American Journal of Management Science and Engineering
2024, Vol. 9, No. 4, pp. 84-96
https://doi.org/10.11648/j.ajmse.20240904.12

Research Article

Artificial Intelligence Adoption and Project Success: A Mixed-Method Study

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Abstract

AI's growing acceptance is changing project management's human-centric approach. Project management is using AI to automate and support duties. This change could improve workflows, decision-making, and project efficiency. The full influence of AI on project success is unknown. There is little empirical evidence linking AI use to project outcomes. This ignorance highlights the necessity to study AI's impact on project management. The project management AI industry is expected to expand 38% annually. Since the late 1980s, AI has improved project management by providing more intelligent and autonomous help. Data privacy, accountability, strategic leadership, communication, innovation, and emotional intelligence are important ethical issues. This study examines how AI adoption affects project success through communication and feedback. This mixed-method study examines how AI adoption affects project success. The quantitative phase measured AI communication, feedback, and project progress via a predefined questionnaire. The sample includes construction, IT, manufacturing, healthcare, and finance project managers and team members. Multiple regression analysis and structural equation modelling were employed in IBM SPSS AMOS to examine AI adoption and project success measures. A qualitative phase of semi-structured interviews with respondents contextualised the quantitative data. Thematic analysis gleaned insights from interview transcripts. AI's impact on project success was examined using integrated data, with ethics in mind. The study examined AI tool-project success relationships using a structural equation model. Communication mode, feedback style, and frequency explained 3% of project success variance. Quantitative research showed that AI communication frequency improves project success, whereas mode and style negatively impact it. Participants' qualitative comments indicated six themes that match quantitative findings, and their replies enhance quantitative results and recommend improvements. The study concluded that AI communication frequency positively increases project success, while mode and style negatively affect it. The mixed-methods approach showed that AI tools alone cannot ensure project success; communication style and frequency are. The study recommended among others that organisations should integrate AI tools into project management systems, match AI communication modes to project team preferences, optimise feedback styles, and provide regular updates to improve AI communication. Project teams need ongoing training.

Keywords

Artificial Intelligence, Communication, Frequency, Mixed Method, Style, Project Success

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Received: 17 July 2024; **Accepted:** 14 August 2024; **Published:** 26 September 2024

1. Introduction

1.1. Background to the Study

The field of project management is experiencing a seismic shift driven by the rapid adoption of Artificial Intelligence (AI) [1]. Traditionally, project management has been a realm where human expertise reigned supreme. Project managers have acted as the conductors of successful projects, orchestrating a complex symphony of tools, techniques, and resources to ensure projects meet established goals within predefined constraints of scope, time, and budget [1]. This human-centric approach has yielded successful projects for decades. However, the rise of AI is ushering in a new era of human-AI collaboration. AI systems are progressively being woven into the fabric of project management processes, offering invaluable support and even automation for a wide range of tasks [17] From the intricate calculations of scheduling and resource allocation to the proactive identification of potential risks and the real-time monitoring of project progress, AI holds the potential to streamline workflows, elevate decision-making capabilities, and ultimately enhance overall project efficiency.

Despite the undeniable allure of AI in project management, the full extent of its impact on project success remains shrouded in a degree of uncertainty. While anecdotal evidence suggests potential benefits, there is a dearth of robust empirical research definitively establishing a causal link between AI adoption and project outcomes [21]. This lacuna in knowledge underscores the critical need for further exploration into the impact of AI on project management. By delving deeper into this topic, researchers can illuminate the true potential of AI to not only bolster project success but also identify and address any potential challenges or limitations associated with its implementation. This knowledge will be instrumental in equipping project managers as they navigate this evolving landscape and harness the power of AI to optimize project outcomes. Furthermore, a deeper understanding of the impact of AI on project management can inform the development of best practices and strategies for successful human-AI collaboration within projects. This will ensure that AI acts as a force multiplier for human expertise, not a replacement, ultimately leading to a new era of project management excellence.

1.2. Statement of the Problem

The market for AI in project management is experiencing explosive growth. Reports by [23] project the global market size to balloon from $1.3 billion in 2020 to a staggering $6.4 billion by 2025, reflecting a compound annual growth rate of nearly 38%. This trend aligns perfectly with a Project Management Institute (PMI) survey where a significant portion (81%) of project professionals reported experiencing AI's growing influence within their organizations [24]. Furthermore, the survey anticipates a rise in the proportion of projects managed using AI, with projections of an increase from 23% to 37% in the next three years [24].

The application of AI software in project management is not entirely new. Researchers began exploring models and systems to assist with various project tasks, including planning, scheduling, monitoring, and controlling, as early as the late 1980s [29]. Since then, AI has undergone significant advancements, incorporating cutting-edge techniques like machine learning, natural language processing, computer vision, and deep learning [29]. These advancements have empowered AI to provide more intelligent and autonomous support for project management, potentially leading to significant improvements in efficiency and effectiveness.

However, while AI offers a plethora of potential benefits for project management, its implementation and use also present challenges and risks. Ethical considerations surrounding data privacy, accountability, and transparency in human-AI collaboration are critical concerns that require careful attention [1]. Additionally, project managers themselves will need to adapt their skillsets to thrive in this evolving landscape. A focus on strategic leadership, communication, creativity, and emotional intelligence will be paramount for success in the age of AI [24].

