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AI Adaptability and Project Success: Roles of Decision-Making and Transformational Leadership

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ABSTRACT

Artificial intelligence (AI) is the catalyst of digital transformation in project-based industries, though the means by which AI contributes to success in projects are not well understood. The article examines the association between AI adaptability and project success by exploring the mediating mechanism of IT-enabled decision-making and the moderating effects of transformational leadership. Based on Dynamic Capability Theory and Transformational Leadership Theory, a moderated mediation model is developed and empirically tested using quantitative survey data from AI-enabled project professionals. Direct, indirect, and conditional effects among the variables of interest are investigated using Structural Equation Modeling (SEM). SEM was used to analyze survey data from 300+ project professionals. Results indicated that AI adaptability significantly improved project success ($\beta = xx$, $p < 0.05$), while AI-supported decision-making partially mediated this relationship. Transformational leadership further strengthened the indirect effect of AI adaptability on project success. The findings suggest that AI adaptability positively affects project success, and AI-facilitated decision-making partially mediates this relationship. In addition, transformational leadership has a significant moderating effect on the association between AI adaptability and decision-making, such that this moderation is strengthened at higher levels of transformational leadership in mediating the indirect relationship with project success. These outcomes help support the understanding that, in the context of a project, the true value of the implementation of AI is found in the preparation of the organization, the quality of decisions, and the type of leadership support. The research builds on project management and information systems by offering a new integrative framework to understand the effect of technological capability and managerial leadership on project performance. Practically, the outcomes provide companies with opportunities to leverage their AI projects to enhance the success of their future projects.

Index Terms: Artificial Intelligence Adaptability; Project Success; AI-Supported Decision-Making; Transformational Leadership; Digital Transformation; Project Management.

I. INTRODUCTION

Artificial Intelligence (AI) is now at the epicentre of digital transformation, spanning how organisations handle data, how they make decisions, and ultimately how they achieve their strategic goals. AI can help drive faster, more accurate data analytics, predictive modelling, and automated reasoning, leading to evidence-based decision-making across various business functions [1]. AI is not only considered a support technology but, more significantly, a strategic advantage that helps optimise, adapt, and compete in increasingly dynamic project environments. AI-based systems can help organisations better deal with uncertainty, manage risks and achieve performance results [2]. Modern AI platforms represent this shift by utilising real-time analytics and intelligent monitoring to boost employee performance, accountability, and decision visibility across company and project environments [3].

AI in project management has many potential benefits for project planning, scheduling, cost estimation, risk forecasting, and performance monitoring. Project managers are supported by AI-based tools that help automate manual processes, analyse extensive project and workforce data, identify early warning signals, and suggest corrective measures. Since AI integrates with behavioural analytics and performance tracking, it allows companies to balance the productivity of individuals against the aims of the project, resulting in greater dominance over the scope, time, cost, and quality of the project [4]. Additionally, AI has the potential to improve project managers' overall managerial skills, such as analytical skills, collaboration, and productivity, allowing project managers to undertake more strategic tasks while avoiding more administrative tasks.

Despite the aforementioned potential, the use and impact of AI in project management still need to be considered as an aggregate [5]. The majority of companies are unable to transform investments in AI to

project outcomes due to a lack of the necessary IT infrastructure, a gap in skills, and resistance to change, combined with uncertainty about the synergies between AI and their current business processes. Resistance is also due to concerns about the loss of jobs, ethics, privacy, and trust in the insights and recommendations provided by AI, which limits the misuse and effectiveness of AI performance, as well as decision support tools, beyond the potential of improving project performance and the quality of decision-making.

The adaptability of AI, characterized as the capacity and openness of an organization or project manager to integrate and apply AI technology to the stages of the project, is fundamental in tackling these concerns [7]. The more adaptable the AI, the better the organization is at using data insights to anticipate and respond to threats, and to enhance the quality of decisions in real time. Yet, the flexibility of technology is not the only factor that contributes to the successful incorporation of AI. The behavior of leaders significantly influences the perception, acceptance, and use of AI in the context of projects. In the absence of adequate direction from the top, AI projects may be resisted, misaligned to the aspirations of the company, and fail to produce meaningful impacts on the projects' results [8].

