

## Improving Project Performance through AI Adoption: The Moderating Role of Organizational and Managerial Capabilities

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### ABSTRACT

*This study examines the relationship between Artificial Intelligence and project Performance. Artificial Intelligence (AI) adoption has become increasingly prevalent in organizations, offering the potential to enhance Project performance. However, the impact of AI adoption on project performance is not uniform and can be influenced by several contextual factors, including organizational capability and managerial capability. This study aims to investigate the relationship between AI adoption and Project Performance, while also examining the moderating roles of organizational capability and managerial capability. The study makes use of an integrative model that blends organizational and environmental variables with AI innovation features. The study explores the direct influences of compatibility, organizational capability, managerial support and technical capability on AI adoption and how it enhances project performance. Furthermore, the moderating effects of organizational capability and managerial capability on the relationship between AI adoption and project performance are examined. The findings suggest that project performance is positively associated with AI adoption, indicating that organizations adopting AI technologies may experience improvements in project outcomes. The study also reveals that organizational capability plays a moderating role in the relationship between AI adoption and project performance. Organizations with strong organizational capabilities, including managerial and technical resources, are more likely to effectively implement AI and achieve higher project performance. Managers who possess the skills to inspire and guide employees are more likely to drive successful AI adoption and subsequently enhance project performance. The findings emphasize the importance of managerial support and technical capabilities in facilitating AI adoption and its impact on project performance.*

**Keywords:** Artificial Intelligence, Project Performance, Managerial Capability, Organizational Capability, Technical Capability Managerial Support, Information Technology

## INTRODUCTION

The rapid advancement of artificial intelligence (AI) has ushered in an era of transformation across industries, revolutionizing the way organizations operate and adapting in a dynamic business landscape. Although the conceptual foundation of AI dates back to the Dartmouth Conference in 1956, its practical impact has recently been materialized due to convergence of advanced algorithms, increased computational power, and large-scale data availability (Benbya et al., 2020). In project-based environments, AI offers significant opportunities to enhance decision-making, process automation, and predictive analysis.

The deployment of new technologies, such as AI, can bring about profound changes in project performance, enabling efficiency gains, improved quality, and cost reductions (Ahmed, Hussain & Philbin, 2021; Ahmed et al., 2024). However, this paradigm shift is accompanied by significant challenges. While AI promises optimization, it also introduces disruptions, potential resistance from personnel, and the need for new skillsets. The balance between benefits and challenges hinges on several factors, including the organization's ability to adapt and the effectiveness of managerial oversight. As articulated by (Crevier, 1993), the integration of new technologies is a dual-edged sword—one that necessitates prudent management.

Existing literature acknowledges that both organizational capabilities and managerial capabilities play crucial roles in shaping project outcomes, particularly in technology-intensive environments. Organizational capability refers to the firm's ability to adapt, integrate and reconfigure resources in response to change, thereby enabling agility and resilience (Helfat & Martin, 2015). Managerial capability, on the other hand, reflects the competence of project leaders in coordinating resources, guiding teams, and making effective decisions under uncertainty (Ko & Cheng, 2007). Prior studies suggest that these capabilities are essential for mitigating the risks associated with technological change and for leveraging new technologies to improve performance (Garrison, Wakefield, & Kim, 2015). When organizational and managerial capabilities align, they mitigate potential disruptions caused by technology adoption and amplify the positive outcomes. Conversely, their absence can expose projects to increased vulnerabilities.

In this dynamic context, organizational capability and managerial capability emerge as pivotal forces that shape the impact of AI adoption on project performance (Mahmood & Ahmed, 2025; Ahmed & bin Mohamad, 2014). Organizational capability denotes the agility and responsiveness of an organization to accommodate change, while managerial capability underscores the competence of project managers in effectively orchestrating AI-powered endeavors (Ahmed, Philbin & Cheema, 2021; Ko, & Cheng, 2007). The intricate interplay between AI adoption, organizational capability, and managerial capability is not yet fully understood (Gold, Malhotra, & Segars, 2001). While AI's potential to revolutionize project management is acknowledged, the specific mechanisms through which organizational and managerial factors modulate their impact remain unexplored. This research seeks to bridge this knowledge gap by delving into the nuanced interactions that define the AI-project performance nexus (Helfat, & Martin, 2015).

