Digital Leadership and AI Literacy Among Financial Technology Professionals: An Empirical Investigation of Relationships and Predictive Capabilities

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Abstract

This research examined the association between digital leadership capabilities and artificial intelligence literacy among fintech professionals. It examined how human-centric leadership dimensions correlate with AI competency components and their predictive relationships. A quantitative correlational design was employed with 76 financial technology professionals across diverse roles and organizations. Data collection employed the validated Digital Leadership Scale, which evaluates seven human-centered dimensions, along with the AI Literacy Scale that examines four essential components. Significant positive correlations were found between all digital leadership dimensions and AI literacy components, with an overall strong relationship between constructs. Operations managers showed the highest digital leadership levels, while data engineers demonstrated superior AI literacy. Regression modeling demonstrated that digital leadership dimensions together accounted for 28.3% of the variance observed in AI literacy. However, individual dimensions were non-significant due to multicollinearity, suggesting digital leadership functions as a holistic construct. Results indicate that comprehensive digital leadership development programs addressing multiple dimensions simultaneously may enhance AI literacy more effectively than isolated skill-building initiatives. The validated relationship between digital leadership and AI literacy provides evidence-based support for integrated leadership development strategies in technology-intensive environments, particularly benefiting fintech organizations navigating AI-driven transformation challenges.

1. Introduction

The accelerated development of artificial intelligence within the financial technology sector has generated extraordinary requirements for leadership capabilities that can navigate both technological complexity and human-centered change management (Kamuangu, 2024). The fintech sector presents a unique context due to its position at the forefront of financial innovation and regulatory complexity (Sayari et al., 2025). Organizations must balance rapid technological advancement with stringent compliance requirements, making the integration of effective leadership and AI competency essential for competitive advantage while maintaining customer trust and regulatory adherence.

Digital leadership has developed into a multifaceted strategic competency crucial for technology-driven transformation, encompassing human-centric traits, technical expertise, and the ability to foster innovation while maintaining ethical standards (Abbu et al., 2025). Unlike traditional leadership paradigms, digital leadership integrates behavioral competencies with strategic vision to create digitally proficient organizational cultures that can effectively implement AI-driven solutions. This conceptualization draws from dynamic capability theory and resource-based view frameworks, emphasizing how leaders must develop both technological understanding and human-centric capabilities to navigate digital transformation effectively (Gunawan et al., 2025).

Simultaneously, AI literacy has gained prominence as a fundamental competency enabling individuals to navigate AI-pervaded environments safely and competently, encompassing AI awareness, usage capabilities, evaluation skills, and ethical considerations (Wang et al., 2022). This competency framework is grounded in technology acceptance and competency-based learning theories, recognizing that effective AI adoption requires both technical skills and cognitive understanding of AI capabilities and limitations. This becomes particularly critical in fintech environments where professionals must understand, implement, and manage AI systems while ensuring regulatory compliance and maintaining customer trust.

Despite the fintech industry's unprecedented AI adoption rate, significant gaps exist in understanding how digital leadership relates to AI literacy among industry professionals (Barroso & Laborda, 2022). Many fintech leaders struggle to effectively guide AI implementation due to an insufficient understanding of both leadership frameworks and AI capabilities, creating barriers to successful digital transformation initiatives.

The lack of empirical research examining this relationship limits organizations' ability to develop targeted training programs, make informed hiring decisions, and create successful transformation approaches (Breidbach et al., 2020). Previous studies have primarily concentrated on digital leadership or AI literacy as distinct concepts, offering minimal exploration of their interrelated characteristics in professional environments (Nguyen et al., 2025).

This investigation sought to establish the character and intensity of the association between digital leadership and AI literacy among fintech professionals via three distinct objectives:

1. Measuring the degrees of digital leadership and AI literacy among fintech professionals within different professional roles
2. To investigate the association between digital leadership dimensions and AI literacy elements
3. To establish the forecasting capacity of digital leadership dimensions regarding AI literacy among fintech professionals

2. Literature Review and Hypothesis Development

2.1 Digital Leadership: Theoretical Foundations and Measurement

Digital leadership has evolved from traditional leadership theories to encompass the unique challenges of digital transformation, extending beyond basic digital competency to include strategic vision, innovation management, and human-centered organizational change capabilities (Hensellek, 2020).

