contribute to understanding behavioral acceptance, they provide limited evidence regarding how chatbot capabilities influence project-level outcomes.

Furthermore, prior research has largely examined chatbot applications in customer service, healthcare, and public administration, with comparatively little attention devoted to project management environments (Felicetti *et al.*, 2024). More importantly, the mechanisms through which chatbot functionalities create organisational value remain underexplored. Existing studies often assume a direct relationship between AI capabilities and performance outcomes, overlooking the role of process-level improvements. Consequently, little empirical evidence exists regarding whether project management process efficiency serves as an explanatory mechanism linking chatbot capabilities with project performance. Addressing these gaps, the present study develops and empirically tests a process-based framework integrating Technology Acceptance Model constructs with project management process theory.

This study aims to answer the following questions

1. What is the impact of chatbot capabilities on project management process efficiency within PMIS?
2. What is the effect of project management process efficiency on project performance?
3. Does project management process efficiency mediate chatbot capabilities and project performance?

The study aims to examine the effect of chatbots in project management systems on project performance by improving the efficiency of project management processes.

1. To examine the effect of chatbot features on project management process efficiency
2. To examine the effects of process efficiency on project performance
3. To explore the mediation effect of process efficiency

The increasing use of AI-powered conversational agents raises broader questions regarding the role of intelligent systems in supporting human decision-making, coordination, and organisational practices. This study contributes to theory by extending TAM beyond adoption-focused explanations and linking AI-chatbots PMIS capabilities directly to project outcomes through process efficiency. It also provides practical guidance for organizations on how chatbot integration can improve project performance through structured process optimization. Furthermore, it extends existing research by empirically examining Project Management Process Efficiency (PME) as a mediating mechanism.

Theoretical Framework

This research synthesizes the Technology Acceptance Model (TAM) and process-based project management theories to understand the effects of chatbot systems on project performance. TAM (Davis *et al.*, 1989) stresses the importance of perceived usefulness for system success. While TAM primarily explains technology adoption through perceived usefulness, this study extends the model by incorporating automation capability and real-time reporting as technology-specific functional capabilities of chatbot-enabled PMIS. Therefore, this study complements TAM with process-based project management theory, which argues that organisational performance improvements occur through the optimization of operational processes rather than through technology adoption alone. The integration of these perspectives enables examination of both technology-related capabilities and the process mechanisms through which such capabilities influence project outcomes. In this study, perceived usefulness is broadened to include automation capability and real-time reporting to capture the capabilities of Project Management Information Systems (PMIS) integrated with chatbots. This research also considers the processes that technology supports, arguing that technology does not inherently enhance project performance unless it supports key project management processes. These processes serve as the operational conduits through which technology capabilities can improve project performance (Wang *et al.*, 2024). The model consequently suggests that the efficiency of the project management process serves as a mediating mechanism between chatbot capabilities and project performance (Vicci, 2022). This approach helps to bridge the information systems theory and project management literature by showing that the use of chatbot technology is beneficial not only for project management but also for enhancing workflows, reducing ambiguity, and enabling real-time decision-making in PMIS.

LITERATURE REVIEW

Artificial Intelligence Chatbots in Project Management Information Systems

Project Management Information Systems (PMIS) are indispensable for coordinating project activities, communication, progress monitoring, and managerial decision-making throughout the project life cycle. Even though they are very common, conventional PMIS are often based on manual data entry, disconnected communication, and reporting processes that can slow

decision-making and reduce operational efficiency (Felicetti *et al.*, 2024). Organizations are looking for intelligent technologies to make existing PMIS more functional and enable more responsive project management in an increasingly complex, data-intensive environment. With the recent growth of Artificial Intelligence (AI), especially Generative AI & NLP technologies, the use of conversational agents, or Chatbots, in organisational information systems has increased rapidly (Müller *et al.*, 2024). Chatbots can handle repetitive tasks, fetch information, produce reports, and offer natural language interaction, and are becoming a major force in automating routine tasks. They have proven to be invaluable resources for digital transformation efforts and intelligent decision support systems, as they can provide real-time assistance (Haenlein *et al.*, 2019). Recent studies published by E-Palli Publishers also highlight the growing role of artificial intelligence and digital technologies in improving organizational decision-making and technology-enabled management practices. These studies reinforce the view that AI-driven systems can enhance operational efficiency, support informed decision-making, and facilitate digital transformation across organizational settings (Adamopoulou, 2020; Igwenagu *et al.*, 2026). Moreover, researchers have suggested that the use of technology alone is insufficient to achieve optimal performance if technological capabilities are not adequately integrated into organisational procedures and project processes.

Perceived Usefulness and AI-Supported Project Work

Perceived usefulness (PU), a core construct of the Technology Acceptance Model (TAM), refers to the extent to which users believe that a technology improves their job performance (Davis *et al.*, 1989). In project management environments, PU plays a crucial role because professionals operate under time pressure, resource constraints, and high information demands. With the emergence of AI-powered chatbots, perceived usefulness has evolved beyond basic system efficiency to include functional value such as faster access to project information, automated reporting, and improved communication support (Kang, 2026). These capabilities reduce administrative workload and improve workflow efficiency in PMIS environments.