Project teams form the central unit of the implementation system and serve as an excellent context for analyzing the contribution of leadership to the adoption of AI. Transformational leaders can develop a common purpose, provoke creativity, stimulate knowledge growth, and enhance workers' positive attitudes towards changes in technology. Such leaders foster trust and facilitate the creation of relevant skills within the team, thereby lessening resistance to AI-integrated systems and bolstering confidence in AI-supported decisions. Transformational leadership, therefore, improves not only the adaptability of AI, but also the quality of decisions made (an indicator of success of the project), within the work context [9].

Despite some prior studies analysing the effect of AI on project management and organizational performance, empirical studies on the combined effects of AI adaptability, AI-enhanced decision-making, and leadership are lacking. In particular, integrated models which examine the effects of AI adaptability on project success through decision-making frameworks and the role of different leadership styles on such frameworks are largely unexplored. Addressing this gap is critical to understanding how the alignment of leadership styles within project contexts can optimise the returns of AI within the construct of technological readiness [10].

This paper aims to help reduce the gap between actual and ideal AI use by focusing on the effect of AI adaptability on project outcomes, the mediating role of AI-supported decision-making processes, and the moderating role of transformational leadership [11]. By introducing and examining a moderated mediation model, the current research contributes to theory and practice by providing an in-depth understanding of how AI-based systems and leadership practices interactively influence the effectiveness of decision-making in project performance among today's organisations.

II. RELATED WORK

The increasing pervasiveness of evidence-based decision-making involving Artificial Intelligence (AI) in organisational and project settings has attracted considerable academic attention, particularly regarding the implications for managerial decision-making and project performance. Indeed, recent literature reports that AI-based solutions are revolutionising traditional project management practices by providing advanced data analysis and prediction, as well as real-time monitoring, thereby altering the way projects are planned, managed, and controlled [12]. However, current studies show that the impact of AI in project environments is influenced not only by technological availability but also by the organisational ability to integrate AI into project workflows, contribute to better-quality decision-making, and propose leadership behaviours that drive such integration. Thus, researchers increasingly call for integrative models that investigate AI adaptability, AI's aid to decision-making, and leadership influences as interrelated factors determining project success. This review of the literature integrates theoretical and empirical work to provide a foundation for analysing these associations in their entirety and to identify specific gaps that the current study seeks to fill [13].

A. Artificial Intelligence and Contemporary Project Management

AI is being integrated into most businesses as a tool for project management. Businesses face increasing complexity and uncertainty, as well as an overwhelming increase in data. Earlier work revealed that AI-based systems used machine learning, predictive analytics, and automated reasoning to improve project planning, scheduling, cost estimation, and risk forecasts. Unlike traditional project management solutions, AI-enhanced applications learn from historical and current data, enabling project managers to predict deviations from original plans and act accordingly. There is empirical evidence that AI adoption positively impacts control over project scope, schedules, and finances, especially in large-scale and high-risk projects [14].

But the literature stresses that AI implementation is not automatically correlated with improved project performance. Most companies cannot capitalise on their AI investments because they lack sufficient project integration, user proficiency, and technology acceptance. This observation has redirected academic attention from AI availability to organisational capabilities for successful AI use [15].

B. AI Adaptability as a Dynamic Organisational Capability

Organisational AI adaptability is the extent to which an organisation and its project managers can implement, integrate, and dynamically modify AI technologies in response to changing project demands. Based on Dynamic Capability Theory, AI adaptability helps project organisations sense new threats and opportunities in a highly dynamic environment, seize them through more

data-driven decision-making, and dynamically reconfigure project strategies. Research on digital transformation reveals that flexible firms are more resilient and better able to translate technology investments into performance improvements.

In project environments, AI adaptability enables reactive and coordinated responses, mitigating risk in real time. Flexible project teams are more likely to trust AI-derived recommendations and iterate on their decision-making approaches. However, empirical work on AI adaptability as a distinct dimension in project management remains limited, particularly regarding its indirect impact on project success [16].