The theoretical foundation of digital leadership draws primarily from dynamic capability theory, which emphasizes organizations' ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Gunawan et al., 2025). This perspective positions digital leaders as capability orchestrators who must continuously adapt their competencies to leverage emerging technologies while maintaining organizational effectiveness.

The resource-based view further informs digital leadership conceptualization by highlighting how leaders must develop and deploy unique combinations of technological and human resources to create sustainable competitive advantages. Digital leaders function as resource integrators, combining technological understanding with human-centric capabilities to create digitally proficient organizational cultures. Recent systematic reviews identify digital leadership as a multidimensional construct that operationalizes these theoretical perspectives by emphasizing how leaders must develop both technological understanding and human-centric capabilities (Gunawan et al., 2025).

Transformational leadership theory also contributes to digital leadership understanding, particularly through its emphasis on inspirational motivation and intellectual stimulation dimensions. Digital leaders must inspire followers to embrace technological change while stimulating innovative thinking about technology applications. This theoretical grounding explains why digital leadership extends beyond technical competency to include behavioral and motivational elements essential for successful digital transformation.

Capability development models from organizational learning theory inform how digital leadership competencies are acquired and refined. These models suggest that leadership capabilities develop through experiential learning, social interaction, and systematic reflection on technology implementation experiences. This theoretical perspective underlies the multidimensional approach to measuring digital leadership, recognizing that effective digital transformation requires integrated development across multiple competency areas.

Abbu et al. (2025) developed the Digital Leadership Scale (DLS), which represents a significant advancement over earlier digital leadership frameworks by addressing key limitations in previous measurement approaches. Unlike earlier models that focused primarily on technical competencies or treated digital leadership as an extension of traditional leadership, the DLS emphasizes human-centric dimensions, addressing the criticism that previous frameworks neglected the behavioral and ethical aspects essential for digital transformation success.

Comparative analysis with earlier frameworks reveals that the DLS addresses several gaps identified in the literature. While Hensellek's (2020) framework emphasized strategic vision and innovation management, it lacked operational measurement dimensions. The DLS operationalizes these concepts through specific dimensions like transparent agenda and track record. Similarly, earlier models often treated ethical considerations as peripheral, whereas the DLS positions "ethical use of AI" as a core dimension, reflecting growing concerns about responsible AI implementation.

A notable theoretical tension emerges between prescriptive approaches that emphasize specific leadership behaviors and descriptive approaches that focus on naturally occurring leadership patterns. The DLS attempts to bridge this tension by combining behavioral indicators (participative style, positive attitude) with outcome-oriented measures (track record, skills acquisition). However, this integration raises questions about whether these represent distinct competencies or interconnected manifestations of underlying leadership capability.

The DLS constitutes a notable progression in assessing digital leadership from a human-centered perspective, recognizing seven essential dimensions. The positive attitude dimension encompasses leaders' commitment to organizational success and accountability, reflecting the optimistic mindset necessary for digital transformation. Ethical use of AI addresses responsible technology implementation, requiring leaders to understand trustworthy AI systems, ensuring fairness and

compliance. The growth mindset dimension emphasizes leaders' belief in development potential, which is particularly important in rapidly evolving technological environments requiring continuous adaptation.

The track record dimension focuses on demonstrated ability to implement digital solutions, improving operational efficiency and customer experience. A transparent agenda addresses strategic clarity, requiring leaders to maintain documented strategies that stakeholders can understand and support. Skills acquisition emphasizes organizational capability development through recruitment, training, and educational partnerships. The participative style dimension highlights the collaborative, hands-on approach necessary for effective digital leadership implementation.

2.2 AI Literacy: Conceptual Framework and Components

AI literacy has developed into an essential skill for operating within AI-integrated settings, with competing conceptualizations creating both opportunities and challenges for measurement. Wang et al. (2022) established the Artificial Intelligence Literacy Scale (AILS), which represents a departure from earlier binary approaches that distinguished between AI-literate and AI-illiterate individuals.

Synthesis of evolving frameworks reveals significant conceptual development in AI literacy measurement. Earlier approaches focused primarily on technical understanding, while the AILS incorporates four dimensions that address both cognitive (AI awareness, AI evaluation) and behavioral (AI usage, AI ethics) components. This multidimensional approach contrasts with simpler frameworks but creates conceptual overlaps that deserve examination.