However, prior research shows that perceived usefulness alone does not always translate directly into organizational performance. While it strongly influences adoption and satisfaction, its impact on operational outcomes is often indirect and depends on how effectively the technology is embedded into organizational processes (Nenni *et al.*, 2025). In other words, usefulness becomes meaningful only when it enhances the execution of project activities. Therefore, this study argues that perceived usefulness contributes to project outcomes by influencing project management process efficiency (PME). When users perceive chatbots as useful, they are more likely to integrate them into communication, monitoring, and decision-making processes, thereby improving overall process efficiency.

H1: Perceived usefulness has a positive effect on project management process efficiency.

Automation Capability and Project Management Process Efficiency

Automation capability refers to the extent to which AI-chatbots can perform repetitive, routine, and administrative tasks with minimal human intervention. In project management, automation is increasingly recognized as a critical capability for improving workflow efficiency, reducing manual workload, and enhancing process consistency (Greco & Corvello, 2024). By automating tasks such as task assignment, status reporting, schedule updates, and information retrieval, chatbot-enabled systems can reduce the administrative burden and allow project professionals to focus on higher-value activities. Traditional project management processes require extensive human involvement, and routine updates inevitably lead to delays, inconsistencies, and cognitive overload for the project team. These limitations are overcome by automation technologies, which streamline workflows and ensure that routine tasks are executed consistently and efficiently (Kang, 2026).

New research has shown that the use of AI-powered automation in project environments can increase operational efficiency, as project professionals spend less time on administrative work and more time on tasks that add greater value to the project, such as decision-making and strategic planning (Nenni *et al.*, 2025). With these services, the project status can be automatically updated, tasks assigned, progress reports generated, and alerts raised in case of deviations. These capabilities enhance coordination and reduce dependency on manual reporting structures (Kaplan & Haenlein, 2020). However, there is also literature indicating that automation may not lead to better project outcomes if not properly incorporated from the outset into project management processes and supported by organizational readiness and user acceptance (Brandtzaeg & Følstad, 2017; Raisch & Krakowski, 2021). On a theoretical level, the automation capability is linked to process-based project management theory, which suggests that improvements in project performance can be achieved by enhancing process efficiency rather than merely adding technology. Thus, when chatbot automation capabilities are well integrated into PMIS, it is expected to facilitate more efficient communication, reduce delays, and improve coordination among stakeholders. Collectively, the literature indicates that automation capability can streamline project workflows, reduce administrative burden, and enhance coordination efficiency. Therefore, organizations with higher chatbot automation capabilities are expected to achieve greater efficiency in project management.

H2: Automation capability positively influences the efficiency of the project management process.

Real-Time Reporting and Project Management Process Efficiency

Real-time reporting means that information systems can provide real-time information on project progress, risks, and performance indicators. The speed with which information is delivered and its quality are critical in project management for making efficient decisions, managing risks, and coordinating activities between various stakeholders (Adamopoulou, 2020). Reporting systems can be periodic and delayed, making it harder for project managers to respond to new issues promptly. AI-powered chatbots and PMIS solve this by maintaining real-time reporting and providing quick access to project data for stakeholders (Erica *et al.*, 2024). Recent studies have shown that real-time information systems can positively impact monitoring and control processes in project environments. Chatbots can be seamlessly integrated with PMIS to provide real-time status reports, build automated dashboards, and alert project managers to any schedule or budget changes (Tarafdar *et al.*, 2019). Furthermore, real-time reporting enhances communication visibility across widely dispersed teams, minimizing misunderstandings and aligning people and parties. This implies that the effectiveness of real-time reporting depends not only on its availability but also on the organization and meaning of information within project processes (Shollo, 2013). Theoretically, real-time reporting enhances the efficiency of project management processes, thereby improving response, coordination, and control mechanisms. Thus, there is an expectation that the higher the level of real-time reporting capability, the more efficient the project management process (Wamba *et al.*, 2017).

H3: The real-time reporting feature positively impacts the efficiency of the project management process.

Project Management Process Efficiency and Project Performance

Project management process efficiency concerns how project management processes are conducted, such as communication, scheduling, risk management, monitoring, and control. Processes are important to ensure that project objectives are met within the given time, cost, and quality constraints (Joslin & Müller, 2016). These processes can be inefficient, leading to delays, budget overruns, miscommunication, and suboptimal project outcomes. In the past, there was a clear consensus in the literature that process efficiency is one of the main factors determining project success. Communication processes effectively coordinate work among team members, and their schedules help them complete tasks on time (Serrador & Turner, 2015). Likewise, effective risk management procedures help identify and address risks at an early stage in the project. Monitoring and control processes keep track of and rectify deviations from the project plan. These process efficiency factors are important to overall project performance.

Importantly, process-based project management theory holds that the impact of technology lies not in the performance of the project itself, but in the efficiency of the processes that enable that performance. This means that no matter how sophisticated the system is such as, AI-enabled PMIS, its performance will not be better until it streamlines the core project management workflows. Empirical evidence also supports this argument: process efficiency is closely correlated with project success, stakeholder satisfaction, and resource utilization. Hence, it is expected that the efficiency of project management processes would positively influence the project performance (Mir & Pinnington, 2014).