While the importance of AI adoption and organizational capabilities is well recognized, the intricate interplay between AI adoption, organizational capability, and managerial capability is not yet fully understood (Gold, A. H., Malhotra, & Segars, 2001). This research seeks to bridge this knowledge gap by delving into the nuanced interactions that define the AI-project performance nexus (Helfat, & Martin, 2015).

The research examines the relationships between AI adoption, project performance, organizational capability, and managerial capability (Khatib, 2020). It specifically investigates the potential synergies and challenges associated with AI integration in project environments, with a focus on how organizational and managerial capabilities mediate these effects. By analyzing these relationships, the study aims to provide

insights into the mechanisms that influence successful AI implementation and its impact on project outcomes (Hong Chen, 2020).

The research questions guiding this study revolve around the relationships between AI adoption, project performance, organizational capability, and managerial capability (Khatib, 2020). We aim to ascertain the potential synergies and challenges posed by AI in project contexts, examining how the capabilities of both organizations and managers mediate these effects. By scrutinizing these intricate relationships, we intend to shed light on the dynamics that determine successful AI integration and its subsequent impact on project outcomes (Hong Chen, 2020).

The significance of this research lies in its practical and theoretical contributions. From a practical perspective, the findings offer valuable guidance for organizations seeking to effectively leverage AI in project management and performance outcomes (Oliveira, & Martins, 2008). From a theoretical standpoint, the study contributes to the growing body of knowledge on AI-adoption and capability-based perspective by examining their combined influence on project performance (Collis, 1994). Furthermore, by integrating empirical analysis with theoretical insights, this research responds to the need for a more comprehensive understanding of how AI, organizational capability, and managerial capability collectively shape project success (Chin, Marcolin, & Newsted, 2003; Garrison, Wakefield, & Kim 2015; Hong Chen, 2020).

This study's significance transcends theoretical curiosity. Its insights hold practical implications for organizations seeking to harness AI's potential for project management (Oliveira & Martins, 2008). Unveiling the interplay between AI and capabilities, this research informs strategic decisions, empowers project leaders, and contributes to the evolving landscape of project management practices in the AI era (Collis, 1994). It looks at the complexities of AI adoption, organizational and managerial capabilities, and their collective influence on project performance (Chin, Marcolin, & Newsted, 2003). It also engages in a comprehensive exploration that encompasses empirical investigation, theoretical underpinnings, and practical implications (Garrison, Wakefield, & Kim 2015). This research contributes to the understanding of how AI's integration impacts the projects of today, and the capabilities that guide organizations toward a successful future (Hong Chen, 2020).

## **LITERATURE REVIEW**

The fusion of artificial intelligence (AI) and project performance has emerged as a critical area of inquiry within contemporary business and technological research. This research explores multidimensional relationships between AI adoption, project performance, and their underlying theoretical foundations, positioning AI as a transformative force in modern project environments (Neumann, Guirguis & Steiner, 2023).

Artificial intelligence (AI) stands as the epitome of machines replicating human intelligence, capable of reasoning, learning, and perceiving the world around them. The foundation of AI rests upon the creation of algorithms and computational models that empower machines to engage in tasks that traditionally demanded human cognitive capabilities. From natural language processing and speech recognition to visual perception and decision-making, AI encompasses a spectrum of forms and functions. For instance, rule-based AI adheres to predetermined rules, well-suited for systems with straightforward decision-making processes (Sweet, & Grace-Martin, 1999). In contrast, machine learning algorithms enable machines to learn from data, allowing for complex decision-making and pattern recognition (Neumann et al., 2023). Across various industries like healthcare, finance, transportation, and entertainment, AI has woven itself into processes, automating tasks, enhancing accuracy, and improving decision-making.