Despite the identified challenges, the potential benefits of AI in project management are undeniable. This study aims to explore this potential by investigating the impact of AI adoption on project success. The research defines AI adoption by considering the communication and feedback methods used within the project. Established metrics for project success, encompassing factors like project completion within scope, time, and budget constraints, will be utilized for evaluation. The evaluation will draw upon existing project management frameworks and methodologies [10] to ensure a robust and reliable assessment.

This study's main contribution lies in its novel examination of AI communication methods as a determinant of project success—a perspective often overlooked in existing literature. Unlike previous studies that primarily focus on AI's technical capabilities or overall project outcomes, this research delves into the specific aspects of AI communication, such as the mode, style, and frequency, and their nuanced effects on project performance. By integrating both quantitative and qualitative data, this study provides a comprehensive understanding of how AI communication can be optimized to enhance project outcomes. This approach offers a significant advantage over existing methods, as it not only evaluates the efficacy of AI tools but also provides actionable insights for improving their integration into project management practices.

By delving deeper into this topic, this study seeks to contribute valuable insights to the ongoing discussion surrounding AI's role in project management and its potential to en-

hance project success rates. The findings will provide project managers with a clearer understanding of how to leverage AI communication effectively, ultimately contributing to more successful project outcomes in the rapidly evolving landscape of AI-enhanced project management.

This study aims to investigate how the adoption of Artificial Intelligence (AI) influences project success. Specifically, it seeks to understand the extent to which AI adoption accounts for variations in project outcomes. To guide this investigation, the research question posed is: "How does the adoption of AI account for variations in the success of projects?" The study hypothesizes that the adoption of AI does not account for significant variations in project success. By addressing this hypothesis, the research will explore whether AI's impact on project outcomes is substantial or negligible, thereby providing insights into its practical significance in project management.

2. Literature Review

This section discusses the current state of knowledge on AI adoption in project management, including benefits, challenges, and potential impacts on project outcomes.

2.1. Conceptual Review

This conceptual review explores several key concepts crucial for understanding the impact of Artificial Intelligence (AI) adoption on project success. These concepts include Artificial Intelligence (AI), communication modes, communication styles, communication frequency, project success, and its breakdown into completion within scope, time, and budget.

2.1.1. Artificial Intelligence (AI)

The rise of Artificial Intelligence (AI) has significantly impacted numerous industries, and project management is no exception. AI, defined as the field of computer science focused on creating intelligent machines capable of mimicking human cognitive functions like learning, problem-solving, and decision-making [6], offers a broad spectrum of technologies that can significantly enhance various aspects of the project lifecycle.

One key technology is Machine Learning (ML). ML algorithms allow AI systems to learn from data without explicit programming. This empowers AI to analyse project data, identify trends and patterns, and predict potential risks or opportunities that might otherwise be missed [24]. For instance, AI can be used to analyse historical project data to predict project completion timelines with greater accuracy, leading to improved project planning and resource allocation.

Another transformative technology is Natural Language Processing (NLP). NLP allows AI systems to understand and process human language. This capability facilitates seamless communication between humans and AI systems. Project teams can utilize NLP-powered AI tools to interact with AI through natural language queries, receive progress reports, or generate summaries of project data [1]. This not only streamlines information access but also fosters a more collaborative environment where human expertise and AI insights can be effectively combined [24].

Furthermore, Computer Vision (CV) allows AI systems to extract meaningful information from visual data such as images and videos. In project management, CV can be used for tasks like monitoring project progress through image recognition of construction milestones, analyzing construction sites using drone footage to identify potential delays, or even identifying potential safety hazards within project environments [29]. This real-time data collection and analysis empowers project managers to make proactive decisions and course corrections when needed.

The application of these AI technologies extends beyond automating tasks and data analysis. AI systems can also provide valuable insights and recommendations to support project managers in critical decision-making processes. For instance, AI can be used to recommend resource allocation strategies based on real-time data analysis, identify potential schedule disruptions before they occur, or suggest corrective actions based on predicted risks [21]. This not only improves project efficiency but also allows project managers to focus on strategic decision-making.

It's important to recognize, however, that AI adoption in project management is not a one-size-fits-all solution. The effectiveness of AI heavily relies on the chosen application and its seamless integration within the existing project workflows [1]. Careful consideration needs to be given to how AI can best complement the existing project management structure and team skillsets to ensure optimal project outcomes.

2.1.2. Communication Mode, Style and Frequency: The Bridge Between AI and Human Collaboration

Effective communication remains the cornerstone of project success, even when AI enters the equation [11]. For seamless collaboration and optimal utilization of AI capabilities, fostering clear communication between AI systems and project teams is crucial. This communication takes various forms, each offering advantages and drawbacks:

(i). Choosing the Right Communication Mode

Visual Dashboards: These user-friendly dashboards provide a visual representation of key project metrics and trends generated by AI [1]. However, some level of data literacy might be needed to interpret the visualizations effectively.