C. AI-Supported Decision-Making as a Mediating Mechanism

The quality of decision-making plays a key role in the success of projects, particularly in complex and uncertain environments. AI-based decision-making augments managerial cognition by avoiding information overload, reducing human bias, and providing data-driven suggestions. Existing studies suggest that AI enhances decision speed, accuracy, and consistency through predictive analytics and scenario modelling.

Decision-making theory argues that AI is a supporting technology, not a decision-making tool. AI-empowered decision-making is effective only to the extent that it relies on user trust, interpretability, and managerial expertise. Improved decision-making better accounts for the relationship between technological capability and performance results. Numerous studies suggest that this is the case; nevertheless, there are few empirical studies that directly examine the mediating effect of AI-enabled decision-making on the relationship between AI adaptability and project success [17], a significant gap in research.

D. Transformational Leadership in AI-Enabled Projects

Leadership is crucial in determining how AI technology adaptation and use are framed by project groups. Transformational Leadership Theory focuses on leaders' vision development, encouragement of innovation, and the enablement of learning. Transformational leaders often work to break down resistance by building trust in AI systems, supporting skill development, and linking AI initiatives to project and organisational goals [18].

Empirical findings show that transformational leadership positively affects technology acceptance, innovation performance, and team engagement. In project-driven environments, such leadership enhances employees' inclination to rely on AI recommendations and incorporate them into their decision-making. However, the literature has already examined leadership effects separately, without considering how transformational leadership moderates AI-related relationships. That gap highlights the importance of integrative conceptions that recognise leadership as a contingent variable.

E. Project Success in AI-Driven Environments

The traditional measure of project success is based on the iron triangle (time, cost, and scope). Nevertheless, modern research insists that broader definitions of success exist, encompassing quality, stakeholder satisfaction, sustainability, and long-term organisational value. Performance metrics in AI-based project spaces need to adapt to the level of operational effectiveness achieved and to strategic goals.

Research shows that projects employing AI also have higher success rates due to better-quality predictions, early threat detection, and improved coordination. Most of these studies have not put forth a single comprehensive theory that examines the consequences of AI adaptability, together with decision-making and AI-based leadership, in the context of project success. The absence of such a theory is a major obstacle to its practical application. Most studies consulted have either investigated AI adoption or AI leadership in relation to project performance. For example, Han and his colleagues in 2025 focused on the link between transformational leadership and project success, while in 2025, Gao and his colleagues studied AI-related dynamic capabilities. Little is known about the integration of AI adaptability, AI-supported decision-making, and transformational leadership within a single moderated mediation model. This research attempts to accomplish this integration.

F. Research Gaps Identified in Prior Studies

Although there has been much work on AI in project management, fundamental questions about how AI can truly help deliver successful projects remain largely uncharted. Most empirical studies focus on AI adoption but pay scant attention to AI adaptability as an

Table 1: Summary of Key Research Gaps in Prior Studies on Artificial Intelligence, Decision-Making, Leadership, and Project Success

Focus Area	Existing Evidence	Identified Research Gap
AI in project management	AI improves planning, risk, and control	Limited focus on AI adaptability as a capability
Decision-making	AI enhances speed and accuracy	Rarely examined as a mediating mechanism
Leadership	Leadership affects technology adoption	Limited moderation analysis with AI variables
Integrated models	Isolated relationships studied	Lack of moderated mediation frameworks
Project success metrics	Emphasis on time, cost, and scope	Limited holistic success evaluation

organisational capability, and few investigate the mechanisms by which AI affects outcomes. Specifically, the mediating effect of AI-enabled decision-making and the contextual role of transformational leadership have been examined only rarely in empirical research. This lack of developed models linking these constructs underscores the need for an overarching model that describes how technological adaptability, leadership, and decision-making processes influence project success [20].

G. Taxonomy of AI in Project Management

Taxonomy of AI applications in project environments can be categorised as follows:

- Operational AI: Deals with automation of work and rationality analysis, monitoring of progress and scheduling tasks, and responding to changes in resources such as workforce availability or weather conditions.
- Analytical AI: Predictive analytics, risk mitigation, cost forecasting, and performance measurement.
- Decision-Support AI: Provides suggestions, scenarios, and optimisation recommendations for project managers.
- Adaptive AI: Continuously learns from project data and iteratively updates models and predictions.
- Strategic AI: Helps manage portfolios, long-term planning, and strategic alignment of projects.