H4: Project management process efficiency positively impacts project performance.

Mediating Role of Project Management Process Efficiency

Technological capability and organisational performance have long been topics of discussion in the field of information systems. Process-based theories suggest an indirect relationship between advanced technology and performance outcomes, as these technologies affect performance through interactions with operational processes (Almheiri *et al.*, 2025). Project management process efficiency (PME) therefore, serves as a key mediating variable between technological capability and performance for AI-powered chatbots in PMIS. The project communication, coordination, scheduling, and monitoring processes are expected to be improved in project environments by chatbot capabilities, including perceived usefulness, automation, and real-time reporting (Al-Ghithani, 2025). However, these capabilities do not automatically lead to better project outcomes if they are not effectively integrated into project processes. In PME, technological features are integrated to improve project execution.

Recent research on AI use in project contexts indicates that the benefits of digital technologies are mostly at the process level rather than in outcomes, with little evidence of direct impacts on outcomes (Zhang *et al.*, 2026). This is consistent with the notion that technology is an enabler and not a performance driver. Thus, PME is a vital bridge between chatbot capabilities and project success. This mediating position is compatible with the resource-based and process-oriented understanding of project management, which holds that an organization's performance depends on the utilization of resources and technologies within specific processes.

H5: Project management process efficiency mediates the relationship between chatbot capabilities and project performance.

Conceptual Framework

This study's conceptual framework suggests that integrating chatbots into project management systems improves project performance by increasing the efficiency of project management processes. The independent variables include four chatbot features: perceived

usefulness, automation, and real-time reporting that affect the efficiency of project management processes as shown in Figure 1. Project management process efficiency is defined as a multidimensional construct comprising communication management, time and schedule management, risk management, and project monitoring and control (Raja, 2025). These enhancements lead to improved coordination, faster decision-making, earlier risk detection, and greater project visibility. The model also suggests that process efficiency mediates the relationship between chatbot capabilities and project performance

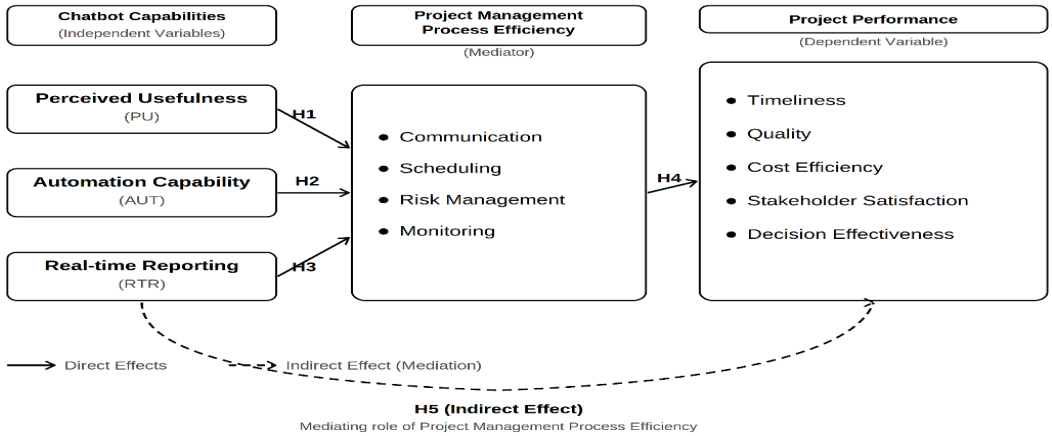

Figure 1: Conceptual Framework of AI-Chatbot Integration in Project Management Information Systems

MATERIALS AND METHODS

Research Design and Philosophy

This study adopts a quantitative, cross-sectional research design grounded in a positivist research philosophy, focusing on hypothesis testing and the objective measurement of relationships between chatbot capabilities and Project Management Information Systems (PMIS). A deductive research approach was used, with hypotheses derived from the Technology Acceptance Model (TAM) and process-based project management theory, and then empirically tested using statistical methods. The study employs a survey strategy, which is appropriate for collecting standardized data from a large number of respondents and for generalizing findings across project-based environments.

Population and Sampling Technique

The target population of the study is individuals working in project management settings, including project managers, team leaders, software developers, business analysts, and IT support personnel. They were selected for their firsthand experience with PMIS tools and their growing exposure to chatbot-enabled systems. The sample size is adequate for statistical reliability and model estimation. Respondents were recruited from project-driven organizations operating in Malaysia, with a focus on IT and project-driven environments. A nonprobability purposive sampling technique was employed to ensure that participants possessed relevant knowledge and experience. Data were collected from 300 respondents through an online survey distributed via Google Forms. The sample size is considered adequate for regression and mediation analysis, ensuring statistical reliability and robustness.

Sample Size Justifications

A total of 300 valid responses were collected. The sample size was determined based on methodological recommendations for regression and mediation analysis. According to Hair *et al.* (2019), a minimum sample size of 10–20 observations per variable is sufficient for regression models. Since this study includes five key constructs, 100–150 responses would be sufficient; however, the study exceeds this threshold to enhance statistical power and reliability. Additionally, a sample size of 300 for bootstrapping mediation analysis (5000 resamples) is considered moderate to large for stable confidence intervals.