Text Reports: Offering detailed and comprehensive information generated by AI, text reports are valuable for in-depth analysis and documentation. The time-consuming nature of reading lengthy reports, however, makes them less suitable for quick information dissemination.

Natural Language Interaction (NLI): This mode allows for

a more natural and interactive communication style. Project team members can ask questions using plain language, receive explanations from the AI system, and even engage in a dialogue [24]. NLI fosters trust and acceptance of AI recommendations but can be computationally expensive to implement.

The chosen communication mode significantly impacts user experience and understanding. Selecting the appropriate mode influences how information is presented, understood, and ultimately utilized by project team members.

The effectiveness of communication between AI and project teams goes beyond the delivery method. Both the style and frequency of communication are equally important considerations:

(ii). Communication Style

The way information is conveyed by the AI system plays a crucial role. AI communication can be directive, providing clear instructions with minimal room for interpretation. Alternatively, AI communication can be suggestive, offering recommendations and explanations alongside the data it presents [1]. The chosen style significantly influences user trust and acceptance of AI suggestions. For instance, directive communication might be more suitable for high-risk situations where clear instructions are paramount. Conversely, a suggestive style might be more appropriate for collaborative decision-making processes.

(iii). Communication Frequency

The frequency of interaction between AI and project team members is crucial. While frequent communication can keep teams informed about project progress and potential issues, excessive communication can lead to information overload [14]. A constant barrage of information from AI can hinder focus and cause frustration among team members. Striking the right balance between keeping teams informed and avoiding information overload is crucial. Factors like project complexity, team size, and individual communication preferences all need to be considered.

For instance, a fast-paced project with frequent changes might necessitate more frequent AI communication updates. Conversely, a more stable project with a smaller team might require less frequent communication. Additionally, individual preferences within the team should be taken into account. Some team members might appreciate receiving regular updates, while others might prefer to access information on their own terms [7].

By carefully considering the communication mode, style, and frequency, project managers can foster a successful human-AI collaboration environment. This ensures effective information flow, fosters trust in AI recommendations, and ultimately contributes to project success.

2.1.3. Project Success

Project success is a coveted destination on the roadmap of any project manager. Reaching this destination, however, requires navigating a multifaceted landscape with various considerations. Traditionally, the "iron triangle" constraints have served as the guiding principles for project success: completing the project on time, within budget, and within scope (Shenhar & Dvir, 2007). However, with the growing adoption of Artificial Intelligence (AI) in project management, a new dimension emerges – effective communication between AI and human project teams. This section delves deeper into the traditional iron triangle aspects of project success and explores how AI communication can influence achieving these goals.

(i). Project Completion Within Scope

This dimension emphasizes delivering a project that fulfils all the agreed-upon functionalities and requirements as meticulously defined in the project scope statement [2]. A well-defined scope serves as the project's blueprint, ensuring all stakeholders are aligned on the project's deliverables. Deviations from the scope can lead to project failure if not managed effectively. Here, AI can play a crucial role by analyzing historical data to identify potential scope creep risks and proactively flag potential issues during project execution [1]. Additionally, AI-powered communication tools like natural language interaction (NLI) can facilitate clear communication between project teams and stakeholders, ensuring everyone remains on the same page regarding project scope [24].

(ii). Project Completion Within Time

This dimension focuses on adhering to the predetermined project schedule. Completing a project on time is paramount for several reasons. Timely delivery ensures project outcomes are realized when needed, avoids delays that can disrupt dependent projects, and mitigates the risk of cost overruns associated with extended project timelines [4]. AI communication can significantly impact adherence to the project schedule. For instance, AI can analyze real-time project data to identify potential schedule risks, such as resource bottlenecks or task dependencies that might lead to delays [21]. By proactively highlighting these risks through clear communication channels (e.g., visual dashboards), project managers can take corrective actions and adjust the schedule as needed, increasing the likelihood of on-time completion.

(iii). Project Completion Within Budget

Effective cost management is a cornerstone of project success. This dimension emphasizes delivering the project within the predefined financial constraints [6]. Managing costs effectively ensures project financial viability and avoids budget overruns that can cripple project resources and impact overall success. AI offers valuable tools to enhance cost

management through communication. AI can analyze historical project data to predict potential cost overruns and identify areas for cost optimization [24]. Additionally, AI communication through text reports can provide detailed breakdowns of project costs, allowing for better cost tracking and informed decision-making regarding resource allocation [1].

2.1.4. The Interplay Between AI Communication and Project Success

While the iron triangle remains a fundamental framework for project success, the effective utilization of AI introduces a new layer of complexity. Communication plays a central role in this interplay. By carefully considering the communication mode (visual dashboards, text reports, NLI), style (directive, suggestive), and frequency, project managers can leverage AI to achieve success across the iron triangle constraints.

For instance, imagine a fast-paced project with frequent changes. In this scenario, utilizing AI-powered visual dashboards for real-time progress updates and potential risk identification would be highly beneficial. This would allow the project team to stay informed and adapt quickly to changing circumstances, ultimately contributing to staying on schedule and within budget.

Conversely, for a more stable project with a smaller team, text reports providing detailed cost analyses might be more suitable for periodic reviews. This targeted communication approach would avoid information overload and ensure the team has the necessary information for informed decision-making regarding project finances.

