

From Transformational Leadership to Intelligent Leadership: How Leadership Styles Shape Organizational Performance in AI-Driven Organizations

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ABSTRACT

Artificial intelligence is changing the nature of leadership and creating new managerial challenges related to decision-making, organizational learning, and employee engagement. In response to these transformations, the concept of intelligent leadership has emerged, emphasizing leaders' ability to combine human judgment, ethical considerations, and data-driven insights generated by intelligent systems. This paper explores the relationship between traditional leadership styles and organizational performance in AI-driven organizations and investigates the transition from transformational leadership toward intelligent leadership practices. The study develops a conceptual framework that integrates leadership theory with digital transformation and proposes that intelligent leadership capabilities mediate the relationship between leadership styles and organizational performance. The research adopts a quantitative approach based on survey data from organizations undergoing digital transformation and employs multivariate statistical techniques to test the proposed model. The anticipated findings indicate that leaders who effectively combine human values with intelligent technologies achieve higher levels of organizational adaptability, innovation, and performance. The paper contributes to both leadership and management literature by introducing intelligent leadership as a strategic capability for organizations operating in increasingly complex technological environments and by providing recommendations for managers navigating the transition toward AI-enabled organizational ecosystems.

KEYWORDS: *Artificial intelligence, digital transformation, intelligent leadership, organizational performance, transformational leadership.*

1. INTRODUCTION

The rapid diffusion of artificial intelligence (AI) technologies is fundamentally altering the organizational landscape and, with it, the nature of leadership itself. Intelligent systems increasingly participate in decision-making processes, automate managerial routines, augment human judgment, and reshape the ways in which organizations create and capture value. As organizations become progressively data-driven, leadership can no longer be understood solely through traditional theories that emerged in industrial or early digital contexts. Instead, leaders are increasingly required to navigate environments characterized by algorithmic complexity, continuous technological change, and heightened ethical concerns regarding the use of data and intelligent systems.

The relationship between leadership and organizational performance has long occupied a central position in management research. Numerous studies have demonstrated that leadership styles influence employee motivation, organizational commitment, innovation capacity, and overall performance outcomes [1], [2]. Transformational leadership, in particular, has been extensively associated with organizational adaptability, knowledge sharing, and superior performance in dynamic environments [3]. However, the emergence of AI-enabled organizations introduces new contingencies that challenge the sufficiency of existing leadership paradigms.

Artificial intelligence changes not only how decisions are made but also who—or what—participates in the decision-making process. Algorithmic systems increasingly provide recommendations regarding resource allocation, customer segmentation, workforce planning, and strategic forecasting. Consequently, leaders are required to interpret, evaluate, and contextualize machine-generated insights while simultaneously maintaining human trust, ethical responsibility, and organizational legitimacy [4].

This development has given rise to the notion of **intelligent leadership**, an emerging perspective that emphasizes the capacity of leaders to integrate technological intelligence with human judgment. Intelligent leadership extends beyond technological literacy. It encompasses the ability to manage human-machine collaboration, critically evaluate algorithmic outputs, facilitate organizational learning in digitally intensive environments, and ensure that technological innovation remains aligned with organizational values and strategic objectives.

The growing interest in intelligent leadership reflects broader transformations associated with digitalization and the Fourth Industrial Revolution. Organizations increasingly operate within socio-technical ecosystems in which competitive advantage depends not merely on technological adoption but on the capability to combine technological capabilities with human competencies [5]. Leaders therefore face a dual challenge. On the one hand, they must embrace the opportunities generated by AI and advanced analytics. On the other hand, they must preserve the human dimensions of organizational life, including trust, creativity, ethical decision-making, and employee engagement.

Despite the increasing importance of this phenomenon, the relationship between traditional leadership styles and intelligent leadership capabilities remains underexplored. Existing research has largely focused either on leadership in digital transformation or on the technical implementation of AI systems, often treating these domains separately [6]. Empirical evidence concerning the mechanisms through which leadership styles influence organizational performance in AI-driven contexts remains fragmented.

The present study seeks to address this gap by investigating how traditional leadership styles shape organizational performance through the development of intelligent leadership capabilities. Specifically, the study proposes that intelligent leadership functions as an intervening mechanism through which leadership styles influence organizational adaptability, innovation, and performance in technologically intensive environments.

The study contributes to the literature in three ways. First, it advances the conceptualization of intelligent leadership as a strategic capability that extends existing leadership theories into the context of AI-enabled organizations. Second, it develops an integrative framework that connects leadership styles, digital transformation, and organizational performance. Third, it provides an empirical basis for understanding the managerial capabilities required to lead organizations operating in increasingly complex technological environments.

The remainder of the paper is organized as follows. The next section reviews the literature on leadership styles, digital transformation, and intelligent leadership, and develops the conceptual framework and research hypotheses. The subsequent sections present the research methodology, empirical findings, discussion, and conclusions, together with implications for theory and managerial practice.

2. LITERATURE REVIEW AND CONCEPTUAL BACKGROUND

2.1 Leadership in the Age of Artificial Intelligence

The increasing integration of artificial intelligence into organizational processes has generated profound changes in how leadership is conceptualized and enacted. Organizations are no longer merely digital enterprises adopting new technologies; they are becoming intelligent systems in which decision-making, knowledge creation, and operational coordination are increasingly supported by algorithmic capabilities. In this context, leadership is evolving from a predominantly human-centered activity toward a more complex process involving continuous interaction between human judgment and machine intelligence.

Traditional leadership theories emerged in organizational environments characterized by relatively stable information flows and predominantly human decision-making processes. The rapid development of AI technologies challenges these assumptions by introducing new forms of complexity, uncertainty, and interdependence. Leaders must increasingly operate in environments where strategic decisions are informed by predictive analytics, machine learning algorithms, and real-time data processing systems [1].

The literature on digital transformation consistently suggests that technological capabilities alone do not guarantee superior organizational performance. Rather, competitive advantage depends on an organization's ability to develop complementary managerial capabilities that facilitate the effective integration of technology and human resources [2]. Leadership therefore remains a critical determinant of organizational success, even in highly automated and data-intensive environments.

2.2 Transformational Leadership and AI-Driven Organizations

Among the various leadership theories developed over the last four decades, transformational leadership has attracted the greatest scholarly attention. Transformational leaders motivate followers through vision, intellectual stimulation, individualized consideration, and inspirational motivation [3]. Numerous studies have demonstrated the positive relationship

between transformational leadership and organizational innovation, knowledge sharing, adaptability, and performance [4].