Questionnaire Development

The measurement instrument was developed based on the available literature in information systems and project management, with constructs oriented toward the chatbot-powered PMIS. A five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used to measure all items. The following constructs were used in the questionnaire:

1. Perceived Usefulness (PU): It is a scale that determines how the integration of chatbots can improve the performance and efficiency of the task.
2. Automation Capability (AUT): Records the capability of chatbots to automate common project management tasks.
3. Real-Time Reporting (RTR): Evaluates how chatbots can deliver real-time updates and project information.
4. Project Management Efficiency (PME): This is a multidimensional construct that encompasses advancements in communication, schedule, risk management, and monitoring and control.

5. Project Performance (PP): Indicates the perceived positive changes in the project results, such as timeliness, quality, and effectiveness in decision-making.

A small number of respondents were used to pre-test the instrument to guarantee its relevance and clarity. Some small adjustments have been made to enhance readability and contextualization.

Data Analysis Procedure

Statistical software (SPSS) was used to analyze the data obtained. The analysis was conducted systematically; it summarized the characteristics of the respondents and used descriptive statistics to provide a general picture of the data. Cronbach's alpha was used to assess the internal consistency of measurement scales through reliability analysis. The analysis of correlations was conducted to investigate relationships among variables and to assess the presence of multicollinearity. Furthermore, the direct effects of AI chatbots' capabilities on the efficiency of the project management process, and the effect of process efficiency on project performance, were tested using multiple regression analysis. Lastly, the mediation analysis was used to test the mediating effect of project management process efficiency on the relationship between chatbot capabilities and project performance. This is an important step towards testing the proposed process-based framework.

Reliability Testing

To make the findings robust, reliability and validity were evaluated.

1. Reliability was evaluated through Cronbach's alpha, with values above 0.70 being deemed acceptable.
2. Construct validity was ensured by carefully adapting measurement items from established studies and following theoretical constructs.
3. Content validity was ensured through the fact that questionnaire items are exhaustive in terms of capturing chatbot capabilities and project management processes.

Validity Considerations

The study adhered to ethical standards. Respondents were guaranteed anonymity and confidentiality, and participation was voluntary. No personal data was gathered. All data were used solely for academic purposes, and respondents were informed that their responses would be used for academic purposes.

RESULTS AND DISCUSSION

Demographic Statistics

The demographic characteristics of the respondents are summarized in Table 1. A total of 300 valid responses were obtained and included in the analysis. The questionnaire was designed based on key constructs of the study, including perceived usefulness (PU), automation capability (AUT), real-time reporting (RTR), project management efficiency (PME), and project performance (PP). Therefore, respondents were selected based on their experience with project management information systems (PMIS) and AI-chatbot tools in project environments. The

Table 1: Demographic Profile for Project Management

Variable	Category	Frequency	Percentage (%)
Gender	Male	171	57
	Female	129	43
Occupation	Government	73	24.3
	Private	75	25
	IT/Software	59	19.7
	Self-employed	93	31
Job Role	Project Manager	59	19.7
	Team Lead	67	22.3
	Software Developer	62	20.7
	Business Analyst	53	17.7
	IT Support	59	19.7
PM Experience	<1 year	54	18
	1–3 years	53	17.7
	4–6 years	70	23.3
	7–10 years	51	17
	10+ years	72	24
Digital Experience	<1 year	64	21.3
	1–3 years	53	17.7
	4–6 years	65	21.7
	7–10 years	55	18.3
	10+ years	63	21

distribution shows that the largest group of respondents falls within the gender; the sample is relatively balanced, with 57.0% of respondents male and 43.0% female. In terms of occupation, the respondents are evenly spread across various industries, with the highest percentage of 31.0 being self-employed. The largest category is the private sector at 25.0%, followed by the government at 24.3%, and finally IT/software professionals at 19.7%. The job roles suggest equal representation, with team leads (22.3%), software developers (20.7%), project managers (19.7%), IT support staff (19.7%), and business analysts (17.7%). In total, 24.0% of respondents have over 10 years of experience in project management, and 23.3% have between 4 and 6 years. In the same vein, the distribution of digital experien

Descriptive Statistics

Statistical measures, including measures of central tendency and dispersion for the study variables, were calculated using descriptive statistics. Table 2 shows the results. The mean scores show moderate levels of all constructs. AUT has the highest mean value (M = 2.9707, SD = 0.6176), followed by RTR (M = 2.8900, SD = 0.6504) and PU (M = 2.8767, SD = 0.6497). PME has a slightly lower mean (M = 2.5560, SD = 0.5926), whereas PP has the lowest mean (M = 2.1993, SD = 0.6595). Relatively moderate mean values imply that, on average, respondents would perceive the constructs at an average level. The standard deviation indicates a good amount of variability, suggesting the responses are reasonably spread out and not highly clustered.

