
| RESEARCH ARTICLE

Digital Leadership and Employee Innovative Behavior in Service Firms: The Mediating Roles of Knowledge Sharing and Work Engagement

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| ABSTRACT

Digital transformation has increased the importance of employee innovative behavior in service firms, where employees are expected to generate, share, and implement new ideas in technology-enabled work environments. This study examines the effect of digital leadership on employee innovative behavior and investigates the mediating roles of knowledge sharing and work engagement. Drawing on Social Exchange Theory, the Knowledge-Based View, and Job Demands–Resources Theory, the study proposes that digital leadership enhances employee innovation by fostering knowledge exchange and strengthening employees' motivational involvement. Data were collected from 400 employees working in service firms and analyzed using partial least squares structural equation modeling. The results show that digital leadership positively affects knowledge sharing, work engagement, and employee innovative behavior. Knowledge sharing and work engagement also positively influence employee innovative behavior. Moreover, both mediating effects are significant, indicating that digital leadership promotes employee innovation directly and indirectly through knowledge sharing and work engagement. The findings contribute to digital leadership and innovation literature by clarifying the social and motivational mechanisms through which digital leadership stimulates employee-level innovation. The study also provides practical implications for service firms seeking to build digitally enabled, knowledge-sharing, and engagement-oriented workplaces.

| KEYWORDS

Digital leadership; Employee innovative behavior; Knowledge sharing; Work engagement; Service firms; PLS-SEM.

| ARTICLE INFORMATION

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1. Introduction

Digital transformation has become a central force reshaping how service firms compete, operate, and create value. Service firms increasingly rely on digital platforms, data systems, online customer interactions, artificial intelligence applications, and technology-enabled service delivery to improve customer experience and operational responsiveness. In this context, innovation is no longer limited to formal research and development departments. Instead, innovation increasingly depends on employees who interact directly with customers, use digital tools, identify service problems, share practical knowledge, and propose new ways to improve service quality and customer experience. Recent studies also indicate that digital transformation and digital leadership are increasingly important for stimulating employee-level innovation in technology-enabled work environments (Gao & Gao, 2024; Wang et al., 2025).

Employee innovative behavior refers to employees' intentional generation, promotion, and implementation of new ideas in the workplace (Janssen, 2000; Scott & Bruce, 1994). In service firms, this behavior is especially important

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because employees frequently face changing customer expectations, service failures, digital service demands, and competitive pressures. Employees who behave innovatively can suggest new service processes, improve customer interaction methods, adopt digital tools creatively, and support organizational adaptation. Prior research has emphasized that employee innovative behavior is a key micro-level foundation of organizational innovation and competitive advantage, particularly in dynamic and digitally transformed environments (Gao & Gao, 2024; Scott & Bruce, 1994).

However, employee innovative behavior does not occur automatically. Employees need leadership support, psychological motivation, access to knowledge, and an organizational climate that encourages experimentation. Digital leadership has therefore become an important leadership capability in contemporary service firms. Digital leadership refers to leaders' ability to articulate a digital vision, support digital transformation, encourage digital technology use, and enable employees to adapt and innovate in digital work contexts. Recent empirical evidence shows that digital leadership can influence innovative work behavior, knowledge sharing behavior, employee creativity, and innovative performance through mechanisms such as psychological empowerment, psychological ownership, job crafting, and knowledge sharing (Gao & Gao, 2024; Sebetci, 2025; Wang et al., 2025; Yang et al., 2025).

Although prior research has increasingly examined the relationship between digital leadership and innovation-related outcomes, several gaps remain. First, many studies focus on digital leadership as a direct antecedent of innovative behavior, while less attention has been paid to the internal mechanisms through which digital leadership stimulates employee innovation. Second, existing studies often examine either knowledge-related mechanisms or motivational mechanisms separately. However, in service firms, innovative behavior may require both knowledge sharing and work engagement. Employees need knowledge from colleagues, customers, and digital systems, but they also need energy, dedication, and absorption to transform knowledge into innovative actions. Third, the service sector provides an important but still underexplored context because service innovation is highly dependent on employee-customer interaction, employee initiative, and real-time problem solving. Recent studies suggest that knowledge sharing and work engagement are important mechanisms for explaining innovative work behavior, but their combined mediating roles in the digital leadership–innovative behavior relationship remain insufficiently examined (Elamin et al., 2024; Gao & Gao, 2024; Sebetci, 2025).