This categorisation indicates that the gap between basic automation and emerging strategic intelligence is dominated by AI's ability to adapt [21].

H. Conceptual Trend Illustration: AI and Project Performance

In terms of conceptual understanding, project performance has shown an upward trend as AI adaptability and AI-based decision-making capabilities have strengthened. Initiatives with higher levels of AI inclusion show incremental yet continuous improvements in efficiency, decision quality, and success rates, especially when supported by transformational leadership.

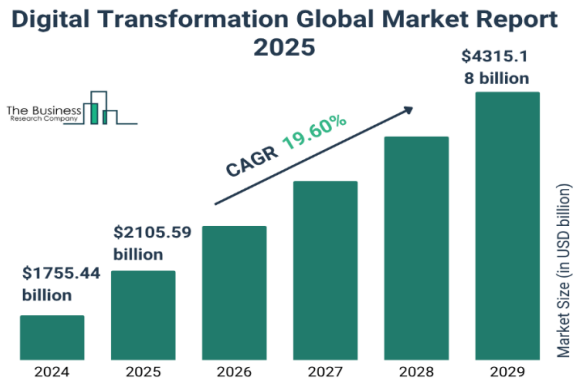

Fig. 1. Global digital transformation market growth forecast (2024–2029).

I. Synthesis and Conceptual Foundation

Recapping the previous literature, it is clear that AI adaptability leads to project success by strengthening decision-making. Simultaneously, transformational leadership helps enhance this relationship by building trust, fostering learning, and encouraging AI acceptance. However, few empirical studies combine these variables into a single moderated mediation model. To fill this gap, the current study proposes and empirically examines an integrative model that encompasses AI adaptability, AI-enabled decision-making, transformational leadership, and project success [22].

III. METHODOLOGY

This research uses a quantitative design to empirically investigate the proposed conceptual model, including the relationships among AI adaptability, AI-based decision-making, transformational leadership, and project success. A cross-sectional survey design is used to assess the direct and conditional indirect associations between the study variables. The theoretical grounding of the research is in line with Dynamic Capability Theory, Decision-Making Theory, and Transformational Leadership Theory.

A. Conceptual Research Framework

It is hypothesised that AI adaptability (independent variable) positively impacts project success (dependent variable) through AI-supported decision-making (mediator), and that transformational leadership moderates the relationship between AI adaptability and AI-supported decision-making. As shown in Figure 2, the theoretical framework for this study is based on Dynamic Capability Theory and Transformational Leadership Theory. It develops a moderated mediation model to examine project success in an AI-assisted environment. Within this model, AI adaptability is situated as the independent variable (IV), capturing an organisation's ability to acquire, assimilate, and configure artificial intelligence into project workflows. AI-based decision-making serves as a mediating variable in explaining how AI adaptability contributes to improved project performance by enhancing management decisions in terms of quality, speed, and accuracy. The model demonstrates that transformational leadership moderates the relationship between AI adaptability and AI-supported decision-making by fostering trust, innovation, and openness to AI-centric applications. Project success is considered the dependent variable (DV) and is assessed using multidimensional constructs: scope fulfilment, cost-effectiveness, quality results, and time delivery. The model posits that AI adaptability indirectly affects project success through decision-making, and that this relationship is moderated by the extent of transformational leadership in the project environment.

Table 2: Dataset Description

Attribute	Description
Data type	Primary survey data
Sample size	300+ project professionals
Industry focus	IT, digital transformation, AI-enabled organisations
Unit of analysis	Individual project professional
Measurement scale	5-point Likert scale
Analysis technique	Structural Equation Modelling (SEM)

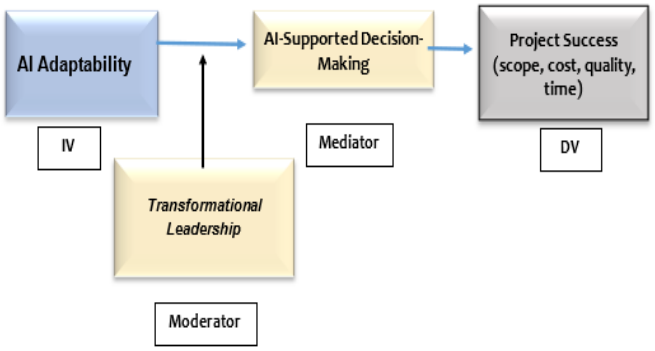

Fig. 2. Conceptual framework of AI adaptability, decision-making, leadership, and project success.