Table 2: Descriptive Statistics

Construct	N	Min	Max	Mean	Std. Deviation
PU	300	1	4.6	2.8767	0.6497
AUT	300	1.4	4.6	2.9707	0.6176
RTR	300	1.2	4.6	2.89	0.6504
PME	300	1.2	4	2.556	0.5926
PP	300	1	3.8	2.1993	0.6595

Reliability Test

The reliability analysis used Cronbach's alpha to assess the internal consistency of all constructs. The results indicated low reliability for perceived usefulness (PU), Automation Capability (AUT), and real-time reporting (RTR), suggesting inconsistencies in item responses, as shown in Table 3. Items with low item-total correlations were removed following reliability diagnostics. After refinement, all constructs achieved acceptable reliability ($\alpha = 0.81$), except project management efficiency (PME), which showed moderate reliability ($\alpha = 0.626$), which is acceptable for exploratory research. Project management (PP) demonstrated good reliability ($\alpha = 0.721$). These results confirm the adequacy of the measurement scales.

Table 3: Reliability Test

Construct	Cronbach's Alpha
PU	0.811
AUT	0.791
RTR	0.834
PME	0.626
PP	0.721

Correlation Analysis

Pearson correlation analysis was conducted to explore the relationships among the study variables. Table 4 gives the results. The results show that most variables have a significant positive correlation. The strongest correlation between PME and PP is $r = 0.699$ ($p < 0.01$). Similarly, RTR shows a moderate positive correlation with PME ($r = 0.427$, $p < 0.01$), while PU is moderately correlated with PME ($r = 0.384$, $p < 0.01$) and PP ($r = 0.331$, $p < 0.01$). AUT also demonstrates significant positive correlations with PME ($r = 0.314$, $p < 0.01$) and PP ($r = 0.252$, $p < 0.01$). However, the relationship between PU and AUT ($r = 0.019$, $p = 0.739$) and between AUT and RTR ($r = 0.102$, $p = 0.077$) is weak and non-significant. Notably, all the correlation coefficients are in the range of 0.80, indicating no multicollinearity. On balance, the findings indicate that the variables have significant relationships that warrant further study using regression and mediation.

Table 4: Correlation Analysis

	PU	AUT	RTR	PME	PP
PU	1	0.019	0.129	0.384	0.331
AUT	0.019	1	0.102	0.314	0.252
RTR	0.129	0.102	1	0.427	0.365
PME	0.384	0.314	0.427	1	0.699
PP	0.331	0.252	0.365	0.699	1

Regression Analysis

Multiple regression analysis was conducted to investigate the direct effects of PU, AUT, and RTR on PP. Table 4 shows the results. The model explains 26.1% of the variance in project performance ($R^2 = 0.261$), indicating a moderate level of explanatory power. The adjusted R^2 value of 0.253 suggests that the model remains stable after accounting for the number of predictors. Furthermore, the standard error of the estimate (0.5698) indicates an acceptable level of prediction accuracy.

Table 5: Model Summary

Model	R	R Square	Adjusted R- Square	Std. Error of the Estimate
1	.511a	0.261	0.253	0.5698

Table 6: ANOVA Table for Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	33.937	3	11.312	34.843	.000b
Residual	96.103	296	0.325		
Total	130.04	299			

The ANOVA results for the regression model are presented in Table 6—the effect of PU, AUT, and RTR on PP. The model is statistically significant ($F = 34.843$, $p < 0.001$), indicating that the predictors jointly explain a meaningful proportion of the variance in project performance. The results confirm that the overall regression model is a good fit for the data.

Table 7: Coefficient for Analysis Regression

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.219	0.244	--	-0.896	0.371
PU	0.292	0.051	0.288	5.708	0
AUT	0.229	0.054	0.215	4.274	0
RTR	0.31	0.051	0.306	6.045	0

Specifically, RTR has the strongest influence ($\beta = 0.306$, $p < 0.001$), followed by PU ($\beta = 0.288$, $p < 0.001$) and AUT ($\beta = 0.215$, $p < 0.001$). These results suggest that the enhancement of PU, AUT, and RTR is linked with an increase in PP. Thus, the direct effect hypotheses are justified at this step of the analysis.

Mediation Analysis

Mediation analysis was performed using the PROCESS macro (Model 4) and 5000 bootstrap samples to investigate the mediating role of PME between the independent variables (PU, AUT, RTR) and PP.

Model 1: Mediation Results (PU → PME → PP)

The findings show PU has a considerable influence on PME ($\beta = 0.3500$, $p < 0.001$). PME, in turn, significantly influences PP ($\beta = 0.7462$, $p < 0.001$). Nonetheless, the direct impact of PU on PP ($\beta = 0.0749$, $p = 0.100$) is reduced to an insignificant level when PME is incorporated into the model.

Table 8: Indirect Effect Mediation Result

Path	Effect Type	β	SE	t / BootSE	p-value	LLCI	ULCI	Result
PU → PME	Direct (a-path)	0.35	0.0488	7.1726	0	0.254	0.4461	Significant
PME → PP	Direct (b-path)	0.7462	0.0498	14.9882	0	0.6482	0.8441	Significant
PU → PP	Direct (c')	0.0749	0.0454	1.6499	0.1	-0.0144	0.1643	Not significant
PU → PP (via PME)	Indirect	0.2612	0.0327	—	—	0.1997	0.3296	Significant (Full Mediation)

The indirect effect is significant ($\beta = 0.2612$), and the 95% bootstrap confidence interval (0.1997, 0.3296) excludes zero. This confirms that there is full mediation.