This study addresses these gaps by examining the mediating roles of knowledge sharing and work engagement in the relationship between digital leadership and employee innovative behavior. Knowledge sharing refers to employees' exchange of information, experience, expertise, and work-related know-how with colleagues (Brock et al., 2005; Van den Hooff & De Ridder, 2004; Wang & Noe, 2010). Work engagement refers to a positive, fulfilling work-related state characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). Both constructs are highly relevant in service firms because employees must continuously learn, coordinate, and remain motivated to deliver innovative services. Recent research confirms that knowledge-sharing behavior can strengthen innovative work behavior in service contexts, while work engagement can help explain how leadership and organizational resources are transformed into proactive and innovative employee behaviors (Elamin et al., 2024; Gao & Gao, 2024).

The objective of this study is to develop and test a research model explaining how digital leadership enhances employee innovative behavior through knowledge sharing and work engagement. The study makes three contributions. First, it extends digital leadership literature by explaining the social and motivational pathways linking digital leadership to employee innovation. Second, it contributes to employee innovative behavior research by integrating knowledge sharing and work engagement as complementary mediating mechanisms. Third, it provides practical implications for service firms by showing that digital leaders should not only promote technology use but also build knowledge-sharing routines and engagement-oriented work environments.

2. Literature Review and Hypotheses Development

2.1. Theoretical Background and Key Concepts

Theoretical Background: This study draws on Social Exchange Theory, the Knowledge-Based View, and Job Demands–Resources Theory. Social Exchange Theory suggests that employees reciprocate supportive digital leadership through positive behaviors such as knowledge sharing, engagement, and innovation (Blau, 1964). The Knowledge-Based View emphasizes knowledge creation, sharing, and application as key sources of competitive advantage (Grant, 1996). Job Demands–Resources Theory explains that leadership support and digital resources can enhance work engagement and positive work outcomes (Bakker & Demerouti, 2007). Together, these theories explain how digital leadership promotes employee innovative behavior through knowledge sharing and work engagement.

Digital leadership: Digital leadership refers to leaders' ability to guide employees through digital transformation by articulating a digital vision, supporting technology use, encouraging experimentation, and promoting collaboration. In service firms, digital leadership helps employees use digital tools to improve service quality, adapt to change, and engage in innovative work behavior (Erhan et al., 2022; Gao & Gao, 2024; Wang et al., 2025).

Knowledge sharing: Knowledge sharing refers to employees' exchange of task-related information, ideas, expertise, experience, and problem-solving knowledge with colleagues. In service firms, it helps employees respond to customer needs, solve service problems, combine diverse knowledge, and generate creative solutions that support employee innovative behavior (Van den Hooff & De Ridder, 2004).

Work engagement: Work engagement refers to a positive motivational state characterized by energy, dedication, and deep involvement in work. In service firms, engaged employees are more willing to solve problems, generate ideas, experiment with new approaches, and implement improvements, thereby supporting employee innovative behavior (Schaufeli et al., 2002).

Employee innovative behavior: Employee innovative behavior refers to employees' generation, promotion, and implementation of new ideas at work (Janssen, 2000; Scott & Bruce, 1994). In service firms, it includes improving service procedures, customer interactions, digital tool use, and service delivery. This behavior is essential because frontline employees directly identify customer needs and contribute to service innovation.

2.2. Digital leadership and knowledge sharing

Digital leadership is expected to enhance knowledge sharing by encouraging openness, collaboration, digital communication, and cross-functional interaction. Digital leaders provide digital tools and platforms that help employees exchange experiences, customer insights, technical knowledge, and service improvement ideas. From the Knowledge-Based View, leadership shapes how knowledge is created, shared, and applied within organizations (Grant, 1996). Prior studies show that knowledge sharing is influenced by organizational climate, communication practices, and willingness to exchange knowledge (Bock et al., 2005; Van den Hooff & De Ridder, 2004; Wang & Noe, 2010), while recent studies link digital leadership to knowledge sharing and innovation (Gao & Gao, 2024; Sebetci, 2025).