AI's integration into project management has been transformative, revolutionizing various aspects of the project lifecycle. From project scheduling and planning to resource allocation and risk management, AI technologies have reshaped traditional paradigms. Machine learning algorithms analyze historical project data to discern trends and forecast potential hazards, aiding project managers in making informed decisions (Weber & Schütte, 2019). Furthermore, AI-driven recommendations for resource allocation consider factors like availability and skill sets, optimizing project efficiency (Neumann, Guirguis, & Steiner, 2023). Predictive analytics powered by AI assist in risk management, enabling project managers to anticipate risks and devise suitable strategies for mitigation (Aboelmaged, 2014). Moreover, natural language processing tools and chatbots enhance team communication, facilitating seamless updates and information exchange (Panesar, Venkatesh, Rakhra, Jairath, & Shabaz, 2021). Real-time project tracking is facilitated through AI technologies, enabling swift identification of deviations from the plan and the implementation of corrective actions (Neumann et al., 2023). With the infusion of AI, project managers are empowered to make more informed decisions, streamline processes, and enhance project outcomes.

Traditional project success metrics often fall short in capturing the intricate dynamics of modern projects (Ahmed et al., 2025; Takim & Akintoye 2002). The integration of AI offers a pathway to more precise, real-time success predictions. Prior studies have explored the shortcomings of conventional metrics and argue that AI's capacity to consider a wider array of variables and adapt to evolving project conditions can yield more accurate forecasts (Zhu, & Mostafavi, 2017). Empirical evidence supports this notion, with AI-based project success prediction systems exhibiting notable accuracy rates (Ahmed et al., 2024; Takim & Akintoye 2002). Much research is needed to build upon this foundation, unraveling the potential of AI to revolutionize project success forecasting (Ahmed & Jawad, 2022; Ahmed et al., 2021).

Existing theoretical frameworks provide valuable lenses for examining AI adoption at individual and organizational levels. At the individual level, the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) explain user intentions, attitudes and behavioral responses toward technology adoption. At the organizational level, the Technology, Organization, and Environment (TOE) framework highlights how technological readiness, organizational capabilities and environmental dynamics collectively shape AI adoption decisions (Hong Chen, 2020).

In addition, The Diffusion of Innovation (DOI) theory explains how innovativeness spreads over time within social systems through communication channels and adopter categories (Rogers). The Technology, Organization, and Environment (TOE) framework comprehends the distinct context in which AI adoption unfolds, encompassing technological backgrounds, organizational competencies, and environmental influences (Oliveira, & Martins, 2008).

These theoretical models together provide a comprehensive foundation for understanding the complex and multi-layered dynamics of AI-adoption. They guide this study in exploring how technological, organizational and environmental factors interact to influence the integration of AI within project and organizational settings.

## **RESEARCH MODEL AND HYPOTHESIS**

The research hypotheses of this study are rooted in the intersection of artificial intelligence (AI) adoption and project performance, driven by the capabilities of organizations, managers, and technical resources. Leveraging machine learning algorithms, natural language processing, and other AI techniques holds the promise of enhancing the quality of decision-making, automating tasks, and uncovering insights that were previously challenging to discern. This research explores the multifaceted connections between AI adoption and project performance, while considering the crucial roles of organizational capability, managerial

support, and technical proficiency (Ahmed, Samar & Philbin, 2025; Martínez & Fernández-Rodríguez, 2015).

**(H1):** AI adoption has a positive and significant effect on project performance.

Organizations that harness the potential of AI technologies to automate tasks, enhance decision-making, and uncover insights are likely to experience improved project completion times, better risk management, and higher levels of customer satisfaction (Martínez & Fernández-Rodríguez 2015).

**(H2):** Organizational compatibility positively moderates the relationship between AI adoption and project performance, such that the positive effect of AI adoption on project performance is stronger when organizational compatibility is high. Organizations where managers exhibit support for AI adoption by allocating resources, fostering integration, and championing its implementation are more likely to successfully integrate AI into their operations (Co, Eddy Patuwo, & Hu, 1998).