Theoretical tensions exist between different AI literacy conceptualizations. The AILS emphasizes individual competencies, while recent developments by Yuan et al. (2024) propose holistic scales incorporating individual, interactive, and sociocultural dimensions. This debate reflects a fundamental question about whether AI literacy should be conceptualized as a personal capability or as a socially embedded practice. Similarly, Chiu et al. (2024) argue for objective assessments over self-reported measures, challenging the AILS reliance on perceived competency.

Critical comparison reveals that while the AILS addresses cognitive and behavioral aspects, it may underemphasize the collaborative and contextual elements highlighted by more recent frameworks. Nong et al. (2024) established evaluation frameworks incorporating morality, critical thinking, and self-efficacy components, suggesting that the four-factor AILS model may be incomplete.

This framework recognizes four fundamental components necessary for professional AI competency. AI awareness encompasses individuals' ability to distinguish between AI and non-AI technologies, understand AI assistance capabilities, and identify daily AI applications. This foundational component reflects the basic understanding necessary for informed AI system interaction. AI usage focuses on practical application skills, including skillful use of AI applications for work tasks and efficient learning of new AI tools.

AI evaluation addresses higher-order thinking skills required for assessing AI capabilities and limitations, choosing appropriate solutions from AI-generated options, and selecting suitable AI applications for specific tasks. This component becomes particularly important in professional contexts involving AI recommendation evaluation. AI ethics encompasses adherence to ethical principles when using AI, awareness of privacy and security issues, and vigilance against AI technology abuse, gaining increasing importance as organizations recognize responsible AI implementation needs.

Recent developments have expanded AI literacy measurement beyond self-reported measures to include objective assessments (Chiu et al., 2024) and holistic scales incorporating individual, interactive, and sociocultural dimensions (Yuan et al., 2024), whereas Nong et al. (2024) established thorough evaluation frameworks incorporating morality, critical thinking, application ability, self-efficacy, and cognitive ability.

2.3 Digital Leadership and AI Literacy in Fintech Context

The fintech industry presents unique challenges for digital leadership implementation, requiring leaders who balance innovation with regulatory compliance, manage technological complexity while maintaining customer trust, and foster cultures embracing both technological advancement and ethical responsibility (Wu & Pambudi, 2025). Fintech organizations operate in highly regulated environments where leaders must navigate complex compliance requirements while pursuing technological innovation, making the ability to implement AI solutions that enhance efficiency while maintaining regulatory compliance a critical leadership competency.

Studies examining leadership capabilities in the artificial intelligence age have recognized 24 essential competencies, encompassing personality characteristics and technical abilities required for successful Artificial Intelligence-era leadership (Bock & von der Oelsnitz, 2025). These results indicate that successful digital leadership necessitates combining human-centered capabilities with AI comprehension, reinforcing the theoretical link between digital leadership dimensions and AI literacy components.

The ethical use of AI dimensions in digital leadership directly corresponds to AI ethics components in literacy frameworks. This suggests that leaders prioritizing responsible AI implementation are more likely to develop a comprehensive AI understanding. Similarly, the skills acquisition dimension of digital leadership relates to AI usage and evaluation capabilities, as leaders investing in organizational capability development are likely to develop their own AI competencies (Hossain et al., 2025).

2.4 Conceptual Framework

The conceptual model unifies digital leadership as the predictor variable containing seven human-focused dimensions, namely growth mindset, participative style, ethical use of AI, track record, positive attitude, skills acquisition, and transparent agenda. Alongside AI literacy as the outcome variable, consisting of four fundamental components (AI evaluation, AI usage, AI ethics, AI awareness). This model is anchored in theoretical principles formulated by Abbu et al. (2025) for digital leadership and Wang et al. (2022) for AI literacy.