H1: Digital leadership positively influences knowledge sharing.

2.3. Digital leadership and work engagement

Digital leadership is expected to strengthen work engagement by providing clear digital direction, reducing uncertainty, supporting technology use, and encouraging employee participation in change. According to Job Demands–Resources Theory, leadership support is an important job resource that enhances employees' energy, dedication, and involvement (Bakker & Demerouti, 2007; Schaufeli et al., 2002). In technology-enabled workplaces, digital leadership helps employees cope with digital change and use digital tools meaningfully. Recent studies also show that digital leadership is associated with work engagement and innovation-related outcomes (Karafakioğlu & Findikli, 2024; Wang et al., 2025).

H2: Digital leadership positively influences work engagement.

2.4. Digital leadership and employee innovative behavior

Digital leadership is expected to enhance employee innovative behavior by encouraging experimentation, supporting digital learning, promoting openness to change, and providing technological resources. Employees under digital leadership are more likely to identify digital opportunities, propose service improvements, and implement new ideas. This argument is consistent with Social Exchange Theory, which suggests that employees reciprocate supportive leadership through constructive extra-role behaviors (Blau, 1964). Recent studies also show that digital leadership fosters innovative behavior through psychological empowerment, psychological ownership, and job crafting (Gao & Gao, 2024; Sebetci, 2025; Wang et al., 2025).

H3: Digital leadership positively influences employee innovative behavior.

2.5. Knowledge sharing and employee innovative behavior

Knowledge sharing is expected to enhance employee innovative behavior because innovation depends on employees' ability to combine diverse knowledge, learn from others, and apply shared insights to new problems. From the Knowledge-Based View, knowledge becomes valuable when it is shared, integrated, and applied within the organization (Grant, 1996). In service firms, knowledge sharing helps employees learn from customer feedback, service failures, colleagues' experiences, and technology-enabled interactions. Prior studies show that knowledge sharing supports innovative work behavior and translates leadership, engagement, and organizational support into innovation outcomes (Bock et al., 2005; Elamin et al., 2024; Van den Hooff & De Ridder, 2004; Wang & Noe, 2010).

H4: Knowledge sharing positively influences employee innovative behavior.

2.6. Work engagement and employee innovative behavior

Work engagement is expected to enhance employee innovative behavior because engaged employees have greater energy, dedication, and involvement, making them more willing to go beyond routine tasks, solve problems, and implement new ideas. Engagement is commonly defined through vigor, dedication, and absorption (Schaufeli et al., 2002, 2006). In service firms, engaged employees are more likely to identify customer needs, improve service processes, share knowledge, and experiment with digital tools. Prior studies show that work engagement is positively related to innovative work behavior and can support innovation through knowledge-sharing mechanisms (Elamin et al., 2024; Karafakioğlu & Findikli, 2024; Sari et al., 2021).

H5: Work engagement positively influences employee innovative behavior.

2.7. Mediating role of knowledge sharing

Knowledge sharing is expected to mediate the relationship between digital leadership and employee innovative behavior. Digital leadership creates a collaborative digital environment that encourages employees to exchange information, share work experiences, and learn from one another. From the Knowledge-Based View, knowledge becomes valuable when it is shared, integrated, and applied within organizations (Grant, 1996). Shared knowledge provides employees with diverse information, expertise, and problem-solving resources that support creativity and innovative work behavior (Bock et al., 2005; Van den Hooff & De Ridder, 2004; Wang & Noe, 2010). Recent studies also suggest that knowledge sharing explains how leadership and digital leadership promote innovation (Elamin et al., 2024; Gao & Gao, 2024; Sebetci, 2025).

H6: Knowledge sharing mediates the relationship between digital leadership and employee innovative behavior.

2.8. Mediating role of work engagement

Work engagement is expected to mediate the relationship between digital leadership and employee innovative behavior. Digital leadership provides direction, support, and digital resources that enhance employees' energy,

dedication, and involvement. According to Job Demands–Resources Theory, job resources such as leadership support and technology-related resources strengthen work engagement and positive outcomes (Bakker & Demerouti, 2007; Schaufeli et al., 2002). Engaged employees are more likely to invest effort in generating, promoting, and implementing new ideas. Recent studies also show that work engagement links digital leadership with innovative behavior, employee voice behavior, and organizational agility (Karafakioğlu & Findikli, 2024; Yang et al., 2024; Zia et al., 2024).