Model 2: Mediation Result (AUT → PME → PP)

AUT significantly predicts PME ($\beta = 0.3017$, $p < 0.001$), and PME significantly predicts PP ($\beta = 0.7653$, $p < 0.001$). However, the direct effect of AUT on PP is not

Table 9: Direct Effects Mediation Result

Path	Effect Type	β	SE	t / BootSE	p-value	LLCI	ULCI	Result
AUT → PME	Direct (a-path)	0.3017	0.0528	5.7178	0	0.1979	0.4055	Significant
PME → PP	Direct (b-path)	0.7653	0.0486	15.7486	0	0.6697	0.861	Significant
AUT → PP	Direct (c')	0.0377	0.0466	0.8079	0.4198	-0.0541	0.1294	Not significant
AUT → PP (via PME)	Indirect	0.2309	0.0388	—	—	0.1547	0.3067	Significant (Full Mediation)

significant (β = 0.0377, p = 0.4198).

The indirect effect is significant (β = 0.2309), with a confidence interval (0.1547, 0.3067). This implies complete mediation, indicating that AUT affects PP fully via PME.

Model 3: Mediation Result (RTR → PME → PP)

RTR has a significant effect on PME (β = 0.3889, p < 0.001), and PME significantly affects PP (β = 0.7389, p < 0.001). The direct effect of RTR on PP becomes non-significant (β = 0.0828, p = 0.0746).

Table 10: Mediation Analysis Results for Real-Time Reporting

Path	Effect Type	β	SE	t / BootSE	p-value	LLCI	ULCI	Result
RTR → PME	Direct (a-path)	0.3889	0.0477	8.1464	0	0.2949	0.4828	Significant
PME → PP	Direct (b-path)	0.7389	0.0508	14.5469	0	0.6389	0.8389	Significant
RTR → PP	Direct (c')	0.0828	0.0463	1.7889	0.0746	-0.0083	0.1739	Not significant
RTR → PP (via PME)	Indirect	0.2873	0.0391	—	—	0.2153	0.3703	Significant (Full Mediation)

The indirect effect is also significant (β = 0.2873), with a confidence interval of (0.2153, 0.3703), and therefore full mediation is observed. In all three models, PME completely mediates the relationship between the independent variables (PU, AUT, RTR) and PP. This means that the actions of PU, AUT, and RTR on PP can occur only indirectly via PME, rather than directly. Moreover, the addition of PME significantly improves the model's explanatory power (R2 = 0.49), thereby playing a crucial role in explaining PP.

Discussion

The findings of this study provide strong empirical support for the proposed model linking chatbot capabilities to project performance through project management process efficiency (PME). The results show that perceived usefulness (PU), automation capability (AUT), and real-time reporting (RTR) have significant positive effects on PME, which in turn has significant positive effects on project performance (PP). The findings support all proposed hypotheses (H1–H5). Perceived usefulness, automation capability, and real-time reporting were found to positively influence project management process efficiency, supporting H1, H2, and H3. Furthermore, project management process efficiency positively affected project performance, supporting H4. Finally, the mediation analysis confirmed that project management process efficiency fully mediates the relationship between chatbot capabilities and project performance, supporting H5.

Remarkably, the mediation analysis confirms that PME fully mediates the relationship between chatbot capabilities and project performance, indicating that process efficiency is the key factor in transforming technological capabilities into organisational outcomes (Følstad & Taylor, 2021). This finding extends existing AI-enabled project management research by identifying project management process efficiency as the underlying mechanism through which chatbot capabilities generate organisational value. Rather than directly producing performance gains, chatbot technologies create value by improving the effectiveness of core project management processes.

This finding supports earlier studies that highlight automation as a key driver of efficiency and productivity in digital systems (Felicetti *et al.*, 2024). Similarly, real-time reporting had the most significant impact among the independent variables, implying that access to project information in real time is crucial for monitoring and decision-making. This aligns with Muller *et al.* (2024), who state that real-time data analytics is an effective way to control the project and manage risks.

The confirmation of full mediation is one of the most significant contributions of this research, as it implies that chatbots' capabilities do not directly improve project performance but can do so indirectly by enhancing communication, scheduling, risk management, and monitoring processes (Wang *et al.*, 2024). This result

supports the process-based approach in the project management literature, which holds that performance improvement is achieved through streamlined processes rather than isolated technological implementations (Ingason *et al.*, 2025). From an AI and Society perspective, the findings suggest that the effectiveness of intelligent systems depends not only on technological sophistication but also on how they are embedded in human workflows and organisational practices.

Although the results are highly suggestive of PME's mediating role, they also have significant theoretical and practical implications. The lack of meaningful direct relationships between chatbot capabilities and project performance after the introduction of the mediator suggests that performance improvements cannot be guaranteed by adopting these technologies (Chheda, 2019). The findings suggest that technological capabilities alone may be insufficient to improve project outcomes unless translated into efficient project management processes (Haenlein *et al.*, 2019). Rather, the results underscore that the efficiency of chatbot integration depends on how successfully the technologies are integrated into organisational processes.