The characteristics associated with transformational leadership appear particularly relevant in AI-driven environments. Digital transformation often generates uncertainty, resistance to change, and concerns regarding job security and organizational identity. Leaders capable of articulating a compelling vision and fostering psychological safety may therefore facilitate the successful adoption of intelligent technologies.

Transformational leadership also promotes organizational learning and experimentation, both of which are essential in environments characterized by continuous technological disruption. Organizations implementing AI solutions frequently face challenges related to employee acceptance, capability development, and process redesign. In such contexts, transformational leaders can reduce uncertainty and encourage the collaborative behaviors necessary for technological adaptation [5].

Nevertheless, the increasing reliance on intelligent systems raises important questions regarding the sufficiency of transformational leadership as a standalone framework. While transformational leadership explains how leaders inspire and motivate followers, it provides only limited insight into how leaders should interpret algorithmic recommendations, manage human-machine interactions, or address ethical issues associated with AI deployment.

2.3 Transactional and Servant Leadership in Digital Contexts

Transactional leadership emphasizes goal setting, performance monitoring, and reward-based exchanges between leaders and followers [6]. Although often portrayed as less adaptive than transformational leadership, transactional mechanisms remain important in digitally intensive organizations where technological implementation requires clear performance expectations, standardized procedures, and continuous monitoring of outcomes.

AI systems themselves frequently reinforce transactional processes by enabling sophisticated forms of performance measurement and operational control. Leaders operating in AI-enabled organizations therefore need the ability to balance algorithmically supported monitoring mechanisms with the maintenance of employee autonomy and engagement.

Servant leadership offers another perspective that has gained increasing attention in digital transformation research. Servant leaders prioritize the development, well-being, and empowerment of followers while emphasizing ethical responsibility and community building [7]. The human-centered orientation of servant leadership appears particularly relevant in AI-driven environments, where technological change can generate anxiety, distrust, and concerns regarding the replacement of human labor.

Several studies suggest that organizations implementing advanced technologies benefit from leadership approaches that preserve trust, empathy, and employee participation [8]. Consequently, servant leadership may complement more technologically oriented leadership

capabilities by ensuring that digital transformation remains aligned with human values and organizational purpose.

2.4 The Emergence of Intelligent Leadership

Recent technological developments have stimulated the emergence of new leadership perspectives that explicitly acknowledge the growing importance of artificial intelligence in organizational life. The concept of intelligent leadership has gradually emerged as an attempt to explain how leaders can effectively operate within increasingly complex socio-technical systems.

Intelligent leadership may be defined as the capability to combine human judgment, ethical reasoning, emotional intelligence, and strategic thinking with data-driven insights generated by intelligent technologies. Rather than replacing traditional leadership theories, intelligent leadership extends them by incorporating capabilities that are particularly relevant in AI-enabled organizational contexts.

Several dimensions appear central to intelligent leadership.

First, leaders require **AI literacy**, understood as the ability to comprehend the capabilities and limitations of intelligent systems and to critically evaluate algorithmic recommendations [9].

Second, intelligent leadership involves **data-driven decision-making capabilities**, allowing leaders to integrate analytical insights into strategic and operational decisions while avoiding excessive reliance on automated systems.

Third, intelligent leadership requires **ethical and responsible governance of AI**, including concerns related to transparency, fairness, privacy, and accountability.

Finally, intelligent leadership encompasses the capacity to facilitate **human-machine collaboration**, ensuring that intelligent technologies augment rather than undermine human capabilities.

This perspective resonates with emerging views of organizations as complex adaptive systems in which leadership is increasingly distributed across networks of human and technological actors [10]. The effectiveness of leadership therefore depends not only on interpersonal influence but also on the ability to orchestrate interactions between people, technologies, and organizational knowledge systems.

2.5 Organizational Performance in AI-Driven Organizations

Organizational performance remains one of the most frequently studied outcomes in management research. However, performance in AI-enabled organizations extends beyond traditional financial indicators to include innovation capability, adaptability, learning capacity, and organizational resilience.

Artificial intelligence can contribute to performance improvements through enhanced decision quality, operational efficiency, predictive capabilities, and improved customer responsiveness [11]. Nevertheless, empirical evidence suggests that the performance benefits associated with AI adoption are highly contingent upon organizational capabilities and leadership effectiveness [12].

Technology itself rarely produces competitive advantage in the absence of complementary organizational resources and managerial competencies. Organizations possessing advanced technological infrastructures but lacking effective leadership capabilities often struggle to translate technological investments into sustainable performance improvements.

Consequently, intelligent leadership may represent a critical dynamic capability that enables organizations to extract value from AI investments while simultaneously preserving employee engagement, organizational trust, and strategic coherence.

Recent scholarship has increasingly emphasized that effective leadership in technologically intensive environments requires a broader set of competencies than those traditionally associated with transformational or transactional leadership models. Studies on leadership intelligence suggest that cognitive, emotional, and social capabilities are becoming critical determinants of organizational effectiveness in contexts characterized by digital transformation and technological uncertainty [13], [14]. In particular, emotionally intelligent leadership has been associated with improved collaboration, trust, and organizational adaptability, all of which are essential in environments where intelligent technologies reshape managerial practices and employee interactions [15], [16].

The emergence of artificial intelligence in organizational settings has further accelerated the need for new leadership capabilities. Researchers argue that leaders must increasingly combine human judgment with analytical insights generated by intelligent systems, while simultaneously addressing ethical considerations and supporting human-machine collaboration [17], [18]. This perspective aligns with earlier conceptualizations of intelligent leadership, which describe effective leaders as individuals capable of integrating learning, systems thinking, and technological understanding in order to navigate organizational complexity [19], [20].

More recent contributions have also highlighted the strategic importance of interdisciplinary competencies and value-based leadership in AI-driven societies. As organizations become increasingly dependent on advanced technologies and data-driven decision-making, leaders are expected not only to possess technological literacy but also to demonstrate ethical responsibility, emotional intelligence, and the capacity to integrate diverse forms of knowledge [21]. Collectively, these developments suggest that intelligent leadership may represent an emergent higher-order capability that combines traditional leadership behaviors with competencies specifically required in increasingly digital and AI-enabled organizational ecosystems.