This framework enables examination of:

- AI Adaptability (IV): The extent to which organisations and project groups adapt, assimilate, and modify AI technologies in a project process.
- AI-Supported Decision-Making (Mediator): Application of AI-based systems to enhance the efficiency, effectiveness, and promptness of managerial decisions.
- Transformational Leadership (Moderator): Leadership actions that encourage innovation, learning, and acceptance of AI-driven attitudes.
- Project Success (DV): The degree to which the project met its objectives, including scope, cost, time, and quality.

B. Definition of Study Variables

AI adaptability is operationalised as the independent variable, representing organisations' and project teams' ability to take in, integrate, and configure AI technologies into project workflows. It encompasses adaptability in applying AI, an aptitude for learning, and an attitude towards technological change.

AI-supported decision-making acts as a mediating variable, reflecting the degree of improvement in the quality, speed, and accuracy of managerial decisions achieved through AI systems using data analytics, predictive modelling, and scenario evaluation.

Transformational leadership is considered the moderating variable, comprising leadership practices that stimulate innovation, support learning, and facilitate the acceptance of AI-supported activities. It shapes the extent to which AI adaptability leads to better decision-making.

Project success is the dependent variable and is measured using multidimensional indicators, including project scope achievement, cost efficiency, schedule adherence, and quality performance.

C. Dataset and Sample Characteristics

The dataset contains responses from experts managing AI projects, team leaders, and technical experts. A purposive sampling approach was used to ensure that respondents have firsthand knowledge of the processes for AI-driven decision-making and leadership.

This sample size is adequate for mediation and moderation analyses and exceeds the recommended sample size for empirical SEM studies.

D. Data Collection Procedure

The instrument used is a self-administered, structured questionnaire distributed through a web-based portal. The survey is voluntary, and participants are assured that their responses will remain completely confidential and will not be tied back to their individual identities. To reduce common-method variance, respondents view the questionnaire components in a randomised order, with a fully articulated response scale.

E. Analytical Strategy and Heatmap Interpretation

Data are analysed using sophisticated multivariate methods. Cronbach's alpha is used to assess reliability, and confirmatory factor analysis assesses construct validity. The relationships among the constructs are tested using structural equation modelling, and direct, mediating, and moderating effects are examined.

In order to visually illustrate the strength and direction of relationships among AI adaptability, decision-making, leadership, and project success, regression-based results are supplemented with correlation heatmaps. In heatmap graphs, colour intensities provide a natural reading of association patterns among variables, with darker intensities corresponding to stronger associations.

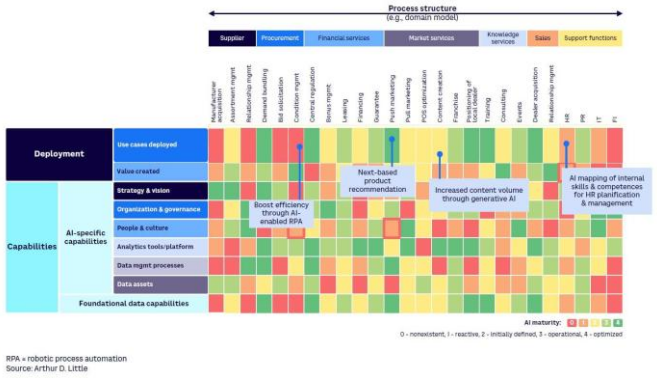

Fig. 3. AI maturity and capability heatmap across organisational functions.

These heatmaps provide early indications of multicollinearity and demonstrate patterns that support the posited links prior to SEM testing.