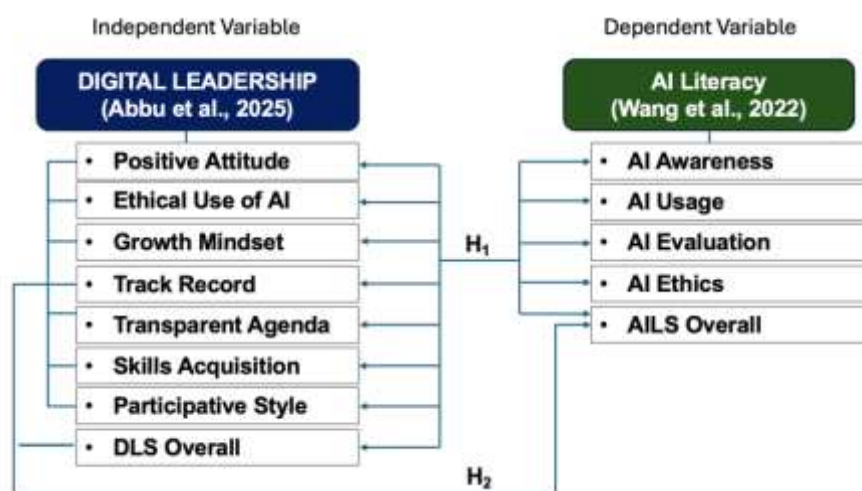Figure 1. Conceptual Framework for Digital Leadership and AI Literacy

The framework in Figure 1 examines two primary relationships corresponding to the study's hypotheses:

H_1: There are significant positive correlations between digital leadership dimensions and AI literacy components among fintech professionals.

H_2: Digital leadership and its dimensions significantly predict AI literacy among fintech professionals.

The theoretical foundation suggests that effective digital leadership facilitates AI literacy development through several mechanisms. Leaders with strong positive attitudes and growth mindsets are more likely to embrace AI technologies and invest in learning. Those demonstrating ethical use of AI and transparent agendas are better positioned to develop appropriate evaluation and ethics capabilities. Leaders with proven track records and skills acquisition capabilities more effectively use AI tools and maintain awareness of developments. At the same time, participative leadership styles support collaborative learning processes necessary for comprehensive AI literacy development.

2.5 Research Gaps and Study Rationale

While heightened interest exists in both constructs, several essential gaps continue to exist. Minimal empirical research has explored the connection between digital leadership and AI literacy within specific sectoral contexts, particularly in technology-driven industries like fintech. Most existing research treats these constructs as separate phenomena, with limited investigation of their interconnected nature. Additionally, there is insufficient research examining how different professional roles within fintech organizations may require varying combinations of digital leadership and AI literacy capabilities.

Finally, most studies have focused on individual constructs without examining predictive relationships that could inform organizational development strategies. This study addresses these gaps by examining relationships between validated measures of digital leadership and AI literacy within the fintech professional context, providing empirical evidence for theoretical connections while offering practical insights for organizational capability development.

3. Data and Methodology

3.1 Research Design and Participants

This research utilized a quantitative correlational methodology to investigate the association between digital leadership and AI literacy among fintech professionals. The correlational method was suitable for exploring the extent and nature of relationships between these variables without intervention, enabling analysis of naturally existing connections in professional settings.

Seventy-six fintech professionals were selected through purposive sampling. Inclusion criteria included current employment in a fintech company, a minimum of six months of fintech experience, and willingness to participate. Exclusion criteria included employment in traditional financial institutions without fintech operations, consultant or temporary worker status, and incomplete survey responses.

3.2 Data Collection and Instrumentation

Data was gathered through a well-structured online questionnaire administered via Google Forms, which included demographic details, the (DLS) Digital Leadership Scale, and the (AILS) AI Literacy Scale.

The Digital Leadership Scale (DLS) employed a validated 21-item measure created by Abbu et al. (2025) that assesses seven human-centered dimensions through a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). These dimensions encompass ethical use of AI, positive attitude, growth mindset, track record, transparent agenda, skills acquisition, and participative style. The DLS functions as a self-evaluation instrument that allows leaders to recognize performance deficiencies across essential dimensions vital for digital transformation.

The AI Literacy Scale (AILS) employed the validated 12-item instrument developed by Wang et al. (2022), which assessed four core constructs using a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree). The components include AI awareness, AI usage, AI evaluation, and AI ethics, with some items requiring reverse scoring. The AILS measures users' general AI competence rather than their ability to use specific AI applications.

Both instruments demonstrated excellent reliability in the fintech professional context. The Digital Leadership Scale achieved outstanding internal consistency (Cronbach's α = 0.977, McDonald's ω = 0.978), while the AI Literacy Scale showed strong reliability (Cronbach's α = 0.930, McDonald's ω = 0.951). These coefficients substantially exceed the conventional threshold of 0.70 and are consistent with original validation studies.