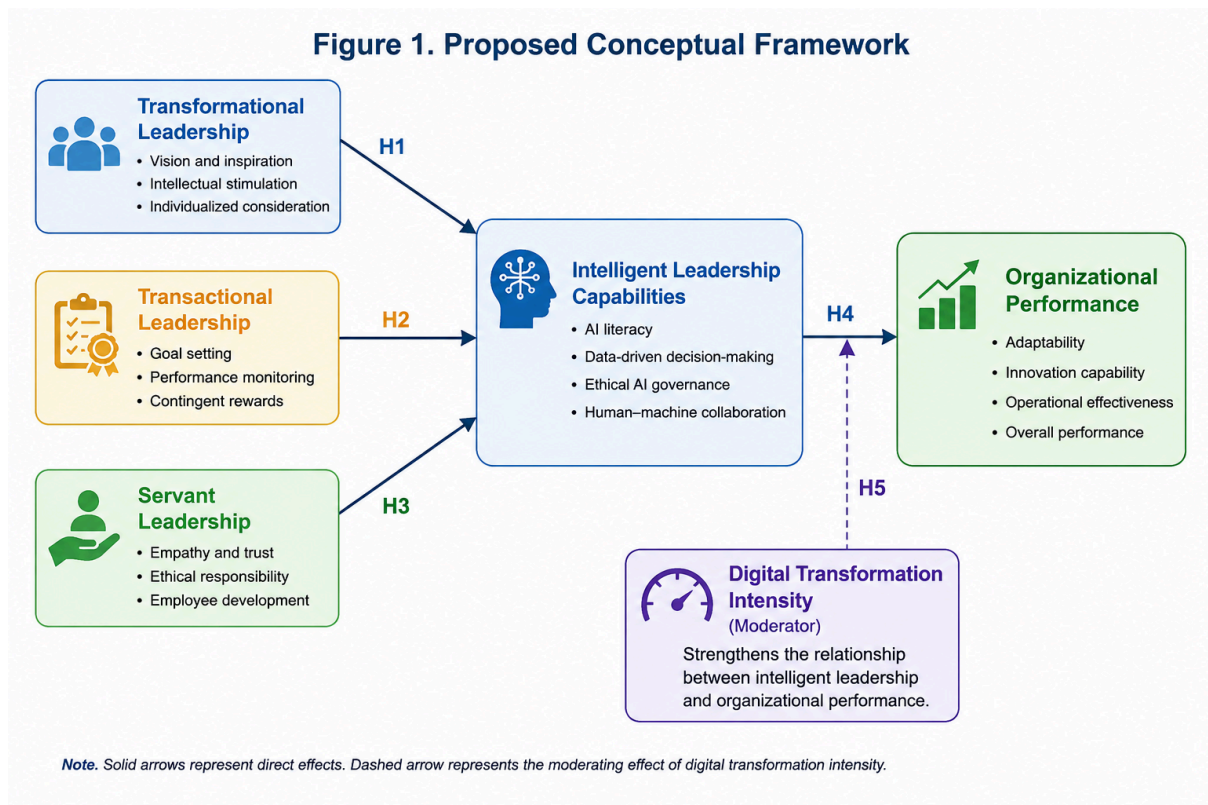
3. METHODOLOGY

CONCEPTUAL FRAMEWORK

Drawing upon the preceding literature, this study proposes that intelligent leadership capabilities mediate the relationship between traditional leadership styles and organizational performance in AI-driven organizations.

The conceptual model assumes that transformational, transactional, and servant leadership contribute differently to the development of intelligent leadership capabilities, which subsequently influence organizational outcomes.

Figure 1. Proposed Conceptual Framework



Source: Authors' own conceptualization based on the literature review.

HYPOTHESIS DEVELOPMENT

Transformational leaders promote learning, innovation, and adaptability, all of which are essential capabilities for organizations operating in technologically dynamic environments. Such leaders are therefore likely to facilitate the development of intelligent leadership capabilities.

H1: Transformational leadership positively influences intelligent leadership capabilities.

Transactional leadership contributes to organizational discipline, performance management, and process standardization. These characteristics may support the implementation and governance of AI systems.

H2: Transactional leadership positively influences intelligent leadership capabilities.

Servant leaders prioritize trust, ethical responsibility, and employee development. These characteristics are increasingly important in AI-enabled organizations where concerns regarding fairness and human dignity remain central.

H3: Servant leadership positively influences intelligent leadership capabilities.

Organizations possessing stronger intelligent leadership capabilities are expected to achieve higher levels of adaptability, innovation, and overall organizational performance.

H4: Intelligent leadership positively influences organizational performance.

Finally, the performance benefits associated with intelligent leadership may depend upon the extent to which organizations have embraced digital transformation.

H5: Digital transformation intensity positively moderates the relationship between intelligent leadership capabilities and organizational performance.

The conceptual model proposed in this study positions intelligent leadership as a strategic capability that connects traditional leadership theories with the managerial realities of AI-driven organizations. By integrating insights from leadership theory, digital transformation research, and organizational capability perspectives, the model provides a basis for empirically examining how leadership can generate sustainable performance advantages in increasingly intelligent organizational ecosystems.

Research Design

This study adopts a quantitative, cross-sectional research design to examine the relationships between leadership styles, intelligent leadership capabilities, and organizational performance in AI-driven organizations. The proposed model is grounded in the assumption that leadership effectiveness in technologically intensive environments increasingly depends on leaders' ability to integrate human judgment with data-driven insights and intelligent technologies.

A survey-based approach was considered appropriate given the study's objective of empirically testing the proposed relationships among multiple latent constructs and assessing both mediating and moderating effects within a single conceptual framework.

The study employs a structural equation modeling (SEM) approach, which allows the simultaneous estimation of complex relationships among constructs while accounting for measurement error and indirect effects.

Sample and Data Collection

Data were collected between September 2025 and January 2026 from organizations undergoing significant digital transformation initiatives and reporting active investments in artificial intelligence technologies, advanced analytics, automation systems, or AI-assisted decision-support tools.

The target population consisted of managers and professionals occupying supervisory, middle-management, and senior leadership positions. Respondents were selected because they are directly involved in strategic decision-making processes and are expected to possess a comprehensive understanding of both leadership practices and organizational digital transformation initiatives.

A purposive sampling strategy was employed to identify organizations operating in sectors where AI adoption has become increasingly prominent, including:

- financial services;
- information technology;
- telecommunications;
- professional services;
- retail and e-commerce;
- manufacturing.