**(H3):** Managerial compatibility positively moderates the relationship between AI adoption and project performance, such that the positive effect of AI adoption on project performance is stronger when managerial compatibility is high. Managers who possess the ability to inspire, lead, and allocate resources effectively are more likely to recognize the potential benefits of AI technologies, reduce perceived risks, and enhance the integration of AI into existing processes and culture (House, Javidan, Hanges & Dorfman 2002).

This study aims to shed light on the complex relationships between AI adoption and project performance, elucidating the roles of organizational capabilities, managerial support, and technical proficiency. The empirical analysis seeks to contribute to the body of knowledge surrounding the adoption of AI technologies, offering insights that can guide businesses in making informed decisions and reaping the benefits of AI integration.

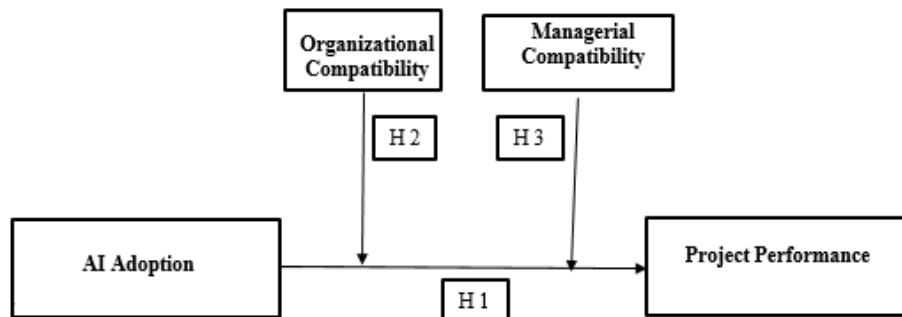


Figure 1. Research model for AI Adoption.

### Methods

The research design elucidates the procedures and strategies used to collect and analyze the required data. This study employs a quantitative research approach, evaluating the model using quantitative methods and techniques. The study investigates the connections among AI Adoption (independent variable), Project Performance (dependent variable), and the moderating variables of Managerial Capability and

Organizational Capability. Quantitative research is chosen due to its capacity to generate representative results based on the large population size. To explore the relationships between the variables under investigation, a questionnaire-based approach was adopted (Dulock, 1993). This study predominantly utilizes the organizational level as the unit of analysis. By examining various telecom organizations in Pakistan and their AI adoption practices, this study aims to generalize findings about the relationship between AI adoption and project performance, while considering organizational and managerial competencies. The telecom organizations participating in the study would serve as the primary analytical unit.

### ***Population and Sampling***

The target population for this survey comprises professionals such as project directors, project managers, software engineers, and project supervisors, predominantly in the telecom sector in Pakistan. The study focuses on IT projects of major software/IT companies in Pakistan, operating in both the public and private sectors from Pakistan. The population frame for this study would be the individuals relevant for providing answers to the research questions of this study, particularly those engaged in IT projects. To ensure the sample's representativeness, a suitable sampling technique was chosen based on the study's objectives and design.

The sample size of 125 participants was determined based on previous studies, suggesting that the sample size should be at least five times the number of indicators. Data collection was carried out using the snowball sampling technique, which is suitable when a sampling frame is challenging to establish. This technique is often applied to small populations with limited accessibility, ensuring the inclusion of participants with relevant knowledge (Kiernan, Kiernan, Oyler, & Gilles, 2005).

### ***Data Collection and Data Analysis***

Primary data for this research was gathered through a pre-designed and validated survey questionnaire, encompassing various questions and scales. The survey was distributed via email, web-based platforms, and traditional methods to IT professionals in Pakistani organizations, specifically in the telecommunications sector within Pakistan. A questionnaire survey was chosen due to its ability to quickly gather a large amount of data.