By understanding the multifaceted nature of project success and the nuanced influence of AI communication, project managers can harness the power of AI to navigate the complexities of project delivery and reach the coveted destination of project success.

2.2. Theoretical Review

The study explores two relevant communication theories and analyze their applicability to human-AI collaboration in project management:

2.2.1. Social Penetration Theory

Developed by Altman and Taylor (1973), the Social Penetration Theory posits that interpersonal communication progresses through layers of increasing intimacy and disclosure. Initial interactions involve shallow exchanges focusing on factual information. As communication progresses, self-disclosure increases, leading to deeper and more personal communication (Altman & Taylor, 1973). This theory offers valuable insights for understanding human-AI communication in project management.

The Social Penetration Theory highlights the importance of building trust between humans and AI systems. Initially, communication might be limited to factual information exchange through reports or dashboards. However, as trust builds, the communication style can evolve to allow for more complex questions and explanations, potentially utilizing Natural Language Interaction (NLI) for a more natural dialogue. This progression fosters deeper understanding and collaboration between project teams and the AI system.

The Social Penetration Theory provides a framework for analyzing the evolution of communication between humans and AI in project teams. This study can explore how communication styles and modes (e.g., reports vs. NLI) change over time, reflecting the development of trust and the increasing depth of information exchange.

2.2.2. Media Richness Theory

Developed by Daft and Lengel (1984), the Media Richness Theory suggests that different communication media vary in their capacity to convey richness, which refers to the ability to transmit information through multiple cues (Daft & Lengel, 1984). Rich media, like face-to-face communication, allows for immediate feedback and nonverbal cues, facilitating complex information exchange. Lean media, like emails, offer limited richness and are more suitable for transmitting simple, unambiguous messages.

The Media Richness Theory emphasizes the importance of selecting the appropriate communication mode for the complexity of the information being conveyed. For instance, project updates requiring immediate clarification might be better suited for a richer medium like video conferencing, while routine progress reports could be communicated via email (a leaner medium).

This theory provides a framework for analyzing the effectiveness of different communication modes (visual dashboards, text reports, NLI) for various communication tasks within human-AI collaboration. The study can investigate how the chosen communication mode impacts task completion, user satisfaction, and understanding of AI-generated information.

The Social Penetration Theory and Media Richness Theory offer valuable frameworks for understanding human-AI communication in project management contexts. By analyzing communication styles, modes, and their impact on trust-building and information exchange, this study can contribute to the development of more effective communication strategies for successful human-AI collaboration in project teams.

2.3. Empirical Review

The growing adoption of AI in project management necessitates a deeper understanding of how humans and AI can collaborate effectively. Communication plays a central role in this collaboration, and several recent studies offer valuable empirical evidence on this topic.

Aalborg et al. (2020) conducted a study exploring the use of visual dashboards for communication between AI and project teams. Their findings suggest that dashboards can be an ef-

fective tool for conveying key project metrics and trends in a user-friendly way. However, the study also highlights the importance of data literacy among project team members for interpreting the visualizations effectively.

The study of [24] investigated the use of Natural Language Interaction (NLI) in human-AI collaboration for project risk management. Their research indicates that NLI fosters trust and acceptance of AI recommendations by allowing project managers to ask questions and receive explanations in plain language. This interactive communication style can lead to a deeper understanding of the reasoning behind AI-generated insights.

In their study [21] examined the impact of AI-powered communication on project schedule adherence. Their study demonstrates that AI can analyze real-time project data to identify potential schedule risks proactively. By communicating these risks effectively through clear channels (e.g., dashboards, reports), project managers can take corrective actions and adjust the schedule as needed, increasing the likelihood of on-time completion.

The study of [14] explored the potential pitfalls of excessive communication in human-AI collaboration. Their research suggests that a constant barrage of information from AI can lead to information overload, hindering focus and causing frustration among team members. This highlights the importance of striking a balance between keeping teams informed and avoiding information overload. The study emphasizes the need to consider factors like project complexity, team size, and individual communication preferences when determining the frequency of AI communication.

Baccarini (2016) conducted a comprehensive review of existing literature on project scope management. His research underscores the importance of clear communication in managing project scope creep. AI-powered communication tools can play a valuable role in this regard by facilitating clear communication between project teams and stakeholders, ensuring everyone remains aligned on project requirements and potential changes.

These empirical studies provide a strong foundation for investigating human-AI communication in project management. By examining the effectiveness of various communication modes, styles, and frequencies, this study can contribute to the development of best practices for fostering successful human-AI collaboration and achieving project success.

3. Research Methods

This study adopted a mixed-method approach to explore the impact of Artificial Intelligence (AI) adoption on project success. The study was conducted in two distinct phases: quantitative and qualitative, following a sequential explanatory strategy [12].

The quantitative phase commenced with the development of a structured questionnaire, informed by existing literature on AI and project management [29]. The survey measured the mode, style, and frequency of AI communication and feedback, as well as project success metrics such as scope, time, and budget adherence.