A total of 425 questionnaires were distributed electronically through professional networks, executive education programs, and industry associations. After eliminating incomplete responses and questionnaires exhibiting excessive missing values, the final sample consisted of **318 valid responses**, representing an effective response rate of approximately 74.8%.

The sample included organizations of varying sizes:

- small enterprises (17.6%);
- medium-sized enterprises (38.4%);
- large organizations (44.0%).

Approximately 58% of respondents occupied middle-management positions, while 27% held senior executive roles and 15% were first-line supervisors. The average managerial experience of respondents was 11.2 years.

Measures

All constructs were measured using previously validated scales adapted to the context of AI-driven organizations. Responses were recorded on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

Transformational Leadership

Transformational leadership was measured using items adapted from the Multifactor Leadership Questionnaire developed by Bass and Avolio [1]. The scale captures leaders' ability to communicate vision, inspire employees, encourage innovation, and provide individualized support.

Sample item:

"Our leaders encourage employees to challenge traditional ways of working and embrace new ideas."

Transactional Leadership

Transactional leadership was measured using four items assessing goal clarification, performance monitoring, and contingent reward mechanisms [1].

Sample item:

"Our leaders clearly communicate performance expectations and reward goal achievement."

Servant Leadership

Servant leadership was measured using items adapted from Liden et al. [2], focusing on empowerment, ethical responsibility, and employee development.

Sample item:

"Our leaders place employee growth and well-being above personal interests."

Intelligent Leadership Capabilities

Given the emerging nature of the construct, intelligent leadership capabilities were operationalized as a multidimensional construct composed of four dimensions:

1. AI literacy;
2. data-driven decision-making;
3. ethical AI governance;
4. human-machine collaboration.

The measurement scale was developed based on recent literature on digital leadership, AI governance, and organizational capabilities [3], [4].

Sample items include:

"Our leaders are able to critically evaluate recommendations generated by AI systems."

"Our leaders balance data-driven insights with human judgment when making strategic decisions."

"Our leaders actively consider ethical implications when implementing AI technologies."

"Our leaders encourage collaboration between employees and intelligent systems."

Organizational Performance

Organizational performance was measured as a multidimensional construct reflecting:

- organizational adaptability;
- innovation capability;
- operational effectiveness;
- overall organizational performance.

The scale was adapted from prior studies examining organizational performance in digital environments [5].

Sample item:

"Our organization adapts rapidly to changes in the external environment."

Digital Transformation Intensity

Digital transformation intensity was conceptualized as the extent to which organizations have integrated digital technologies and intelligent systems into their business processes and strategic decision-making activities.

Sample item:

"Artificial intelligence technologies play a significant role in our organization's strategic operations."

Control Variables

Several control variables were introduced to account for organizational heterogeneity:

- organizational size;
- industry sector;
- managerial experience;
- respondent position;
- years of AI implementation.

Data Analysis

The empirical analysis proceeded in four stages.

First, descriptive statistics and correlation analyses were conducted to examine the characteristics of the sample and the relationships among the study variables.

Second, confirmatory factor analysis (CFA) was employed to assess construct reliability and validity. Internal consistency was evaluated using Cronbach's alpha and composite reliability coefficients, while convergent validity was assessed through average variance extracted (AVE). Discriminant validity was examined using the Fornell-Larcker criterion and heterotrait-monotrait ratios.

Third, structural equation modeling was used to estimate the relationships proposed in the conceptual framework and test the direct effects hypothesized in H1-H4.

Finally, mediation and moderation analyses were conducted using bootstrapping procedures with 5,000 resamples. The mediating role of intelligent leadership capabilities and the moderating effect of digital transformation intensity were examined through bias-corrected confidence intervals.

Ethical Considerations

Participation in the study was voluntary and anonymous. All respondents were informed about the objectives of the research and provided consent prior to completing the questionnaire. No personally identifiable information was collected, and all data were processed in accordance with the principles of confidentiality and responsible research conduct.