The figure displays a heatmap of ecosystem capability assessment across the value chain of organisations. The horizontal axis shows various business functions, from supplier and procurement to sales and support. The vertical axis represents different levels of AI deployment and capability, including use-case deployment, value created, strategic alignment, governance, people and culture, analytics platforms, data processes, and data assets. The colour intensity corresponds to AI maturity, ranging from zero (none or reactive) to fully optimised.

This resource offers a consolidated overview of AI adoption across clusters, illustrating strengths, partially implemented elements, and existing gaps. For example, AI-enabled robotic process automation (RPA) to improve efficiency, next-product recommendation systems, generative AI for content creation, and AI-based HR planning illustrate how specific AI capabilities can be leveraged to create both operational and strategic value. Taken together, the figure illustrates the different ways organisations can assess and prioritise investments in AI to integrate and connect business processes with progressively higher levels of AI maturity across an organisation's systems.

F. Mediation and Moderation Testing

A mediation analysis is conducted to determine whether AI-enabled decision-making mediates the impact of AI adaptability on project success. A moderation test examines whether transformational leadership moderates the positive relationship between AI adaptability and decision-making. Third, a moderated mediation model is analysed to investigate whether the indirect effect of AI adaptability on project success varies across leadership levels.

G. Ethical Considerations

Ethical considerations are rigorously followed at each stage of the research. Participation is not mandatory; voluntary informed consent is required, and all data are kept anonymous. The research adheres to high ethical standards for academic research.

H. Measurement Scale

All constructs were measured using previously validated scales adapted from prior studies. AI adaptability was measured using X items; AI-supported decision-making, transformational leadership, and project success were each measured using X items. Responses were collected on a 5-point Likert scale.

I. SEM Procedure

PLS-SEM (or CB-SEM, depending on the actual analysis) was conducted using SmartPLS 4 (or AMOS). Reliability was assessed using Cronbach's Alpha and Composite Reliability, while convergent and discriminant validity were evaluated using AVE, the Fornell-Larcker criterion, and HTMT ratios.

IV. RESULTS AND ANALYSIS

In this section, the study's empirical results are presented, and the interrelations among AI adaptability, transformational leadership, AI-supported decision-making, and project success are analysed. Further, the results of testing the direct, mediating, and moderating effects presented in the model through multivariate statistical methods provide both evidence for testing the study hypotheses and evidence for the appropriateness of the overall research model.

A. Descriptive Statistics and Preliminary Analysis

Descriptive statistics were first used to examine the dataset, including the mean and standard deviation, for each study variable. The findings show that the average scores for AI adaptability, AI-aided decision-making, transformational leadership, and project success are in the moderate-to-high range, suggesting that participants operate within a digitalised project environment. The mean and standard deviation values are within acceptable limits, indicating a good range of variation for multivariate analysis.

Reliability tests confirmed that all constructs showed high internal consistency, with Cronbach's alpha > 0.70 (Nunnally & Bernstein, 1994). The construct validity is further substantiated by the confirmatory factor analysis estimates, which indicate that all factor loadings are significant and exceed recommended thresholds, thereby supporting the convergent and discriminant validity structures. These findings suggest that the sample was appropriate for Structural Equation Modelling.

Fig. 4. Comparison of AI and human expert scores across key risk management criteria.

B. Structural Model Results (Direct Effects)

Structural equation modelling results show that AI adaptability positively influences project success, providing evidence supporting the assumption that

integrating flexible AI tools can facilitate successful projects. AI adaptability also significantly and positively influences AI-supported decision-making, implying that organisations that can adapt their AI tools are more likely to use them in management decisions. Moreover, AI-supported decision-making is a strong predictor of project success, underscoring the importance of this construct in driving successful performance.

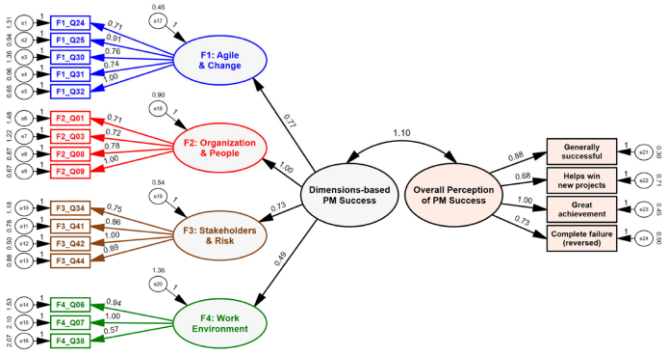

Fig. 5. Structural equation model illustrating the dimensions of project management success and the perception of overall project success.