The population for this study includes project managers and team members across various industries such as Construction, Information Technology (IT), Manufacturing, Healthcare, and Finance, ensuring a diverse representation of AI tool usage in project management. A power analysis was done to determine a sample size of approximately 300 participants, providing the statistical power necessary for analysis [9]. Stratified random sampling was used to select participants, ensuring industry representation [31]. This information is represented in table 1 below.

Table 1. *Stratification of respondents.*

Industry	Population (%)	Sample Size (Based on Stratification)
Construction	20%	60 participants
Information Technology (IT)	30%	90 participants
Manufacturing	25%	75 participants
Healthcare	15%	45 participants
Finance	10%	30 participants

Source: Researcher (2024)

Upon collecting the data, IBM SPSS AMOS was utilized for statistical analysis. Multiple regression analysis was used to assess the relationship between AI adoption and project success metrics, while structural equation modelling explored the direct and indirect effects [19].

The qualitative phase followed, with semi-structured interviews conducted among a subset of survey respondents who expressed interest in further participation. These interviews delved into personal experiences and perceptions of AI in project management, providing context to the quantitative data [8]. Interviews were audio-recorded with participant consent and transcribed verbatim for analysis. Thematic analysis, a flexible and widely used qualitative approach [8], was employed to extract rich insights from the interview transcripts. This process involved an immersive journey through the data, followed by a structured analysis approach. NVivo software assisted in organizing and coding the interview data for thematic analysis [27].

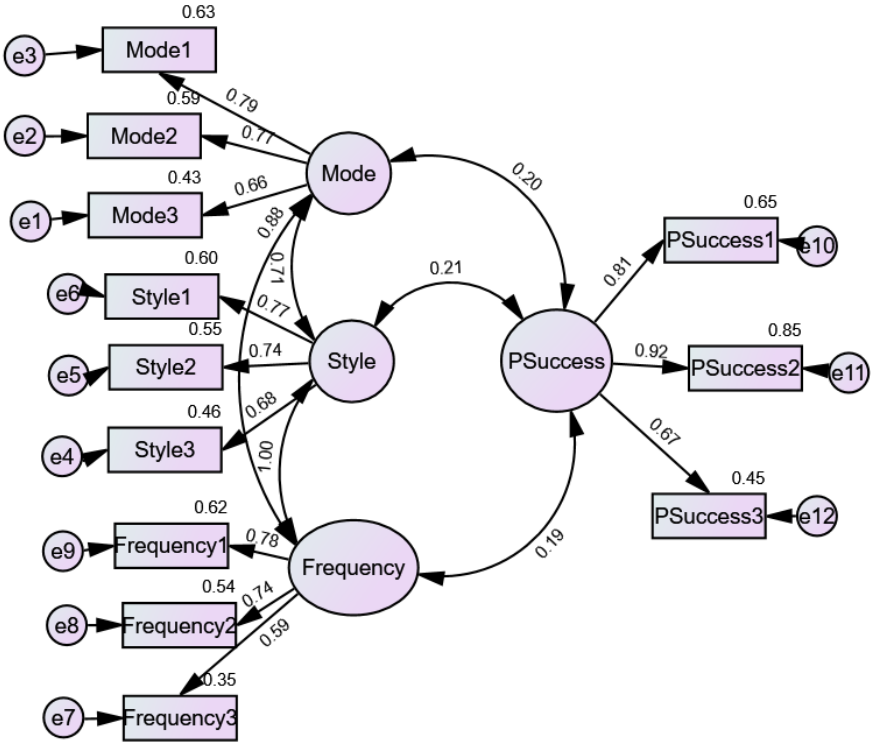
Data from both phases was integrated using a joint display, juxtaposing quantitative results with qualitative themes to draw comprehensive conclusions about AI's impact on project success [15]. Ethical considerations was paramount, with informed consent obtained from all participants and strict

adherence to confidentiality and data privacy standards.

4. Data Analysis and Interpretation

4.1. Measurement Model

The measurement model was evaluated in this research utilising a Confirmatory Factor Analysis (CFA) in SPSS AMOS 28. The CFA included evaluating the item-specific factor loadings. All values satisfied their corresponding common acceptance requirements when the model-fit indices (CMIN/df, GFI, CFI, TLI, SRMR, and RMSEA) were used to quantify the model's overall goodness of fit [32, 17, 5]. With a CMIN/df of 2.873, GFI of .962, CFI of .981, TLI of .947, SRMR of .05, and RMSEA of .06, the four-factor model (Mode of Communication, Style of AI Feedback, Frequency of AI Feedback, and Project Success) matched the data very well (Table 2). This model is displayed in Figure 1.



Source: Data Analysis (2024)

Figure 1. *Measurement Model.*

Table 2. *Model Fit.*

Fit Indices	Recommended Value	Source(s)	Obtained Value
P	Insignificant	[3]	.000
CMIN/df (Chi-square/df)	3-5	Less than 2 [32] to 5 [28]	2.873
GFI	>.90	[16]	.962
CFI	>.90	[5]	.981
TLI	>.90	[5]	.947
SRMR	<.08	[17]	.05
RMSEA	<.08	[17]	.06

Source: Data Analysis (2024)

Composite Reliability and Cronbach's Alpha were used to assess the construct reliability in this research. The study's constructs all met the minimum requirement of 0.70 for Cronbach's Alpha [25]. With a range of 0.909 to 0.925, the composite reliabilities exceeded the criterion of 0.70 [16]. So, overall dependability for each construct was determined by the research (Table 2). Using Average Variance Extracted, the research also determined if the scale items were valid for convergent analysis [16]. According to [16], the average variance extracted values were more than the requirement of 0.50. Table 3 shows that the scale employed in this investigation exhibited the requisite convergent validity.