After collecting the data, the researcher undertakes data cleaning, select 'valid' questionnaires and ensures accuracy. The analysis employed statistical and analytical methods to describe, present, and evaluate the data. SPSS was utilized for statistical analysis and data processing. Various statistical tests were performed to establish the reliability, validity, and relationships between variables. Structural equation modeling and regression analysis were employed as data analysis methods. The measurement model's reliability, validity, convergent validity, and discriminant validity were assessed to ensure the adequacy of the measurement tool.

Construct	Source/Items
Managerial capability	(Garrison et al., 2015; Ravichandran & Lertwongsatien, 2005)
	The inter-department cooperation is very important to adopt AI technologies innovation.

	Formal education and training programs can be developed to include all classes of users ranging from managers to shop floor controllers.
Managerial support	(Garrison et al., 2015; Han et al., 2008)
	Managers are willing to take risks involved in the adoption of AI.
	Our managers have the ability to exploit new technologies before our competitors.
	Our managers have the ability to leverage new IT technologies as a strategic core competence
	Our managers have a strong understanding of how AI technology can be used to increase business performance.
Technical      capability	(Garrison et al., 2015; Han et al., 2008)
	We have standardized process for IT innovation.
	Our IT strategies support our business strategies
	We have suitable hardware/software to protect the security and privacy of our systems and networks.
AI adoption	(Chau & Tam,1997; Reich & Benbasat,1990)
	A timely AI technical implementation and application migration plan has been developed, and the plan has already been endorsed by managers.
	A financial budget and a migration schedule have been approved.
	Our customers highly accept new products and services using AI innovations.
Project Performance	Ahmed and Anantatmula (2017).
	All project assignments were followed as per planned schedule.
	The schedule for each phase of the project was essentially the same as planned.
	Major project activities were completed on schedule.
	The project was delivered on schedule.
	The cost objectives were met in the project.
	The budget for each phase of the project was essentially the same as planned.
	The budget for each phase of the project was essentially the same as planned.

	The project deliverables were of high quality.
	The project deliverables were highly reliable and required minimal maintenance.
	The quality objectives were achieved for the Project.
	The facilities were built based on the owner's requirements.

**DATA ANALYSIS AND RESULTS**

Table 1: *Demographic Profile of Respondents (N = 125)*

Variable	Category	Frequency (n)	Percentage (%)
<b>Gender</b>	Male	92	73.6
	Female	33	26.4
<b>Age</b>	21–30 years	25	20.0
	31–40 years	48	38.4
	41–50 years	35	28.0
	Above 50 years	17	13.6
<b>Education</b>	Bachelor's Degree	38	30.4
	Master's Degree	69	55.2
	MS/MPhil	13	10.4
	PhD	5	4.0
<b>Experience</b>	Less than 5 years	22	17.6
	5–10 years	46	36.8
	11–15 years	34	27.2
	More than 15 years	23	18.4

Variable	Category	Frequency (n)	Percentage (%)
<b>Position</b>	Project Director	11	8.8
	Project Manager	39	31.2
	Software Engineer	51	40.8
	Project Supervisor	24	19.2
<b>Organization Type</b>	Public Sector	47	37.6
	Private Sector	78	62.4

The sample consisted of 125 respondents, of whom 73.6% were male and 26.4% were female. Most respondents were between 31 and 40 years of age (38.4%), followed by those aged 41–50 years (28.0%). A majority held a master's degree (55.2%), while 30.4% possessed a bachelor's degree. In terms of professional experience, 36.8% had 5–10 years of experience, followed by 27.2% with 11–15 years of experience. Software engineers represented the largest occupational group (40.8%), followed by project managers (31.2%). Furthermore, 62.4% of respondents were employed in private-sector organizations, while 37.6% worked in public-sector organizations.

### ***Reliability Analysis***

The reliability analysis assesses the internal consistency of the measurement items using Cronbach's alpha coefficient. The obtained Cronbach's alpha coefficient of .950 suggests a high level of internal consistency among the items on the scale. This value exceeds the threshold for acceptability, indicating strong reliability. A similar value of 0.951 based on standardized items reaffirms the consistent internal consistency of the scale. This high level of reliability reinforces the confidence in the measurement instrument's ability to consistently measure the intended construct (Taherdoost, 2016).