Normality assessment through Shapiro-Wilk tests revealed significant departures from normal distribution for all scale items (all $p < .001$), necessitating non-parametric statistical procedures. This finding is consistent with the ordinal nature of Likert scale responses and the tendency for ceiling or floor effects in organizational settings.

3.3 Data Analysis

Data examination utilized Jamovi statistical software. Descriptive measures comprised means, standard deviations, and frequencies to outline participant features and construct levels among job roles. Spearman correlation analyses explored connections between digital leadership dimensions and AI literacy components, addressing the correlational research objective. Simple and multiple linear regression procedures were implemented with AI literacy as the criterion variable and digital leadership dimensions as explanatory variables to identify predictive relationships.

3.4 Ethical Considerations

The study adhered to ethical research standards with comprehensive informed consent, voluntary participation, and participant withdrawal rights. All information/data were de-identified and maintained securely following data protection standards, with negligible risk to participants and procedures ensuring comfort during the research process.

4. Results and Discussion

4.1 Participant Demographics and Characteristics

The study included 76 fintech professionals from various organizational roles and contexts as seen in Table 1. The sample was well distributed across different job functions, with business analysts comprising the largest group (32.9%, n = 25), followed by project managers (22.4%, n = 17). Most participants possessed substantial industry experience, with 57.9% having six or more years in the fintech sector. Most participants (47.4%) worked in large organizations with over 200 employees, and 59.2% held supervisory responsibilities over teams of varying sizes.

The sample represented diverse fintech sectors, with insurance technology being most prevalent (26.3%), followed by digital banking (18.4%) and fintech infrastructure solutions (17.1%). Educational attainment was high, with 90.8% holding bachelor's degrees, and professional development was evident through the 67.1% who possessed industry certifications, particularly Project Management Professional (PMP) credentials.

The demographic profile reflects the mature nature of the fintech industry, where experienced professionals with formal education and professional certifications dominate the workforce. This aligns with Kamuangu's (2024) observation that fintech organizations require skilled professionals capable of navigating complex technological and regulatory environments. The prevalence of supervisory roles (59.2%) indicates that the sample includes individuals with leadership responsibilities, making them appropriate respondents for examining digital leadership capabilities. The sector diversity from insurance technology to digital banking provides a comprehensive representation of fintech domains, supporting the generalizability of findings across different fintech applications as noted by Senyo et al. (2024) in their analysis of fintech ecosystem diversity.

Table 1. Demographic Characteristics

Category	Type/Group	No. of Respondents	Percentage
1. What is your current job role?	Business Analyst	25	32.90%
	Project Manager	17	22.40%
	Team Lead/Supervisor	8	10.50%
	Product Manager	9	11.80%
	Operations Manager	8	10.50%
	Data Engineer	9	11.80%
2. How many years of experience do you have working in the fintech industry?	Less than 1 year	6	7.90%
	1-2 years	7	9.20%
	3-5 years	19	25%
	6-10 years	20	26.30%
	More than 10 years	24	31.60%
3. What is the size of your current company?	Startup (Less than 50 employees)	15	19.70%
	Mid-size company (50-200 employees)	25	32.90%
	Large company (More than 200employees)	36	47.40%
4. Do you currently supervise or lead a team?	Yes, I directly supervise 1-5 people	9	11.80%
	Yes, I directly supervise 6-15 people	10	13.20%
	Yes, I directly supervise more than 15 people	26	34.20%
	No, but I lead projects or initiatives	6	21.10%
	No supervisory responsibilities	15	19.70%
5. What type of fintech company do you work for?	Digital banking/Neo-bank	14	18.40%
	Payment solutions/E-wallet	6	7.90%
	Lending/Credit platform	5	6.60%
	Investment/Trading platform	7	9.20%
	Insurance technology (Insurtech)	20	26.30%
	Cryptocurrency/Blockchain	10	13.20%
	Fintech infrastructure/B2B solutions	13	17.10%
	Others	1	1.30%
6. What is your highest educational attainment?	Bachelor's degree	69	90.80%
	Master's degree	5	6.60%
	Doctorate's degree	2	2.60%
7. Do you hold professional certifications? (e.g., PMP, CFA, FRM, etc.)	YES	51	67.10%
	NO	25	32.90%
Please list any professional certifications you hold (e.g., PMP, CFA, FRM, etc.)	Bo	1	1.96%
	CFA	3	5.88%
	CSM	6	11.76%
	CSSYB	1	1.96%
	FRM	2	3.92%
	PMP	15	29.41%
	PSM	1	1.96%