Table 3. *Loadings, Reliability, and Convergent Validity.*

Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
Mode of Communication		.853	.871	.692
Mode1	.908			
Mode2	.804			
Mode3	.779			
Style of Feedback		.881	0.903	0.756
Style1	.825			
Style2	.904			
Style3	.878			
Frequency of Communication		.935	.828	.621
Freq1	.898			
Freq2	.823			
Freq3	.618			
Project Success		.879	.835	.629
PP1	.780			
PP2	.863			
PP3	.731			

Source: Data Analysis (2024)

This study assessed the discriminant validity of the test using the Fornell and Larcker Criterion and the Heterotrait-Monotrait (HTMT) Ratio. The Fornell and Larcker Criterion states that a construct has discriminant validity if its square root of AVE is higher than its correlation with other constructs in the study. However, this criterion has been criticized recently, and the HTMT Ratio, a new method to assess discriminant validity, has been used more frequently. The current study did not fully demonstrate discriminant validity using the Fornell and Larcker Criterion. However, using the HTMT Ratio, all ratios were below the required upper limit of 0.85 [16]. Therefore, the study established discriminant validity. Table 4 and Table 5 show the results of discriminant validity.

Table 4. *Fornell and Larcker Criterion.*

	Mode	Style	Freq	PSuccess
Mode	*0.76443*	-0.269	0.573	0.389
Style	-0.269	*0.80463*	-0.284	-0.263
Freq	0.573	-0.284	*0.82116*	0.334
PSuccess	0.389	-0.263	0.334	*0.83933*

Source: Data Analysis (2024)

Table 5. Heterotrait-Monotrait Ratio.

Mode	0.36
Style	0.58
Freq	0.44
PSuccess	0.74

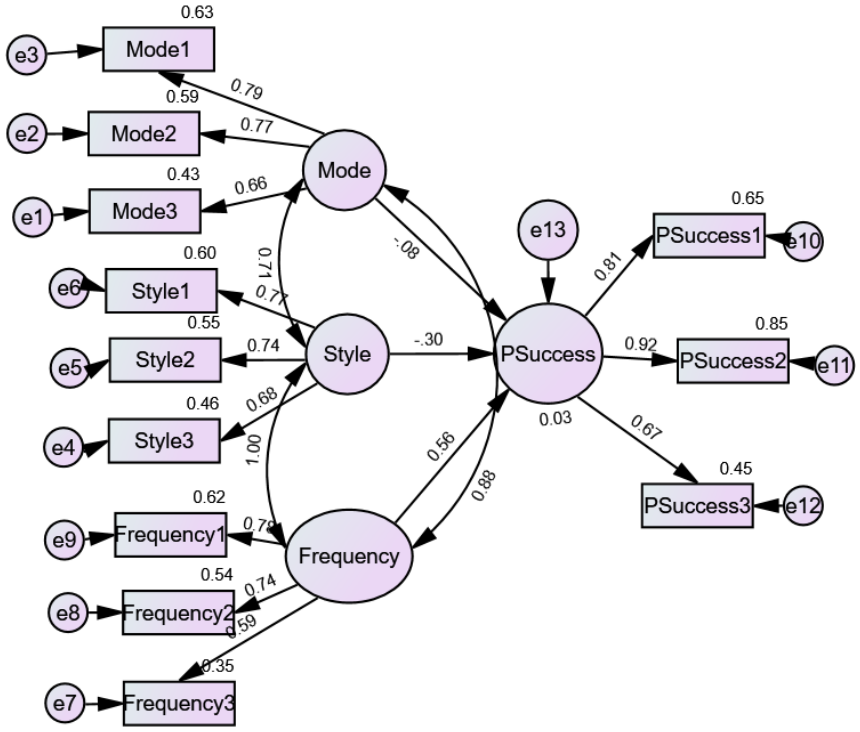
Source: Data Analysis (2024)

4.2. Structural Model Analysis

To evaluate the correlations, a structural equation model produced using SPSS AMOS was used. Since the value of the CMIN/df, the goodness-of-fit indices (GFI) [16], the Tucker and Lewis (1973) index (TLI), and the Confirmatory fit index (CFI) [5] is >.90, the model was considered to be well-fitting [16]. Additionally, an adequate-fitting model was approved as the root mean square error of approximation (RMSEA) is between 0.05 and 0.08 and the standardised root mean residual (SRMR) estimated value is.05 [16]. The model's fit indices, as shown in Table 1, were within the allowed range.

The squared multiple correlation was 0.029 for project success, this shows that about 3% variance in project success is accounted by mode of communication, style of feedback and frequency of feedback.