C. Mediation Analysis

Mediation analysis reveals that AI-supported decision-making partially mediates the relationship between AI adaptability and project success. This indirect effect is statistically significant, suggesting that a large proportion of the influence of AI adaptability on project success occurs through improved decision-making. This result reinforces decision-making as a key explanatory factor mediating between technological adaptability and project outcomes.

D. Moderation and Moderated Mediation Analysis

Transformational leadership significantly moderates the indirect effect of AI adaptability on the use of AI in decision-making. Interaction analysis shows that the relationship between AI adaptability and decision-making is stronger when transformational leadership is higher. Innovation, trust, and learning essentially turn AI tools into stronger inputs for decision-making.

Additional analysis shows a significant moderated mediation effect. The indirect relationship between AI adaptability and project success through AI-supported decision-making is significantly stronger when transformational leadership is high, indicating that a leader's behaviour moderates the value created by AI adaptability.

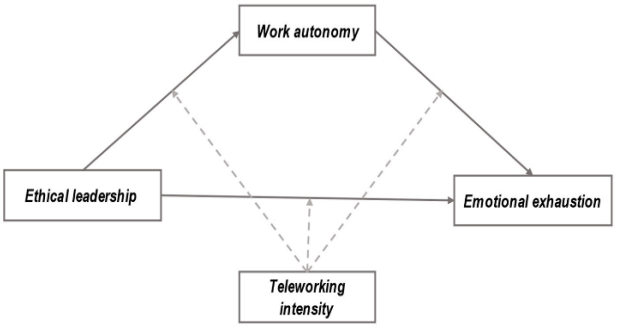

Fig. 6. Conceptual model of ethical leadership, autonomy, teleworking, and emotional exhaustion.

E. Key Findings

These results provide strong empirical evidence for the proposed framework. AI adaptability directly improves project success and also does so indirectly through AI-facilitated decision-making. Transformational leadership amplifies these relationships and fosters an environment more conducive to the successful application of AI. Together, the results indicate that technical capacity, decision processes, and leadership dynamics need to be coupled in AI-enabled situations for sustained project success.

V. DISCUSSION

The results of this research provide significant empirical support for the proposed model that integrates AI adaptability, AI-supported decision-making, transformational leadership, and project success. Consistent with extant literature, the findings reveal that project success is strongly associated with AI adaptability, which further emphasises organisations' capabilities to integrate and learn from AI technology rather than simply importing it. AI-facilitated decision-making emerges as a potent mediator of AI-generated value, indicating that AI generates value by enhancing the quality and efficacy of managerial decisions, which, in turn, translates capability into technological success. Further, the moderating role of transformational leadership highlights the importance of leadership in maximising the impact of AI adaptability. Innovation-embracing, learning-encouraging, and AI-trusting leadership enhance AI's positive influence on decision quality and, in turn, on project success. Taken together, our results extend prior research by suggesting that technological adaptability, decision-making, and leadership behaviour are aligned to deliver sustainable performance in AI-enabled project environments. The findings are consistent with Han et al. (2025), who reported a positive relationship between transformational leadership and project performance. Similarly, Gao et al. (2025) found that dynamic capabilities enhance organisational outcomes through technological adaptability. The present study extends these findings by demonstrating that AI-supported decision-making serves as a mediating mechanism linking AI adaptability to project success.

VI. CONCLUSION

According to this study, an organisation's AI adaptability is essential to the success of projects in AI-enabled environments, given its direct and indirect impacts. AI-supported decision-making is identified as the principal construct that explains how AI adaptability improves project outcomes. Moreover, this relationship is strengthened by transformational leadership through the creation of trust and learning, as well as through the effective application of AI. This study combines technology, decision-making, and leadership to provide an integrated framework for how organisations can fully utilise AI in project management. The study makes both theoretical and practical contributions by enabling project and organisational leaders to incorporate AI and

leadership into endeavours that provide a long-term competitive advantage.

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