H7: Work engagement mediates the relationship between digital leadership and employee innovative behavior.

The proposed research model includes three latent constructs: digital leadership, employee innovative behavior, Knowledge sharing, Work engagement.

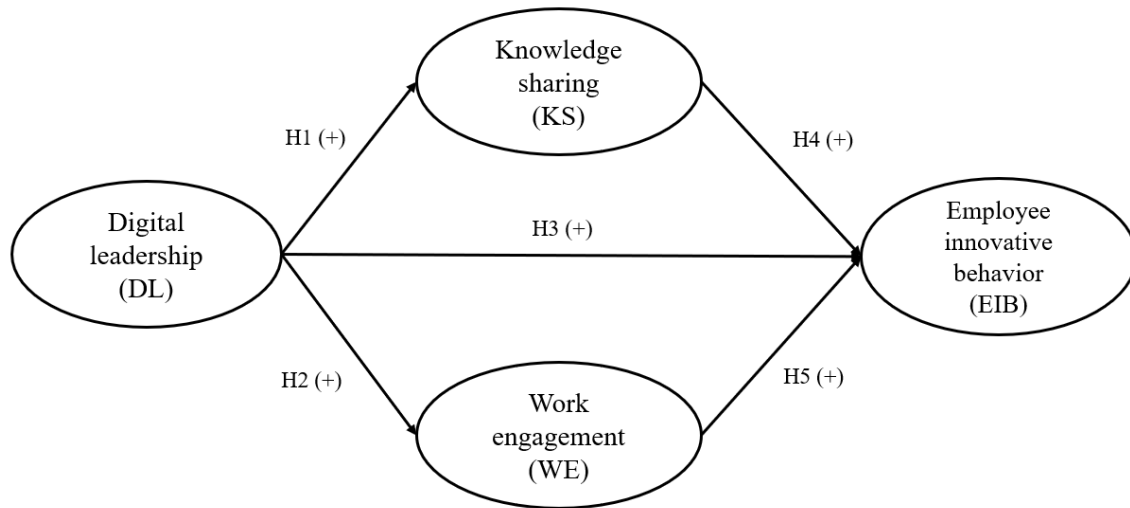


Figure 1: The proposed research model

3. Research Methodology

Research design: This study adopts a quantitative, cross-sectional survey design. This design is appropriate because the study aims to examine hypothesized relationships among latent constructs and test the mediating effects of knowledge sharing and work engagement. A structured questionnaire will be used to collect data from employees working in service firms. Partial least squares structural equation modeling will be used to analyze the data because the model includes multiple latent variables and mediation paths and is prediction-oriented (Hair et al., 2022).

Research context and sample: The study will survey full-time employees in service firms, including banking, tourism, hospitality, retail, education, healthcare, logistics, IT services, and professional services. Respondents should have at least six months of work experience to evaluate digital leadership, knowledge sharing, work engagement, and innovative behavior. The expected sample size is 300–500 valid responses, suitable for PLS-SEM.

Sampling and data collection: The study will use purposive and convenience sampling to select employees working in service firms with sufficient organizational experience. Respondents may be reached through professional networks, business associations, alumni networks, online communities, and participating firms. A pilot test with 30–50 employees will be conducted before the main survey. Participation will be voluntary and confidential.

Measurement scales: All constructs were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Digital leadership was measured with six reflective items adapted from Erhan et al. (2022), Gao & Gao, 2024, and Sebetci (2025), capturing digital vision, technology support, digital learning,

experimentation, and digital transformation guidance. Knowledge sharing was measured with six reflective items adapted from Bock et al. (2005), Van den Hooff and De Ridder (2004), and Wang and Noe (2010). Work engagement was measured with six reflective items adapted from Schaufeli et al. (2002, 2006). Employee innovative behavior was measured with seven reflective items adapted from Scott and Bruce (1994), Janssen (2000), and De Jong and Den Hartog (2010).