Table 2: *Reliability Analysis*

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.950	.951	30

### ***Correlation Analysis***

The two-tailed correlation analysis delves deeper into the relationships between AI, MS, PP, and MC. It revealed strong positive correlations between project performance and artificial intelligence ( $r = 0.782$ ,  $p < 0.01$ ), as well as between project performance and managerial capability ( $r = 0.627$ ,  $p < 0.01$ ). Similarly, a strong positive correlation was observed between project performance and organizational capability ( $r$

= 0.743,  $p < 0.01$ ). These correlations highlight the positive impact of AI adoption and managerial and organizational capabilities on project performance, reinforcing the importance of these factors in achieving successful project outcomes.

Table 3: *Correlation Analysis*

		PP	AI	MC	OC
PP	Pearson Correlation	1			
AI	Pearson Correlation	.782**	1		
MC	Pearson Correlation	.627**	.673**	1	
OC	Pearson Correlation	.743**	.758**	.807**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### *Hypothesis Testing Results*

#### *Regression Analysis*

In the regression analysis, the impact of independent variables on the dependent variable (PP) was assessed. The R-squared value of 0.612, signifying 61.2% of the variability in PP explained by the predictors, underscores their significance (Model  $R^2 = 0.612$ ). The adjusted R-squared value of .608 factors in predictor count, offering a reliable gauge of model fit (Adjusted  $R^2 = 0.608$ ). Notably, the model incorporates the predictor "AI" alongside a constant term.

Table 4: *ANOVA Analysis*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8561.994	1	8561.994	193.619	.000 <sup>b</sup>
	Residual	5439.158	123	44.221		
	Total	14001.152	124			

a. Dependent Variable: PP

b. Independent Variable: AI

Table reveals ANOVA results. The regression's sum of squares (8561.994) signifies explained PP variability. Residual sum of squares (5439.158) accounts for unexplained variability. The F-value of 193.619, with  $p < 0.001$ , underscores the predictors' substantial influence on PP.

Table 5: *Coefficients Analysis*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	13.055	2.474		5.277	.000
	AI	1.453	.104	.782	13.915	.000

a. Dependent Variable: PP

Table presents coefficients. The constant's coefficient is 13.055, indicating PP when predictors are zero. For "AI," the coefficient is 1.453. A one-unit increase in "AI" corresponds to a 1.453 unit increase in PP. Standardized coefficients, notably AI's 0.782, represent change in PP in standard deviation units per one-standard-deviation increase in AI. A significant t-value (13.915,  $p < 0.001$ ) reaffirms AI's importance in explaining PP variation. These findings contribute to the understanding of AI's role in influencing PP (Freund, R. J., Wilson, W. J., & Sa, P. (2006)).

***Moderation Analysis: AI and MC***

The moderation analysis examines the relationship among PP (outcome variable), AI (predictor variable), and MC (moderator variable). Based on a sample size of 125, the results show relationships to uncover significant insights (Memon, M. A., Cheah, J. H., Ramayah, T., Ting, H., Chuah, F., & Cham, T. H. (2019). )The model effectively captures the impact of AI and MC on PP, as indicated by the R-squared value of 0.6361, explaining 63.61% of PP's variance. A mean squared error of 42.1023 highlights predictive accuracy. The F-value of 70.5170, with  $p < 0.0001$ , demonstrates overall model significance.

AI significantly affects PP, with each unit increase in AI corresponding to a 1.7667 unit increase in PP. Similarly, MC yields a significant positive effect, with a one-unit MC increase linked to a 0.8097-unit PP increase. However, the interaction term (Int\_1) did not enhance PP prediction, evident from a non-significant p-value (0.1577). Hence, AI and MC individually influence PP, but their interaction doesn't amplify predictive power.