Moreover, the regression model's relatively modest explanatory power ($R^2 = 0.261$) indicates that, although chatbot capabilities and PME are significant predictors, the proportion of variance in project performance explained remains small. This implies that other contextual and organisational variables may be critical, as noted in previous research (Müller *et al.*, 2024). Hence, in future studies, a more holistic approach should be taken, incorporating these other variables, to better understand the complexity of technology-enabled project performance (Wang *et al.*, 2024). Even though this is a common measure in information systems studies, these measures might not comprehensively represent the objective project performance results (Park, 2024). Therefore, it should incorporate objective performance measures or multi-source data to strengthen the results.

In addition, although real-time reporting emerged as the most significant predictor of PME, this may reflect the growing importance of data-driven decision-making in the modern project environment (Joshi, 2024). However, overreliance on real-time data can also lead to information overload and decision fatigue, potentially undermining its usefulness unless handled effectively. This demonstrates the necessity of implementing balanced strategies that incorporate technological capabilities and human judgment (Cīrule & Bērziša, 2019).

In a practical context, the findings indicate that organizations need to not only embrace chatbot technologies but also implement them effectively within project management processes (Kanishka *et al.*, 2026). Introducing chatbots without aligning them with the projects' fundamental processes can limit their potential benefits. That is why process redesign and training should be on the priority list of project management offices (PMOs) to achieve maximum value of chatbot-enabled PMIS. The findings suggest that AI chatbots function not merely as automation tools but as socio-technical enablers that support coordination and decision-making. This highlights the growing importance of human–AI collaboration in project environments, where conversational AI augments rather than replaces managerial decision-making.

This research contributes to theory and practice by advancing the Process-based Project Management Theory, showing that the value of AI integration lies not only in its technical sophistication but also in its ability to streamline core management workflows. The finding that PME fully mediates the relationship between chatbot features and project success provides a new empirical model for understanding the black box of AI implementation. In practical terms, the study offers a strategic roadmap for organizations by identifying real-time reporting as the most significant predictor of efficiency, enabling PMO leaders to prioritize high-impact AI features over generic automation. This evidence-based approach moves the conversation beyond the current hype around generative AI towards the structured, systematic improvement of project delivery in complex work environments.

From an AI & Society perspective, the findings suggest that conversational AI should not be viewed solely as a productivity tool but as an organisational actor that influences information flows, coordination practices, and human decision-making processes. The study therefore, contributes to ongoing debates concerning the socio-technical implications of AI adoption in professional work environments.

CONCLUSION

This paper examined how the use of chatbots in Project Management Information Systems (PMIS) can affect project performance through the mediating role of project management process efficiency (PME). The results indicate that perceived usefulness, automation, and real-time reporting are key chatbot capabilities that significantly improve PME, thereby enhancing project performance. This supports the process-centered perspective, which holds that digital technologies add value by streamlining workflows and decision-making. The findings suggest that AI-enabled conversational systems create value not merely through automation but through their ability to support coordination, information sharing, and decision-making processes within project environments.

The study employed a theory-based framework that incorporates the Technology Acceptance Model and a process-based approach. The paper also contributes to the empirical validation of the mediating effect of project management process efficiency in chatbot-enabled PMIS. Despite its contributions, this study has several limitations. A cross-sectional design makes it challenging to draw causal conclusions about the relationship between variables. Future research ought to consider longitudinal studies to establish changes over time. Furthermore,

purposive sampling may limit the generalizability of the findings across industries and regions. Future studies may include other variables such as system quality, user experience, and organisational culture.

REFERENCES

Adam, M., Wessel, M., & Benlian, A. (2021). AI-based chatbots in customer service and their effects on user compliance. *Electronic Markets, 31*(2), 427–445

Adamopoulou, E., & Moussiades, L (2020). An overview of chatbot technology. In *IFIP international conference on artificial intelligence applications and innovations* (pp. 373-383). Springer, Cham.

Ahuja, M. (2024). *Analysis and comparison of generative AI chatbot applications.*

Akram, S., Buono, P., & Lanzilotti, R. (2024). Recruitment chatbot acceptance in a company: a mixed method study on human-centered technology acceptance model. *Personal and Ubiquitous Computing, 28*(6), 961–984.

Al-Ghithani, M. R. A. (2025). *The Transformative Role of Artificial Intelligence in Project Management: A Case Study in Qatar Hamad Bin Khalifa University* (Qatar).

Almheiri, H. M., Ahmad, S. Z., Khalid, K., & Ngah, A. H. (2025). Examining the impact of artificial intelligence capability on dynamic capabilities, organizational creativity and organization performance in public organizations. *Journal of Systems and Information Technology, 27*(1), 1–20.

Brandtzaeg, P. B., & Følstad, A. (2017). Why people use chatbots. *International conference on internet science,*

Chen, T., Gascó-Hernandez, M., & Esteve, M. (2024). The adoption and implementation of artificial intelligence chatbots in public organizations: Evidence from US state governments. *The American Review of Public Administration, 54*(3), 255–270.