Data analysis: Data will be analyzed using SPSS and SmartPLS 4. First, data screening will be conducted to remove incomplete responses, duplicate responses, and careless answers. Second, descriptive statistics will summarize respondent characteristics. Third, common method bias will be assessed using Harman’s single-factor test and full collinearity VIF, which are commonly used to detect potential common method bias in survey-based studies (Kock, 2015; Podsakoff et al., 2003). Fourth, the measurement model will be evaluated using outer loadings, Cronbach’s alpha, composite reliability, average variance extracted, and HTMT to assess reliability, convergent validity, and discriminant validity (Fornell & Larcker, 1981; Hair et al., 2022; Henseler et al., 2015). Fifth, the structural model will be assessed using path coefficients, t-values, p-values, VIF, R², Q², and f². Finally, the mediating effects of knowledge sharing and work engagement will be tested using bootstrapping with 5,000 subsamples, as recommended for testing indirect effects in PLS-SEM (Hair et al., 2022; Preacher & Hayes, 2008).

4. Results

4.1 Sample Description

Table 1 presents the demographic profile of 400 respondents from service firms. Female respondents accounted for 52.5%, while male respondents represented 47.5%, indicating a relatively balanced sample. Most respondents were aged 25–34 years (44.0%), followed by those aged 35–44 years (26.0%). Regarding education, 59.0% held a bachelor’s degree and 20.5% had postgraduate qualifications. In terms of work experience, the largest group had 1–3 years of experience (34.5%), followed by 4–6 years (31.0%). Respondents came from diverse service industries, including hospitality/tourism and logistics/professional services, each accounting for 21.5%. Overall, the sample is suitable for examining digital leadership, knowledge sharing, work engagement, and employee innovative behavior.

Table 1 - Sample Description

Characteristic	Category	Frequency	Percentage
Gender	Male	190	47.50%
	Female	210	52.50%
Age	Under 25	68	17.00%
	25–34	176	44.00%
	35–44	104	26.00%
	45 and above	52	13.00%
Education	College or below	82	20.50%
	Bachelor’s degree	236	59.00%
	Postgraduate degree	82	20.50%
Work experience	6 months–1 year	46	11.50%
	1–3 years	138	34.50%
	4–6 years	124	31.00%
	More than 6 years	92	23.00%
Service industry	Banking/finance	72	18.00%
	Hospitality/tourism	86	21.50%
	Retail/customer service	74	18.50%
	Education/healthcare	82	20.50%
	Logistics/professional services	86	21.50%

(Source: Author)

4.2. Measurement model assessment

4.2.1. Reliability and Convergent Validity

The measurement model showed satisfactory reliability and convergent validity. As reported in Table 2, all outer loadings ranged from 0.792 to 0.928, exceeding the recommended threshold of 0.70. Cronbach’s alpha values ranged from 0.922 to 0.957, and composite reliability values ranged from 0.939 to 0.965, confirming strong internal consistency. In addition, AVE values ranged from 0.721 to 0.819, all above the 0.50 threshold. Therefore, the constructs of digital leadership, knowledge sharing, work engagement, and employee innovative behavior achieved adequate reliability and convergent validity for further analysis.

Table 2. Reliability and Validity

Construct	Items	Outer Loadings	Cronbach’s α	CR	AVE
DL	6	0.792-0.890	0.922	0.939	0.721
KS	6	0.829-0.890	0.928	0.943	0.735
WE	6	0.881-0.928	0.956	0.965	0.819
EIB	7	0.867-0.910	0.957	0.964	0.793

(Source: Author)

4.2.2. Discriminant Validity

Discriminant validity was assessed using the Fornell–Larcker criterion and the HTMT ratio. As shown in Table 3, the square roots of AVE for DL, EIB, KS, and WE were 0.849, 0.891, 0.858, and 0.905, respectively, and were higher than their corresponding inter-construct correlations. In addition, all HTMT values ranged from 0.256 to 0.583, below the recommended threshold of 0.85. These results confirm that digital leadership, knowledge sharing, work engagement, and employee innovative behavior are empirically distinct constructs and suitable for structural model assessment.