Table 5: *Moderation Analysis 1*

	Cof	se	t	p	LLCI	ULCI
constant	-.19	8.24	-.02	.98	-16.52	16.1
AI	1.76	.40	4.34	.00	.96	2.57
MC	.80	.36	2.22	.02	.08	1.5
Int_1	-.02	.01	-1.4	.15	-.05	.00

The analysis focuses on MC as the moderator. Coefficients reveal that both AI and MC significantly impact PP, while the interaction term Int\_1 lacks substantial influence.

Table 6: *Moderation Analysis 2*

	coeff	se	t	p	LLCI	ULCI
constant	14.68	7.8	1.8	.062	-.7	30.15
AI	.66	.40	1.6	.10	-.1	1.46
OC	.23	.19	1.2	.22	-.14	.62

In this analysis, OC is considered as the moderator. The model provides insights into PP prediction using AI and OC. AI has a marginally significant effect on PP, and OC yields a non-significant positive effect. The interaction term Int\_1 (AI x OC) does not significantly contribute to PP variance, as reflected by the p-value of 0.4400.

These analyses collectively indicate that while AI plays a role in predicting PP, neither MC nor OC significantly modify AI's impact on PP. These findings enhance our comprehension of AI's relationship with PP and the limited influence of moderators MC and OC on this relationship.

## DISCUSSION

This study seeks to explore the effect of AI adoption on project performance in the telecom sector of Pakistan while taking the moderating effects of organizational capability and management support into consideration. The findings unveil pivotal determinants of AI adoption, including Technical Capability, Managerial Support, Managerial Capability, and Organizational Capability. Compatibility and Relative Advantage are established as positive influencers on AI adoption. Notably, telecom companies prioritize compatibility with their existing network infrastructure when embracing AI, recognizing its potential to enhance customer service, employee productivity, and IT resource optimization. Managerial support surfaces as a driving force, underscoring the significance of engaging top-level managers and positioning AI as a strategic core competence to propel adoption.

Contrary to expectations, Technical Capabilities do not exhibit a uniformly strong relationship with AI adoption. Existing technological infrastructure and technical competence within telecom operators do not necessarily facilitate the process. Managerial Capability indirectly shapes AI adoption through its impact on managerial support, AI's innovation attributes, and other organizational capabilities. Enhanced managerial capability heightens the perception of AI's advantages, diminishes perceptions of relative risk, and augments compatibility and technical readiness. Intriguingly, market uncertainty and competitive pressures do not yield a positive correlation with AI adoption within the telecom industry. Irrespective of market fluctuations and competitive dynamics, telecom sectors prioritize AI to foster business growth and fortify the industry chain.

## CONCLUSION

Artificial intelligence bears the potential to reshape society, revolutionize industries, and amplify profits. The essence of successful AI adoption resides in key facilitators that drive effective AI implementation. The study aligns with the suggested model outlining AI adoption success criteria, encompassing variables such as organizational capabilities, managerial aptitude, and AI innovation traits. The findings underscore

the contributions of these factors to AI adoption and the enhancement of project outcomes. A particularly noteworthy indirect influencer is managerial proficiency. Although this study does not consider all AI adoption influencers, it provides a robust framework for generating and evaluating empirical hypotheses within the interconnected domain. Future research endeavors may examine deeper into these findings, further enriching our understanding of AI adoption dynamics.

The investigation into the relationship between project performance and AI adoption reveals a multifaceted connection. AI adoption can substantially enhance project performance across several critical dimensions. By automating repetitive tasks, optimizing resource allocation, and refining decision-making processes, AI adoption contributes to heightened project efficiency. The infusion of AI technologies has the potential to expedite project timelines, reduce costs, and optimize resource utilization, leading to increased efficiency. Moreover, AI's predictive modeling and real-time insights elevate project effectiveness by aiding project managers in risk identification, outcome prediction, and data-driven decision-making, thereby elevating project success rates (Ahmed et al., 2021; Ahmed & Philbin, 2021). Furthermore, AI-driven mechanisms for continuous monitoring, error detection, and quality control have the potential to enhance project quality, ensuring deliverables meet or exceed expected standards. Lastly, through automated task execution, optimized schedules, and streamlined communication, AI adoption can positively influence project timeliness, minimize delays and propel overall project advancement (Ahmed et al., 2024; Mahmood et al., 2022).