The study assessed the impact of mode of communication, style of feedback and frequency of feedback on project success. The impact of mode of communication on project success was negative and insignificant (β =-.084, t = -.226, p =.821), opposing H1. The impact of style of feedback on project success was negative and significant (β =-.296, t =-.438, p=.661), opposing H2. The impact of frequency of communication on project success was positive and significant (β =.563, t =-.612, p=.540), opposing H3. Model fit indices and Hypotheses results are presented in Table 6, and Figure 2 displays the structural model.



Source: Data Analysis (2024)

Figure 2. Structural Model.

Table 6. Model fit indices and hypothesis results for hypotheses 1-3.

Hypothesised relationship	Standardised estimated	t-value	p-value	Decision
Mode of communication-> project success	-0.084	-0.226	0.821	Not accepted
Style of communication-> project success	-0.296	-1.438	0.661	Not accepted

Hypothesised relationship	Standardised estimated	t-value	p-value	Decision
Frequency of communication-> project success	0.563	-0.612	0.540	Not accepted
R-square				
Project success	0.029			
Model Fit: CMIN/df = 2.873, GFI =.962, CFI =.981, TLI =.947, SRMR =.05, and RMSEA =.06.				

Source: Data Analysis (2024)

4.3. Qualitative Data Analysis

The integration of AI tools in project management has been met with mixed reactions, as evidenced by the responses from participants in the study. The quantitative data suggested a minimal variance in project success attributed to AI communication factors, and the qualitative feedback provides context to these findings. The quantitative analysis indicated that the mode and style of AI communication negatively impact project success, while the frequency of communication has a positive effect. These results were further illuminated by the qualitative feedback from participants, which identified six key themes that resonate with the quantitative findings.

Theme 1: Integration and Utilization of AI Tools: Participants noted that AI tools have been incorporated into their project management workflows, but not to the extent that they significantly influence project outcomes. This aligns with the quantitative finding that the mode of communication has an insignificant negative impact on project success. One participant mentioned, "AI tools are there, but they don't really change the way we work." This sentiment reflects the limited role AI currently plays in influencing project success.

Theme 2: Effectiveness of AI Communication Modes: Regarding the modes of communication, participants expressed that while AI tools offer various communication channels, their effectiveness is questionable. "We get a lot of automated reports, but most of them go unread," shared one project manager. This supports the quantitative result that the mode of AI communication does not significantly contribute to project success.

Theme 3: Style of AI Feedback: The style of feedback from AI systems was frequently described as technical and not user-friendly. "It's like the AI is speaking another language. We need clear, actionable insights, not just data dumps," a participant explained. This frustration provides qualitative support for the significant negative impact of the style of feedback on project success found in the quantitative analysis.

Theme 4: Impact of AI Communication on Project Outcomes: Participants also discussed how the mode and style of AI communication have led to practical challenges in project management. For instance, one recounted, "We missed an important risk alert because it was buried in an AI-generated email that looked like all the others." This experience corroborates the quantitative data, which indicated that the current mode and style of AI communication are not effectively supporting project success.

Theme 5: Desired Improvements in AI Communication: When asked about improvements, participants suggested a need for more personalized and integrated AI communication. "AI should adapt to our communication habits, not the other way around," suggested a team member. This desire for improved integration and personalization echoes the positive significance of the frequency of communication on project success, as indicated by the quantitative results.

Theme 6: Future of AI in Project Management: Looking to the future, participants were optimistic that AI communication could become more intuitive and supportive. "I can see AI becoming a virtual team member, offering real-time advice and insights," envisioned a participant. This forward-looking statement aligns with the quantitative finding that increased frequency of AI communication has a positive impact on project success.

In summary, the qualitative responses from participants provide a deeper understanding of the quantitative results. They highlight the current limitations of AI communication in project management and suggest areas for improvement. The consensus is that while AI has the potential to enhance project success, its mode and style of communication need to be more aligned with human workflows to realize this potential fully. The frequency of communication, however, is already seen as a positive contributor, indicating a pathway for AI tools to add value to project management practices.

4.4. Discussion of Findings

The findings of this study offer a multifaceted view of the role AI communication plays in project management success. The quantitative analysis revealed that the mode and style of AI communication have a negative impact on project success, while the frequency of communication has a positive impact. These results are supported by qualitative insights from industry professionals who have experienced the benefits and challenges of integrating AI into their project management practices.

The slight negative relationship between the mode of AI communication and project success (b = -.084, p =.821) suggests that the way AI tools deliver information may not be

optimally aligned with project management needs. This is consistent with the work of [30], who argue that the effectiveness of communication tools is contingent upon their alignment with organizational processes and goals. Similarly, the negative impact of the style of AI feedback on project success (b = -.296, p =.661) echoes the concerns raised by [20], who emphasize the importance of human-friendly AI interfaces that enhance, rather than hinder, decision-making processes.

Conversely, the positive relationship between the frequency of AI communication and project success (b =.563, p =.540) aligns with the findings of [13], who highlight the significance of timely and regular feedback in enhancing information system success. This suggests that when AI tools provide frequent updates and insights, they can contribute positively to the achievement of project objectives.