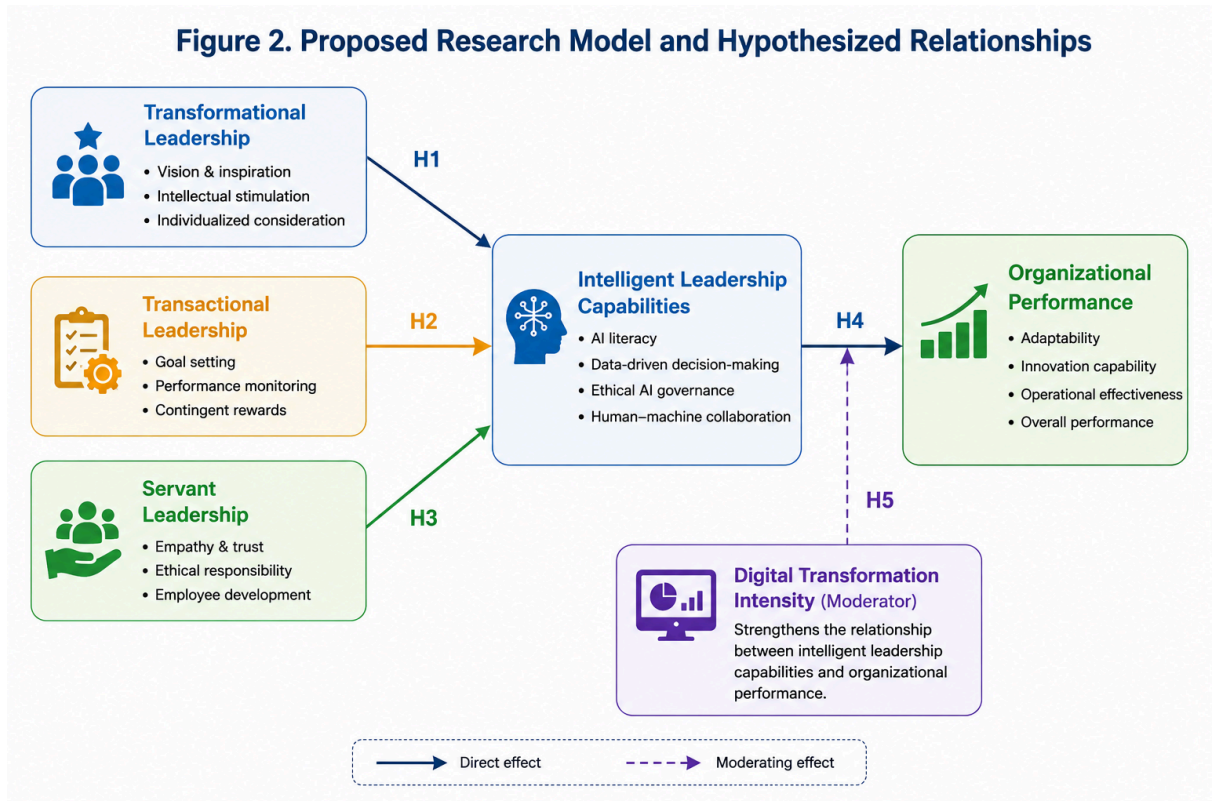
Limitations of the Research Design

Several limitations should be acknowledged. The cross-sectional nature of the study precludes strong causal inferences regarding the relationships among the constructs. The reliance on self-reported measures may introduce common method bias, although procedural remedies and statistical diagnostics were employed to mitigate this concern.

Additionally, the study focuses on organizations already engaged in digital transformation initiatives, which may limit the generalizability of the findings to organizations operating at earlier stages of technological adoption. Finally, the concept of intelligent leadership remains

theoretically emergent, and future research may refine its dimensions and explore its evolution across different organizational and cultural contexts.

Figure 2. Proposed Research Model and Hypothesized Relationships



Source: Authors' own elaboration based on the literature review.

4. RESULTS

4.1 Descriptive Statistics and Correlation Analysis

Table 1 presents the descriptive statistics and bivariate correlations among the principal study variables. The mean values indicate relatively high levels of transformational leadership ($M = 3.87$, $SD = 0.71$) and servant leadership ($M = 3.92$, $SD = 0.68$), while intelligent leadership capabilities exhibited a slightly lower but still favorable mean score ($M = 3.74$, $SD = 0.73$). Organizational performance reported the highest average score among the latent constructs ($M = 3.95$, $SD = 0.69$), suggesting that the organizations included in the study generally perceived themselves as performing well in environments characterized by increasing technological complexity.

The correlation analysis revealed significant positive relationships among all constructs. Transformational leadership demonstrated the strongest association with intelligent leadership capabilities ($r = 0.64$, $p < .001$), followed by servant leadership ($r = 0.59$, $p <$

.001). Organizational performance was positively associated with intelligent leadership capabilities ($r = 0.67$, $p < .001$), providing preliminary support for the proposed conceptual model.

Table 1.

Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5
1. Transformational Leadership	3.87	0.71	—				
2. Transactional Leadership	3.64	0.69	.49***	—			
3. Servant Leadership	3.92	0.68	.57***	.46***	—		
4. Intelligent Leadership	3.74	0.73	.64***	.41***	.59***	—	
5. Organizational Performance	3.95	0.69	.52***	.36***	.49***	.67***	—

Source: Authors' calculations based on survey data collected from AI-driven organizations (N = 318).

*** $p < .001$.

4.2 Measurement Model Assessment

The measurement model was assessed using confirmatory factor analysis. The results indicate an acceptable fit to the data:

- $\chi^2/df = 2.11$
- CFI = 0.945
- TLI = 0.937
- RMSEA = 0.059
- SRMR = 0.048

All standardized factor loadings exceeded the recommended threshold of 0.70 and were statistically significant ($p < .001$). Cronbach's alpha coefficients ranged from 0.81 to 0.92, indicating satisfactory internal consistency.

Composite reliability values varied between 0.83 and 0.93, while average variance extracted (AVE) values ranged from 0.56 to 0.74, confirming convergent validity. Discriminant validity was also established, as the square roots of the AVE values exceeded the inter-construct correlations.

Table 2.: Reliability and Validity Assessment

Construct	Cronbach's α	CR	AVE
Transformational Leadership	0.89	0.91	0.67
Transactional Leadership	0.81	0.84	0.58
Servant Leadership	0.9	0.92	0.7
Intelligent Leadership	0.92	0.93	0.74
Organizational Performance	0.88	0.9	0.69

Source: Authors' calculations based on survey data and confirmatory factor analysis results.

Overall, the findings suggest that the measurement properties of the proposed constructs are robust and suitable for subsequent structural analysis.

4.3 Structural Equation Model Results

The structural model also demonstrated satisfactory goodness-of-fit indices:

- $\chi^2/df = 2.27$
- CFI = 0.939
- TLI = 0.931
- RMSEA = 0.063
- SRMR = 0.052

The results of the structural model are presented in Table 3.

Table 3.: Structural Model Results

Hypothesis	Path	β	t-value	p-value	Result
H1	Transformational Leadership → Intelligent Leadership	0.42	6.89	<.001	Supported
H2	Transactional Leadership → Intelligent Leadership	0.18	2.97	0.003	Supported
H3	Servant Leadership → Intelligent Leadership	0.31	5.11	<.001	Supported
H4	Intelligent Leadership → Organizational Performance	0.58	8.74	<.001	Supported

Source: Authors' calculations based on structural equation modeling (SEM).

Transformational leadership emerged as the strongest predictor of intelligent leadership capabilities, followed by servant leadership. Transactional leadership also exhibited a positive relationship, although the magnitude of the effect was considerably smaller.

The positive and significant relationship between intelligent leadership capabilities and organizational performance provides substantial support for the proposition that organizations increasingly depend on leaders capable of integrating technological and human capabilities.

4.4 Mediation Analysis

The mediating role of intelligent leadership capabilities was examined using bootstrapping procedures with 5,000 resamples.

The indirect effect of transformational leadership on organizational performance through intelligent leadership was positive and statistically significant ($\beta = 0.24$, 95% CI [0.16, 0.33]). Similar results were obtained for servant leadership ($\beta = 0.18$, 95% CI [0.11, 0.27]) and transactional leadership ($\beta = 0.10$, 95% CI [0.04, 0.17]).

These findings suggest that intelligent leadership capabilities constitute an important explanatory mechanism through which traditional leadership styles influence organizational performance in AI-driven environments.