4.2 Digital Leadership and AI Literacy Levels Across Job Roles

Table 2 shows notable variations emerged across professional positions, revealing distinct patterns in both constructs that align with theoretical expectations about role-based competence requirements. For digital leadership, operations managers demonstrated the highest mean scores (M = 4.60, SD = 0.50), followed closely by product managers (M = 4.40, SD = 0.42). These roles, which typically involve strategic oversight and cross-functional coordination, exhibited both high means and relatively low variability, suggesting consistent digital leadership capabilities among professionals in these positions.

In contrast, business analysts showed the lowest digital leadership scores (M = 3.78, SD = 0.92) with the highest variability, indicating more heterogeneous leadership development within this role category. This finding suggests that business analyst positions may require more targeted leadership development interventions, as these professionals often serve as critical bridges between technical and business stakeholders in fintech organizations.

Table 2. Job Role Comparisons

Job Role	N = 76	Digital Leadership Overall	AI Literacy Overall

		Mean	SD	Mean	SD
Business Analyst	25	3.78	0.92	4.60	0.81
Project Manager	17	4.26	0.49	5.03	0.51
Team Lead/Supervisor	8	4.25	0.53	5.24	0.36
Product Manager	9	4.40	0.42	4.96	0.23
Operations Manager	8	4.60	0.50	5.36	0.55
Data Engineer	9	4.10	0.69	6.27	0.42

The AI literacy patterns revealed a different hierarchy, with data engineers achieving the highest scores (M = 6.27, SD = 0.42), reflecting their technical orientation and direct engagement with AI technologies. This finding aligns with expectations that technical roles would demonstrate greater AI competency due to their daily interaction with AI systems and tools. Operations managers maintained strong performance (M = 5.36, SD = 0.55), while business analysts again showed the lowest scores (M = 4.60, SD = 0.81).

The consistently low standard deviation for data engineers suggests a more homogeneous and advanced AI literacy level within this technical role, likely to reflect standardized technical training and shared professional backgrounds. These role-based variations have important implications for fintech organizations seeking to develop comprehensive capability development programs that address the specific needs of different professional functions.

The role-based competency patterns align with Hossain et al.'s (2025) dynamic managerial capability perspective, which suggests that different organizational roles require varying combinations of human and technological capabilities. The finding that operations managers excel in digital leadership while data engineers lead in AI literacy supports Bock and von der Oelsnitz's (2025) identification of role-specific competency requirements in AI-driven organizations. The heterogeneity observed in business analyst capabilities reflects the bridging nature of their role, requiring both technical understanding and business acumen.

4.3 Digital Leadership and AI Literacy Relationship

Correlation findings revealed comprehensive positive linkages between digital leadership dimensions and AI literacy components, providing substantial support for the theoretical association between these constructs. The overall connection between digital leadership and AI literacy was strong and statistically significant ($\rho = 0.529$, $p < .001$), indicating that higher digital leadership capabilities align with increased AI literacy among fintech professionals.

Among the digital leadership dimensions, positive attitude demonstrated the strongest correlations with AI literacy components, ranging from $\rho = 0.367$ (AI evaluation) to $\rho = 0.483$ (AI ethics). This finding suggests that leaders with optimistic, committed attitudes toward organizational success are more likely to develop comprehensive AI competencies. The strong relationship between positive attitude and AI ethics is particularly noteworthy, as it suggests that leaders who demonstrate accountability and commitment to organizational success are also more likely to approach AI implementation with appropriate ethical considerations.

Participative style showed consistently strong relationships across all AI literacy components ($\rho = 0.427$ to $\rho = 0.452$), indicating that hands-on, collaborative leadership approaches facilitate AI skill development. This finding supports the theoretical proposition that digital leadership effectiveness depends on leaders' willingness to engage directly with technology and work collaboratively with their teams to understand and implement AI solutions.

The transparent agenda exhibited particularly strong correlations with AI evaluation ($\rho = 0.520$, $p < .001$), suggesting that leaders who maintain clear, documented strategies are more adept at assessing AI capabilities and limitations. This relationship makes theoretical sense, as strategic transparency

requires a deep understanding of technological capabilities and their alignment with organizational objectives.