The squared multiple correlation coefficient of 0.029 indicates that only a small variance in project success is accounted for by the AI communication variables studied. This finding is in line with the research of [9], who suggest that communication technology alone is not a panacea for project management challenges but must be part of a broader strategy that includes human expertise and effective management practices.

The qualitative responses from participants further elucidate these findings. For instance, the reported ineffectiveness of AI communication modes may be due to a lack of integration with preferred communication channels, as noted by one participant. This supports the argument by [22] that technology must be embedded within the social practices of an organization to be truly effective.

Moreover, the desire for improvements in the mode and style of AI communication reflects the need for AI tools to adapt to human communication preferences, a point underscored by the work of [26]. As AI technology continues to advance, it is expected to become more intuitive and supportive, potentially transforming project management practices [18].

In conclusion, this study's findings contribute to the growing body of literature on AI in project management by highlighting the complex interplay between AI communication factors and project success. While the mode and style of AI communication currently have a limited and sometimes negative impact, the frequency of communication shows promise for enhancing project outcomes. Future research should continue to explore how AI tools can be designed and implemented to better support the dynamic needs of project management.

5. Conclusion

The study's exploration into the impact of AI communication on project success has yielded insightful findings. The quantitative data indicated that while the frequency of AI communication positively affects project success, the mode and style of communication have a negative impact. These results were substantiated by qualitative feedback from project management professionals, who highlighted the need for AI tools to provide clearer, more actionable insights and to be better integrated into existing communication channels.

The mixed-methods approach of the study allowed for a comprehensive understanding of the complexities involved in AI-enhanced project management. It became evident that the mere presence of AI tools is not sufficient to guarantee project success. Instead, the way these tools communicate, and the frequency of their communication play critical roles in their effectiveness.

6. Recommendations

In light of the study's findings, it is recommended that organizations seeking to leverage AI in project management consider a multifaceted approach to enhance the effectiveness of AI communication. First and foremost, AI tools should be deeply integrated into project management systems, ensuring they work in harmony with existing workflows and processes. This integration is crucial for AI to become a natural extension of the project management toolkit.

Furthermore, the development of AI communication modes should be aligned with the preferences and habits of project teams. For example, AI-generated insights could be delivered through popular messaging platforms already in use, ensuring that important information is received and acknowledged promptly. Additionally, the feedback style of AI systems must be refined to provide clear, concise, and actionable insights. Moving away from technical jargon and towards user-friendly interfaces will help in making AI tools more accessible and beneficial to project teams.

The frequency of AI communication also plays a pivotal role in project success. AI tools should offer regular updates that are contextually relevant, providing project teams with timely insights that can inform decision-making and strategy. Alongside these technological improvements, continuous training for project teams is essential. As AI tools and capabilities evolve, so too should the knowledge and skills of those who use them.

Finally, ongoing research into the role of AI in project management is necessary. As AI technology advances, its potential applications within project management will expand, offering new opportunities for enhancing efficiency, effectiveness, and overall project success. By adhering to these recommendations, organizations can better position themselves to capitalize on the benefits of AI, ensuring that their project management practices are robust, responsive, and resilient in the face of technological change.

Abbreviations

AI	Artificial Intelligence
PMI	Project Management Institute

NLP	Natural Language Processing
CV	Computer Vision

Conflicts of Interest

The authors declare no conflicts of interest.

Appendix

QUESTIONNAIRE

Quantitative Questionnaire on AI Adoption and Project Success

Please indicate your level of agreement with the following statements regarding the use of AI in project management.

1. Bio data
2. Role in the organisation.
3. Years of experience

Highest educational qualification

Mode of AI Communication:

4. AI tools communicate project updates in a mode that is convenient for my workflow.
5. The mode of communication used by AI tools aligns well with our project management methodologies.
6. I prefer the mode of communication provided by AI tools over traditional methods.

Style of AI Feedback:

7. The style of feedback from AI tools is clear and understandable.
8. AI tools provide feedback in a style that encourages proactive project management.
9. The feedback style of AI tools is consistent and reliable.

Frequency of AI Communication:

10. AI tools provide regular updates that are appropriately frequent for managing projects.
11. The frequency of communication from AI tools ensures timely decision-making.
12. I am satisfied with the frequency of feedback and communication from AI tools.

Project Success Metrics:

13. AI adoption has led to projects being completed more often within the defined scope.
14. AI tools have contributed to a higher rate of on-time project completion.
15. The implementation of AI has helped to maintain or reduce project budgets.

Semi-Structured Interview Guide:

Introduction:

Thank you for participating in this interview. Your insights will help us understand the nuances of AI adoption in project management.

Questions:

1) Can you describe how AI tools have been integrated into your project management workflow?
2) What modes of communication do AI tools use in your organization, and how effective are they?
3) How would you describe the style of feedback you receive from AI systems?
4) How does the frequency of AI communication affect your project management tasks?
5) Can you share any experiences where the mode, style, or frequency of AI communication significantly impacted your project management tasks?
6) What improvements would you suggest in the mode, style, and frequency of AI communication for better project management?
7) How do you envision the future of AI communication modes, styles, and frequency in enhancing project success?

Conclusion:

We appreciate your time and valuable contributions to this research.

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