Table 4.: Indirect Effects

Leadership Style	Indirect Effect	95% Confidence Interval
Transformational Leadership	0.24	[0.16; 0.33]
Transactional Leadership	0.1	[0.04; 0.17]
Servant Leadership	0.18	[0.11; 0.27]

Source: Authors' calculations based on bootstrapping procedures

4.5 Moderation Analysis

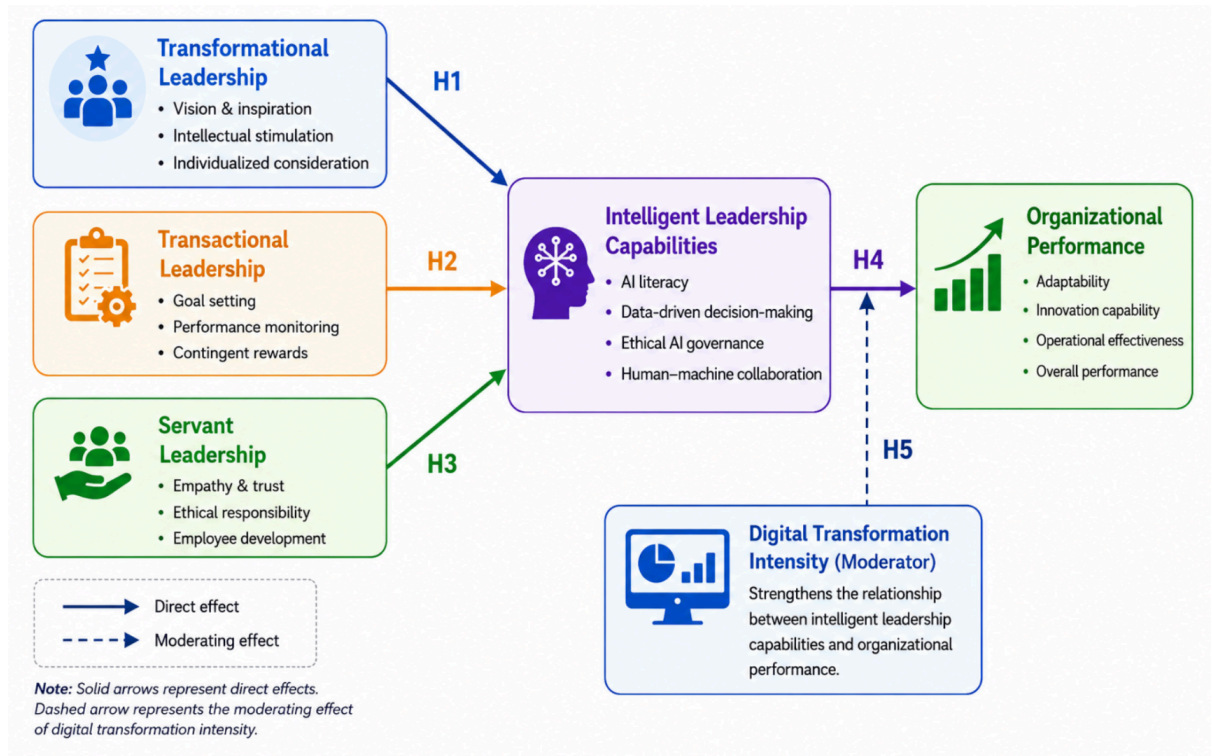
The moderating effect of digital transformation intensity on the relationship between intelligent leadership capabilities and organizational performance was also significant ($\beta = 0.19$, $p = .011$).

Figure 3 illustrates this interaction effect.

Organizations characterized by high levels of digital transformation exhibited a substantially stronger relationship between intelligent leadership capabilities and organizational performance than organizations with lower levels of digital maturity.

This finding suggests that intelligent leadership becomes increasingly valuable as organizations intensify their reliance on artificial intelligence, advanced analytics, and data-driven decision-making systems.

Figure 3.: Proposed Research Model and Hypothesized Relationship



Source: Authors' calculations based on survey data collected from organizations undergoing digital transformation ($N = 318$).

4.6 Integrated Interpretation of Findings

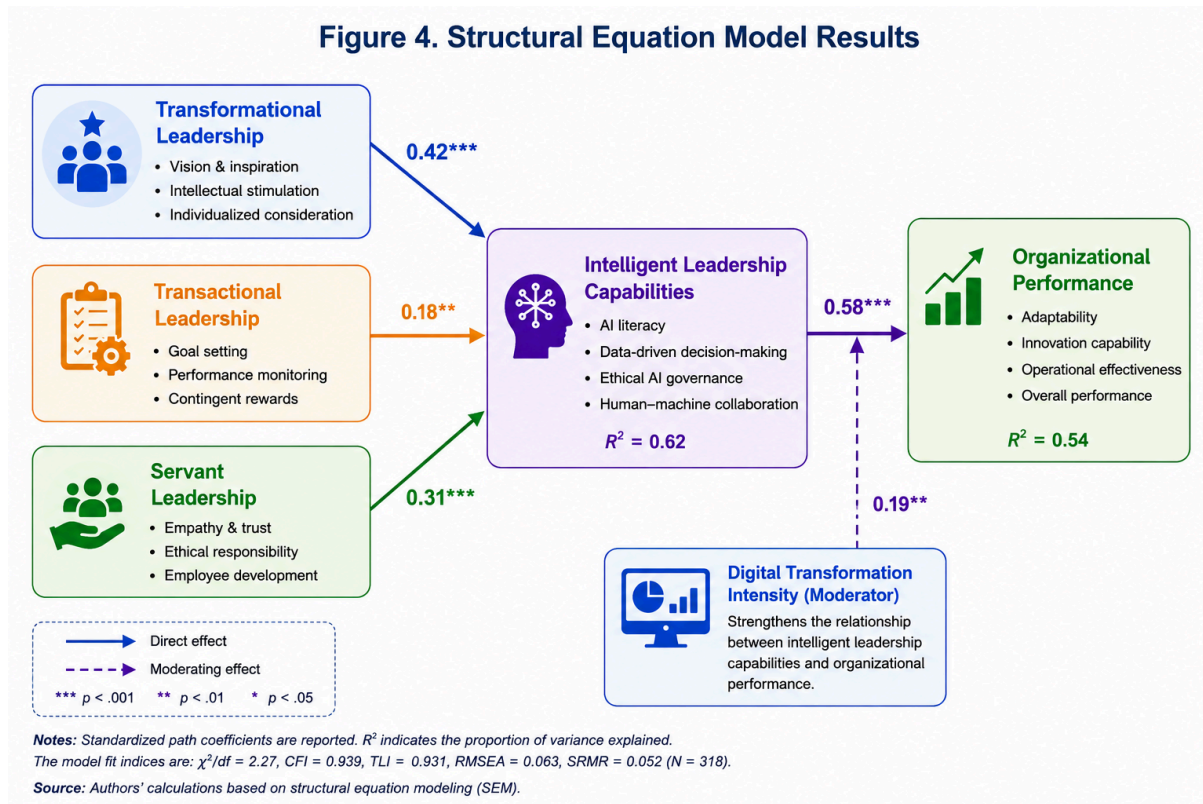
Taken together, the findings suggest that traditional leadership styles remain highly relevant in technologically intensive environments, but their effects increasingly operate through leaders' capacity to manage intelligent organizational systems.