Table 3. Heterotrait–Monotrait Ratio (HTMT)

	DL	EIB	KS	WE
DL	0.849	0.583	0.512	0.537
EIB	0.62	0.891	0.453	0.563
KS	0.551	0.48	0.858	0.256
WE	0.569	0.589	0.271	0.905

Note: Correlations and HTMT ratio are at the lower and upper of the diagonal, respectively; the square roots of AVE are highlighted in bold

(Source: Author)

4.3. Structural model assessment

The structural model was assessed using model fit, explanatory power, predictive relevance, path coefficients, multicollinearity, effect sizes, and mediation effects. As shown in Table 4, the SRMR value was 0.032, which is below the recommended threshold of 0.08, indicating acceptable model fit. The model explained 26.2% of the variance in knowledge sharing (KS), 28.9% of the variance in work engagement (WE), and 46.3% of the variance in employee innovative behavior (EIB). In addition, the Q² values were 0.190 for KS, 0.235 for WE, and 0.364 for EIB, all greater than zero, confirming the predictive relevance of the model.

4.3.1. Hypothesis testing

The direct hypothesis testing results indicate that all proposed direct effects were statistically significant. Digital leadership had a positive effect on knowledge sharing ($\beta = 0.512$, $p < 0.001$, CI [0.440; 0.584]), supporting H1. This suggests that digital leadership encourages employees to exchange knowledge, share work-related information, and collaborate more effectively. Digital leadership also positively influenced work engagement ($\beta = 0.537$, $p < 0.001$, CI [0.466; 0.604]), supporting H2. This indicates that digitally oriented leaders can strengthen employees’ energy, dedication, and involvement in work. In addition, digital leadership had a positive direct effect on employee

innovative behavior ($\beta = 0.280, p < 0.001, CI [0.173; 0.383]$), supporting H3. This finding shows that digital leadership directly encourages employees to generate, promote, and implement new ideas. Knowledge sharing also positively affected employee innovative behavior ($\beta = 0.218, p < 0.001, CI [0.132; 0.309]$), supporting H4. Similarly, work engagement had a positive effect on employee innovative behavior ($\beta = 0.357, p < 0.001, CI [0.258; 0.450]$), supporting H5. Among the direct predictors of EIB, work engagement showed the strongest effect, followed by digital leadership and knowledge sharing. The VIF values ranged from 1.000 to 1.780, below the threshold of 3, indicating that multicollinearity was not a concern. Regarding effect sizes, digital leadership had a large effect on work engagement ($f^2 = 0.406$) and knowledge sharing ($f^2 = 0.354$). However, the direct effect of digital leadership on employee innovative behavior was small ($f^2 = 0.082$). Knowledge sharing also had a small effect on employee innovative behavior ($f^2 = 0.066$), whereas work engagement had a small-to-moderate effect ($f^2 = 0.169$).

4.3.2. Mediation analysis

The mediation results confirm that both knowledge sharing and work engagement significantly mediated the relationship between digital leadership and employee innovative behavior. The indirect effect through knowledge sharing was positive and significant ($\beta = 0.112, p < 0.001, CI [0.068; 0.163]$), supporting H6. The VAF value of 19.2% indicates partial mediation. In addition, the indirect effect through work engagement was also positive and significant ($\beta = 0.192, p < 0.001, CI [0.135; 0.250]$), supporting H7. The VAF value of 32.9% also indicates partial mediation. These results suggest that digital leadership enhances employee innovative behavior both directly and indirectly by promoting knowledge sharing and strengthening work engagement. Overall, all seven hypotheses were supported, confirming the proposed research model.

Table 4. Structural Model Assessment and Hypothesis Testing Result

Latent variables	R ²	Q ²						
EIB	0.463	0.364						
KS	0.262	0.190						
WE	0.289	0.235						
SRMR = 0.032								
Hypothesis	Path	β	Standard deviation	p-value	Confidence intervals	VIF	f^2	VAF (%)
H1: Yes	DL → KS	0.512	0.037	0.000	[0.440; 0.584]	1.00	0.354	-
H2: Yes	DL → WE	0.537	0.036	0.000	[0.466; 0.604]	1.000	0.406	-
H3: Yes	DL → EIB	0.280	0.053	0.000	[0.173; 0.383]	1.780	0.082	-
H4: Yes	KS → EIB	0.218	0.045	0.000	[0.132; 0.309]	1.355	0.066	-
H5: Yes	WE → EIB	0.357	0.049	0.000	[0.258; 0.450]	1.406	0.169	-
H6: Yes	DL → KS → EIB	0.112	0.025	0.000	[0.068; 0.163]	-	-	19.2
H7: Yes	DL → WE → EIB	0.192	0.029	0.000	[0.135; 0.250]	-	-	32.9