Chheda, C. D. (2019). Project Management in the Age of Artificial Intelligence. *PM World Journal Project Management in the Age of AI, 8*(VIII), 1–9.

īrule, D., & Bērziša, S. (2019). Use of chatbots in project management. In *Proceedings of the International Conference on Information and Software Technologies.*

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). Technology acceptance model. *J Manag Sci, 35*(8), 982–1003.

Erica, A., Gantari, L., Qurotulain, O., Nuche, A., & Sy, O. (2024). Optimizing decision-making: Data analytics applications in management information systems. *APTISI Transactions on Management, 8*(2), 115–122.

Felicetti, A. M., Cimino, A., Mazzoleni, A., & Ammirato, S. (2024). Artificial intelligence and project management: An empirical investigation on the appropriation of generative Chatbots by project managers. *Journal of Innovation & Knowledge, 9*(3), 100545.

Følstad, A., & Taylor, C. (2021). Investigating the user experience of customer service chatbot interaction: a framework for qualitative analysis of chatbot dialogues. *Quality and User Experience, 6*(1), 6.

Greco, M., & Corvello, V. (2024). Artificial Intelligence in Project Management: An Empirical Study of Project Managers' Appropriation of Generative Chatbots. *International Conference of the Digital Transformation Society,*

Haenlein, M., Kaplan, A., Tan, C.-W., & Zhang, P. (2019). Artificial intelligence (AI) and management analytics. *Journal of Management Analytics, 6*(4), 341–343.

Igwenagu, M. O., Adewuyi, O. I., Isen, B., & & Opeola, F. (2026). AI-Augmented Project and Program Management: *Predictive Analytics for Risk, Cost and Schedule Control. 5*(1), 46–55. . https://doi.org/10.54536/ajsts.v5i1.6989

Ingason, H. T., Aaltonen, K., Asmundarson, A. S., Fridgeirsson, T. V., Huemann, D., Huemann, M., Kujala, J., Lampela, H., Mancini, M., & Mariani, C. (2025). Personalised learning in project management education: Insights from an artificial intelligence-driven chatbot. *Project Leadership and Society, 6,* 100193.

Joshi, H. (2024). Artificial intelligence in project management: A study of the role of ai-powered chatbots in project stakeholder engagement. *Indian Journal of Software Engineering and Project Management* (IJSEPM).

Joslin, R., & Müller, R. (2016). The relationship between project governance and project success. *International journal of project management, 34*(4), 613–626.

Kang, Y. J. (2026). User acceptance of AI chatbot services in public libraries. *The Electronic Library*, 1–20.

Kanishka, S., Suganya, D., & Padma Kumari, P. (2026). ProJenius: The Project Management Chatbot. 2026 *IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI),*

Kaplan, A., & Haenlein, M. (2020). Rulers of the world, unite! The challenges and opportunities of artificial intelligence. *Business horizons, 63*(1), 37–50.

Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: linking project management performance and project success. *International journal of project management, 32*(2), 202–217.

Müller, R., Locatelli, G., Holzmann, V., Nilsson, M., & Sagay, T. (2024). Artificial intelligence and project management: Empirical overview, state of the art, and guidelines for future research. *Project Management Journal, 55*(1), 9–15.

Nenni, M. E., De Felice, F., De Luca, C., & Forcina, A. (2025). How artificial intelligence will transform project management in the age of digitization: a systematic literature review. *Management Review Quarterly, 75*(2), 1669–1716.

Park, S. (2024). *AI Project Management, focusing on AI utility in Project Management.*

Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of management review, 46*(1), 192–210.

Raja, V. (2025). Artificial Intelligence and Machine Learning in Project Management: A Conceptual

Framework for Future Integration. *Journal of Business and Management Studies, 7*(5), 45–52.

Serrador, P., & Turner, R. (2015). The relationship between project success and project efficiency. *Project Management Journal, 46*(1), 30–39.

Shollo, A. (2013). *The role of business intelligence in organizational decision-making*. Copenhagen Business School.

Simelane, P. M., & Kittur, J. (2026). Leveraging chatbots for enhanced decision-making: a comprehensive literature review. *Frontiers in Artificial Intelligence, 9,* 1748544.

Tarafdar, M., Beath, C. M., & Ross, J. W. (2019). Using AI to enhance business operations. *MIT Sloan Management Review, 60*(4).

Vicci, H. (2022). *Technology, risk, artificial intelligence acceptance, and the adoption of smart devices.*

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J.-f., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of business research, 70,* 356–365.

Wang, A., Zhou, Y., Ma, H., Tang, X., Li, S., Pei, R., & Piao, M. (2024). Preparing for aging: Understanding middle-aged user acceptance of AI chatbots through the technology acceptance model. *Digital Health, 10,* 20552076241284903.

Yi, Z. G. (2025). *Project management in the age of artificial intelligence: A lifecycle approach and best practices. CALA Southeast & Southwest Chapters Joint Conference 2025,*

Zhang, B., Yang, J., Akylbekova, N., & Ibraimova, S. (2026). From IT Maturity to Competitive Intelligence: How Digital Transformation Drives Process Optimization and Management Innovation. *Journal of Sustainable Competitive Intelligence, 16,* e0608–e0608.