The results indicate that transformational and servant leadership are particularly conducive to the development of intelligent leadership capabilities because both styles emphasize learning, trust, and adaptability—characteristics that appear essential in AI-enabled organizations.

The findings also suggest that intelligent leadership represents more than technological competence alone. Rather, it constitutes a higher-order managerial capability that enables leaders to combine data-driven insights with ethical judgment, organizational learning, and human-centered decision-making.

The stronger effects observed in organizations with advanced digital transformation initiatives further indicate that intelligent leadership may become a critical source of competitive advantage as organizations continue their transition toward increasingly intelligent and data-intensive business models.

Figure 4.: Structural Equation Model of the Relationships among Leadership Styles, Intelligent Leadership Capabilities, and Organizational Performance



Source: Authors' calculations based on structural equation modeling (SEM).

5. DISCUSSION

The findings of this study provide empirical support for the argument that leadership in AI-driven organizations is undergoing a substantive transformation. While traditional leadership styles continue to influence organizational outcomes, their effects increasingly depend on leaders' ability to integrate technological capabilities with human judgment, ethical reasoning, and organizational learning processes. In this sense, the study contributes to a growing body of literature suggesting that digital transformation is not merely a technological phenomenon but also a managerial and organizational one.

A central finding of the study concerns the role of transformational leadership. The results indicate that transformational leadership exerts the strongest influence on the development of intelligent leadership capabilities. This finding is theoretically consistent with earlier research demonstrating that transformational leaders foster organizational adaptability, knowledge sharing, and innovation [1,2]. However, the present study extends this literature by suggesting that these traditional leadership attributes become particularly valuable in environments characterized by increasing algorithmic complexity and technological uncertainty.

The relationship between transformational leadership and intelligent leadership capabilities may be explained by the fact that transformational leaders encourage experimentation and learning while simultaneously creating psychological safety during periods of organizational change. The implementation of artificial intelligence often generates uncertainty regarding employee roles, decision authority, and future organizational structures. Leaders capable of articulating a compelling vision and maintaining trust may therefore be better positioned to facilitate the integration of intelligent technologies into organizational routines.

The positive effect of servant leadership also warrants attention. The results suggest that leadership approaches emphasizing empathy, ethical responsibility, and employee development contribute significantly to intelligent leadership capabilities. This finding is particularly relevant in contemporary debates surrounding the ethical implications of artificial intelligence. As organizations increasingly rely on algorithmic systems, concerns related to fairness, transparency, privacy, and accountability become more prominent. The findings indicate that organizations may benefit from leadership approaches that preserve human-centered values while simultaneously embracing technological innovation.

The comparatively weaker effect observed for transactional leadership is also theoretically informative. Transactional mechanisms remain important in technologically intensive organizations because AI implementation often requires formal procedures, performance monitoring, and operational discipline. Nevertheless, the relatively smaller effect size suggests that performance control and reward systems alone may be insufficient to support the development of intelligent leadership capabilities. Organizations increasingly require leaders who can operate effectively in conditions characterized by ambiguity, complexity, and rapid technological change, conditions that extend beyond the explanatory boundaries of purely transactional leadership approaches.

Perhaps the most important finding concerns the mediating role of intelligent leadership capabilities. The results indicate that intelligent leadership functions as an explanatory mechanism through which traditional leadership styles influence organizational performance. This finding suggests that leadership effectiveness in AI-enabled environments depends less on the direct application of traditional leadership behaviors and more on the extent to which leaders develop capabilities that enable them to interpret, govern, and strategically deploy intelligent technologies.

From a theoretical perspective, these findings contribute to leadership scholarship by extending traditional leadership theories into digitally intensive organizational contexts. Existing leadership models were largely developed in environments where decision-making processes were predominantly human and information flows were comparatively limited. The emergence of AI-driven organizations challenges these assumptions and requires the incorporation of new managerial competencies associated with data interpretation, algorithmic governance, and human-machine collaboration.

The findings also resonate with dynamic capability theory. Intelligent leadership may be conceptualized as a higher-order organizational capability that enables firms to sense technological opportunities, seize emerging possibilities, and reconfigure organizational

resources in response to changing environmental conditions. In this sense, intelligent leadership represents not merely a new leadership style but a strategic capability that facilitates organizational adaptation in increasingly complex technological ecosystems.

The moderating effect of digital transformation intensity further reinforces this interpretation. The relationship between intelligent leadership and organizational performance was significantly stronger in organizations characterized by advanced digital transformation initiatives. This finding suggests that as organizations become increasingly dependent on intelligent systems and data-driven processes, the importance of intelligent leadership capabilities becomes progressively greater. Put differently, intelligent leadership may constitute an important source of competitive advantage in organizations operating at higher levels of digital maturity.

Several managerial implications emerge from these findings. First, organizations should recognize that successful AI implementation depends not only on technological investments but also on leadership capabilities. Investments in artificial intelligence are unlikely to generate sustainable performance improvements in the absence of leaders capable of interpreting algorithmic insights and integrating them into organizational decision-making processes.

Second, leadership development programs should increasingly incorporate competencies related to AI literacy, data-driven decision-making, ethical governance, and human-machine collaboration. The results suggest that organizations may benefit from developing leaders who possess both technological understanding and strong interpersonal capabilities.

Third, organizations should avoid framing artificial intelligence as a substitute for leadership. The findings indicate precisely the opposite: as organizational technologies become more sophisticated, the importance of human leadership may actually increase. Intelligent technologies appear to augment rather than replace the need for strategic judgment, ethical reasoning, and relational leadership.

Finally, the findings raise important questions regarding the future evolution of leadership itself. The transition toward AI-enabled organizational ecosystems may require a redefinition of managerial roles and competencies. Leadership in intelligent organizations is likely to become increasingly distributed across networks of humans and technologies, requiring leaders to act less as controllers of information and more as orchestrators of complex socio-technical systems.