Skills acquisition showed moderate to strong correlations across all AI components, reinforcing the logical connection between talent development initiatives and AI competency advancement. Leaders who actively engage in recruiting digital talent and implementing training programs are more likely to develop their own AI understanding through these activities.

Interestingly, while ethical use of AI correlated significantly with all AI literacy components, the correlations were more moderate in magnitude ($\rho = 0.330$ to $\rho = 0.375$). This finding may reflect the specialized nature of AI ethics as a distinct competency area requiring targeted development beyond traditional leadership ethics training—specific knowledge beyond general ethical leadership principles, suggesting ethical AI. The comprehensive positive correlations support the theoretical framework proposed by Abbu et al. (2025), demonstrating that human-centric digital leadership dimensions facilitate technological competency development. The particularly strong relationship between a transparent agenda and AI evaluation aligns with Hensellek's (2020) assertion that strategic clarity is essential for effective technology assessment and implementation. The moderate correlations between ethical use of AI and AI literacy components reflect the complexity of AI ethics, suggesting that ethical AI leadership requires specialized knowledge beyond general ethical principles. These findings extend Wang et al.'s (2022) AI literacy framework by demonstrating its relationship with leadership capabilities, providing evidence for the integrated development approaches advocated by Nguyen et al. (2025) in their systematic review of digital leadership research.

4.4 Predicting AI Literacy with Digital Leadership

In Table 3, multiple linear regression analysis examined the collective predictive capacity of digital leadership dimensions on AI literacy, revealing important insights about how these constructs interact at the multivariate level. The overall model proved statistically significant ($F_{(6, 69)} = 4.54$, $p < .001$), explaining 28.3% of the variance in AI literacy ($R^2 = 0.283$, adjusted $R^2 = 0.221$). This substantial explained variance indicates that digital leadership dimensions collectively represent meaningful predictors of AI literacy development among fintech professionals.

However, none of the individual digital leadership dimensions emerged as statistically significant predictors when entered simultaneously in the regression model. The standardized coefficients ranged from $\beta = -0.210$ (ethical use of AI) to $\beta = 0.343$ (positive attitude), but all p-values exceeded the conventional $\alpha = 0.05$ threshold.

This apparent contradiction between strong bivariate correlations and non-significant regression coefficients reflects the multicollinearity inherent in the digital leadership construct. The high intercorrelations among digital leadership dimensions (ranging from $\rho = 0.633$ to $\rho = 0.860$) suggest that these dimensions function as components of a unified leadership approach rather than as independent predictive factors.

To examine the direct predictive relationship between overall digital leadership and overall AI literacy without the complexity of multicollinearity, a simple linear regression was conducted with digital leadership overall as the sole predictor of AI literacy. This analysis yielded highly significant results ($R^2 = 0.268$, $F_{(1,74)} = 27.1$, $p < .001$), indicating that overall digital leadership explains 26.8% of the variance in overall AI literacy ($\beta = 0.518$, $p < .001$). The simple regression model demonstrates a clear, unambiguous predictive relationship, confirming that when digital leadership is considered as a unified construct, it significantly predicts AI literacy development among fintech professionals.

Table 3. Regression Analysis of Digital Leadership Dimensions and AI Literacy

Model Fit Measures						
			Overall Model Test			
Model	**R**	**R²**	**F**	**df1**	**df2**	**p**

1	0.532	0.283	4.54	6	69	< .001
2	0.518	0.268	27.1	1	74	<.001

Model Coefficients 1 – AI Literacy

Predictor	Estimate	SE	95% Confidence Interval Lower	Confidence Upper	t	p	Stand. Estimate	95% Confidence Interval Lower	Confidence Upper
Intercept	3.086	0.466	2.156	4.015	6.620	< .001			
AttitudeAve	0.320	0.229	-0.137	0.776	1.397	0.167	0.343	-0.147	0.833
EthicsAve	-0.217	0.247	-0.709	0.275	-0.881	0.382	-0.210	-0.686	0.266
MindsetAve	0.122	0.222	-0.321	0.566	0.551	0.583	0.128	-0.336	0.593
TrackRecordAve	-0.147	0.236	-0.618	0.323	-0.625	0.534	-0.143	-0.601	0.315
TransAgendaAve	0.168	0.210	-0.251	0.587	0.799	0.427	0.175	-0.263	0.614
SkillsAcqAve	0.238	0.202	-0.166	0.642	1.174	0.244	0.253	-0.177	0.684