The moderating role of organizational capability unveils the significance of an organization's readiness and capacity to extract value from adoption of AI. Leadership support emerges as a pivotal factor, with strong backing facilitating resource allocation, fostering innovation, and nurturing a culture receptive to change. An organizational culture that promotes experimentation, learning, and adaptation bolsters AI integration into project management, enhancing project performance. Furthermore, robust infrastructure in terms of hardware, software, and data management systems empowers seamless AI implementation, fostering improved project outcomes. Additionally, skilled personnel well-versed in AI technologies augment the organization's ability to leverage AI-driven insights for enhanced project management. Overall, an organization with elevated organizational capability is better positioned to harness AI adoption for optimal project performance.

The moderating role of managerial capability underscores the significance of project managers' expertise in effectively leveraging AI technologies to bolster project performance. Proficiency in AI concepts, algorithms, and tools enables project managers to identify opportunities and align AI solutions with project goals, amplifying project performance. Skillful data analysis and interpretation empower project managers to extract actionable insights, make informed decisions, and enhance project outcomes through AI-driven analytics. Effective change management skills facilitate smooth transitions, ensuring successful AI integration within project management. Moreover, adept collaboration and communication abilities foster seamless teamwork, knowledge sharing, and coordination, leading to the integration of AI technologies into project processes and contributing to superior project performance.

## **IMPLICATIONS FOR RESEARCH**

### ***Theoretical Implications***

This study holds significant theoretical implications by enhancing the understanding of complex relationship between project success and AI adoption. By incorporating the moderating influences of organizational and managerial capacities, this research extends existing theoretical perspective on how AI technologies are embedded within project management environments. The identification of organizational and managerial capabilities as key moderating factors sheds light on their critical roles in this relationship.

This study advances theoretical comprehension of how these factors interact with AI adoption to shape project performance outcomes, examining their contextual effects across diverse industry, project type, organizational size, and cultural settings. Such contextualization strengthens the understanding of conditions under which AI implementation most profoundly enhances project performance.

### ***Practical Implications***

The practical implications of this research are significant for organizations aiming to make informed decisions about AI implementation. With an understanding of the moderate roles played by organizational and managerial competencies, managers can evaluate their preparedness and capacity for successful AI technology integration within projects. This knowledge can guide strategic planning, resource allocation, and process optimization for effective AI integration. The emphasis on enhancing managerial and organizational capabilities provides guidance as to how the benefits of AI deployment can be maximized. Organizations can utilize these insights to identify and prioritize areas for improvement and develop tailored infrastructures, processes, and training initiatives to equip their workforce with the requisite skills for proficient AI adoption.

In summarizing, this study highlights the possibility for organizations to enhance project performance by understanding the interconnectedness of organizational competence, management capability, and AI deployment. This involves amalgamating AI technologies with operational procedures, improving coordination and communication within project teams, and leveraging managerial proficiencies for effective decision-making and project execution. The findings equip organizations to anticipate potential challenges tied to AI usage in projects, proactively devising strategies to mitigate risks stemming from resistance to change, data privacy concerns, or skill shortages. By an innovation-driven culture, as underscored by this research, organizations can improve their performance and stay at the forefront of AI advancements, thereby optimizing their impact on project performance.

### ***Limitations and Future Research***

While this study provides useful insights, it is not without limitations. Future research should extend across multiple industries and geographical contexts to improve the generalizability of findings. Future studies should evaluate differences in organizational environments and project context which may yield varying outcomes regarding technologies (AI adoption, big data analytics, etc.) and performance relationships.

The reliability of survey results is influenced by respondents' honesty and prior experiences with AI technology, warranting careful consideration. Caution must be exercised when extending the study's findings to different situations and categories of AI applications. Employing more objective methodologies in future research endeavors can validate the existing findings.

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