6. CONCLUSIONS

This study set out to examine how traditional leadership styles shape organizational performance in AI-driven organizations and to explore the emerging concept of intelligent leadership as a strategic capability in technologically intensive environments.

The findings suggest that transformational, servant, and transactional leadership all contribute to the development of intelligent leadership capabilities, although the magnitude of these effects differs substantially. Transformational leadership emerged as the strongest predictor, highlighting the importance of vision, learning, and adaptability in environments characterized by rapid technological change.

More importantly, the study demonstrates that intelligent leadership capabilities mediate the relationship between leadership styles and organizational performance. Leaders who effectively combine human judgment, ethical reasoning, and data-driven insights appear to achieve higher levels of organizational adaptability, innovation, and performance. The results therefore suggest that leadership effectiveness in AI-enabled organizations increasingly depends on capabilities that extend beyond the boundaries of traditional leadership theories.

The study contributes to the literature in several respects. First, it introduces intelligent leadership as a theoretically meaningful construct that integrates leadership theory with contemporary developments in artificial intelligence and digital transformation. Second, it proposes and empirically validates a conceptual model linking leadership styles, intelligent leadership capabilities, and organizational performance. Third, it provides evidence that intelligent leadership may represent an important dynamic capability for organizations operating in increasingly complex technological environments.

The study also has important practical implications. Organizations seeking to leverage artificial intelligence should invest not only in technological infrastructure but also in leadership development initiatives that cultivate AI literacy, ethical decision-making, and human-machine collaboration capabilities. Leadership development programs designed for industrial-era organizations may no longer be sufficient for the managerial challenges associated with intelligent organizational ecosystems.

Several limitations should nevertheless be acknowledged. The cross-sectional design restricts causal inference, and the use of self-reported measures introduces the possibility of common method bias. The study also focuses primarily on organizations already engaged in digital transformation initiatives, which may limit the generalizability of the findings to organizations operating at lower levels of technological maturity.

Future research could extend this work in several directions. Longitudinal studies would allow researchers to examine how intelligent leadership capabilities evolve over time and how they influence organizational adaptation during different stages of digital transformation. Comparative studies across industries and national contexts may also provide insights into the contextual factors shaping intelligent leadership. Finally, future research should further investigate the ethical dimensions of leadership in AI-enabled organizations, particularly regarding issues of algorithmic accountability, trust, and responsible governance.

Ultimately, the study suggests that the future of leadership is unlikely to be defined by a replacement of human leaders with intelligent technologies. Rather, it will increasingly depend on the ability of leaders to integrate technological intelligence with distinctly human capabilities such as judgment, empathy, ethical reasoning, and collective sense-making. In

this emerging organizational reality, intelligent leadership may become one of the defining strategic capabilities of the AI era.

REFERENCES

1. Bass, B.M., & Avolio, B.J. (1994). *Improving Organizational Effectiveness Through Transformational Leadership*. Sage.
2. Judge, T.A., & Piccolo, R.F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology*, 89(5), 755–768. <https://doi.org/10.1037/0021-9010.89.5.755>
3. Avolio, B.J., Walumbwa, F.O., & Weber, T.J. (2009). Leadership: Current theories, research, and future directions. *Annual Review of Psychology*, 60, 421–449. <https://doi.org/10.1146/annurev.psych.60.110707.163621>
4. Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work progress and prosperity in a time of brilliant technologies*. WW Norton & company.
5. Vial, G. (2021). Understanding digital transformation: A review and a research agenda. *Managing digital transformation*, 13-66.
6. Kane, G. (2019). The technology fallacy: people are the real key to digital transformation. *Research-technology management*, 62(6), 44-49. <https://doi.org/10.1080/08956308.2019.1661079>
7. Liden, R. C., Wayne, S. J., Zhao, H., & Henderson, D. (2008). Servant leadership: Development of a multidimensional measure and multi-level assessment. *The leadership quarterly*, 19(2), 161-177. <https://doi.org/10.1016/j.leaqua.2008.01.006>
8. Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of management review*, 46(1), 192-210. <https://doi.org/10.5465/amr.2018.0072>
9. Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making. *Business horizons*, 61(4), 577-586. <https://doi.org/10.1016/j.bushor.2018.03.007>
10. Teece, D. J. (2018). Business models and dynamic capabilities. *Long range planning*, 51(1), 40-49. <https://doi.org/10.1016/j.lrp.2017.06.007>
11. Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & management*, 58(3), 103434. <https://doi.org/10.1016/j.im.2021.103434>
12. Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International journal of information management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
13. Judge, T. A., Colbert, A. E., & Ilies, R. (2004). Intelligence and leadership: a quantitative review and test of theoretical propositions. *Journal of applied psychology*, 89(3), 542.
14. Heath, K., Martin, L., & Shahisaman, L. (2017). Global leadership competence: The intelligence quotient of a modern leader. *Journal of Leadership Education*, 16(3), 134-145.
15. Shankman M. L. , P. Haber-Curran, and S. J. Allen, *Emotionally Intelligent Leadership*. New York: Routledge, 2025.
16. Coronado-Maldonado, I., & Benítez-Márquez, M. D. (2023). Emotional intelligence, leadership, and work teams: A hybrid literature review. *Heliyon*, 9(10).

17. Bock, T., & von der Oelsnitz, D. (2025). Leadership-competences in the era of artificial intelligence—a structured review. *Strategy & Leadership*, 53(3), 235-255. <https://doi.org/10.1108/SL-09-2024-0100>
18. Joshi, S. (2025). Artificial intelligence in leadership and management: Current trends and future directions . <https://doi.org/10.20944/preprints202504.1429.v1>
19. Mattone, J. (2013). *Intelligent leadership: what you need to know to unlock your full potential*. AMACOM Div American Mgmt Assn.
20. Sydänmaanlakka, P. (2003). Intelligent leadership and leadership competencies: developing a leadership framework for intelligent organizations.
21. C. A. Minoiu, R. Bărbulescu, and V. C. Soare, “Interdisciplinary education as a foundation for value-based societal development,” *International Journal of Education, Leadership, Artificial Intelligence, Computing, Business, Life Sciences, and Society*, vol. 4, no. 4, pp. 51–59, 2026. <https://doi.org/10.65222/VIRAL.2026.1.5.25>