Model Coefficients 2 - AI_Literacy

Predictor	Estimate	SE	95% Confidence Interval Lower	Upper	t	p	Stand. Estimate	95% Confidence Interval Lower	Upper
Intercept	2.805	0.444	1.920	3.690	6.32	< .001			
Digital_Leadership_AVE	0.551	0.106	0.341	0.762	5.21	< .001	0.518	0.320	0.716

The comparison between multiple and simple regression models reveals important theoretical insights. While the multiple regression explains slightly more variance (28.3% vs. 26.8%), the interpretational complexity introduced by multicollinearity makes the simple regression model more theoretically meaningful and practically useful. Simple regression provides cleaner evidence of predictive relationships, demonstrating that digital leadership, when conceptualized holistically, serves as a strong predictor of AI literacy capabilities.

The multicollinearity finding has important theoretical and practical implications. Theoretically, it supports Abbu et al.'s (2025) conceptualization of digital leadership as an integrated framework where individual dimensions complement and reinforce each other. Practically, it suggests that organizations seeking to develop AI literacy through leadership development should focus on comprehensive programs that address multiple leadership dimensions simultaneously rather than isolated skill-building initiatives.

The significant intercept in the multiple regression model ($\beta = 3.086$, $p < .001$) indicates a baseline level of AI literacy that exists independent of the measured digital leadership dimensions, possibly reflecting technical training, educational background, or other organizational factors not captured in the current model. This finding suggests that while digital leadership significantly contributes to AI literacy development, other factors also play important roles in determining overall AI competency levels.

The multicollinearity pattern supports Gunawan et al.'s (2025) systematic review findings that digital leadership operates as an integrated capability rather than as discrete competencies. The substantial variance explained in both models aligns with Hamzah et al.'s (2025) research on digital leadership competencies, which found that leadership capabilities collectively influence organizational success through systematic integration of competencies. The holistic nature of digital leadership revealed through this analysis extends Hossain et al.'s (2025) dynamic managerial capability framework by demonstrating how leadership dimensions work synergistically in AI-driven environments.

5. Conclusion

This study successfully established empirical evidence for the relationship between digital leadership and AI literacy among fintech professionals, revealing systematic variations across job roles and significant predictive relationships between constructs. Operations managers demonstrated the highest digital leadership levels while data engineers showed superior AI literacy, indicating role-specific competency patterns that align with professional responsibilities. All digital leadership dimensions correlated positively and significantly with AI literacy components, with the overall relationship demonstrating a strong association. Most importantly, digital leadership collectively explained 28.3% of variance in AI literacy through multiple regression. In contrast, the simple

regression model revealed that overall digital leadership significantly predicts AI literacy, confirming digital leadership as a holistic construct where dimensions work synergistically rather than independently.

The findings provide substantial theoretical and practical contributions to understanding leadership-technology competency integration in fintech environments. Theoretically, the study validates the conceptualization of digital leadership as an integrated framework where human-centric dimensions complement each other, supporting Abbu et al.'s (2025) multidimensional approach and extending Wang et al.'s (2022) AI literacy framework into professional contexts. The multicollinearity findings demonstrate that effective digital transformation requires comprehensive rather than fragmented approaches to capability development. Practically, the strong predictive relationship between overall digital leadership and AI literacy provides evidence-based support for organizations to invest in holistic leadership development programs that address multiple dimensions simultaneously, offering validated instruments and clear guidance for fintech organizations navigating AI-driven transformation challenges.

Future research should address current limitations through longitudinal designs to establish causal relationships, objective assessment measures to complement self-reported data, and broader samples across industries to enhance generalizability. Organizations should implement comprehensive digital leadership development programs addressing multiple dimensions simultaneously, educational institutions should integrate both constructs into curricula, and researchers should examine how these competencies translate into organizational performance outcomes. The convergence of human-centric leadership and AI capabilities represents a defining challenge for fintech's future. It requires integrated approaches that recognize the synergistic relationship between leadership effectiveness and technological proficiency rather than treating them as separate domains.

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