(Source: Author)

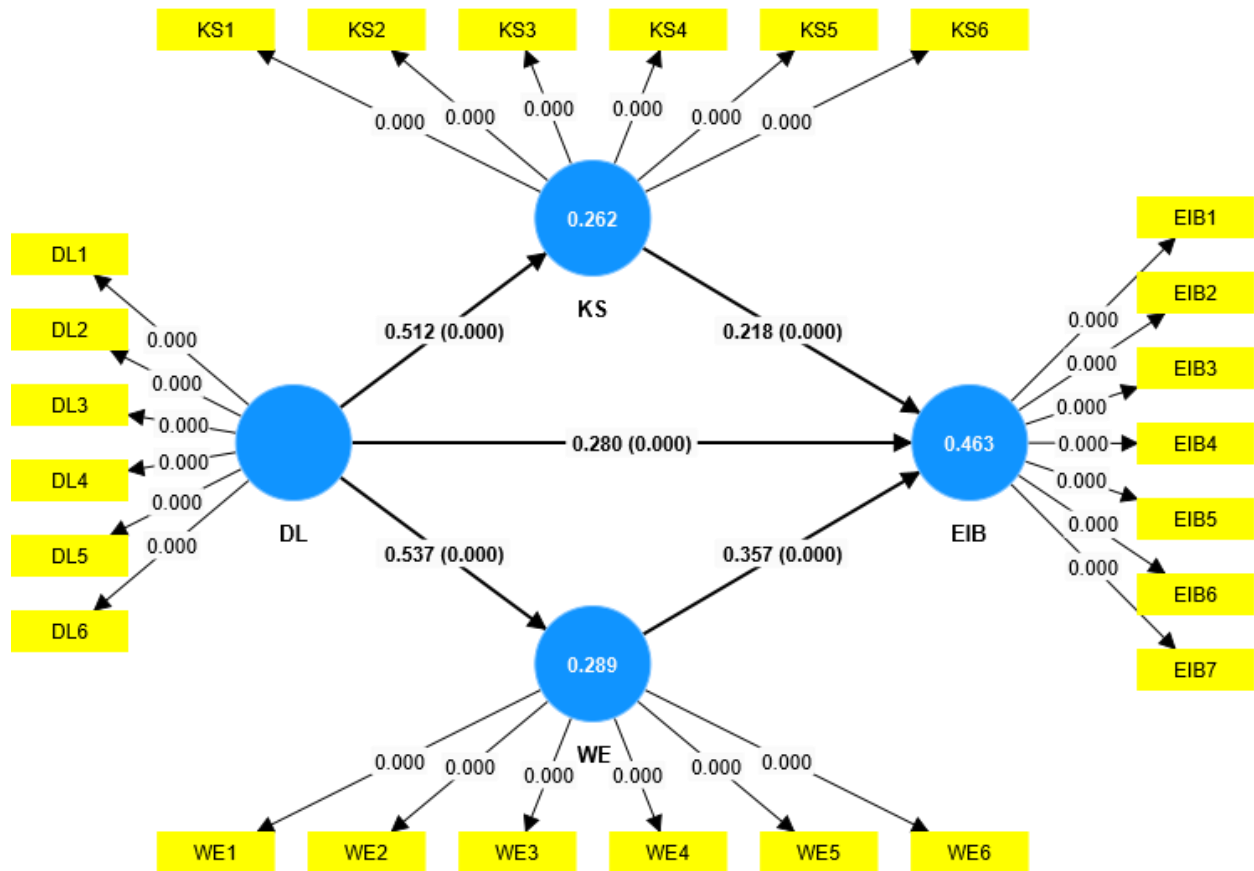


Figure 4. Final Structural Model after Bootstrapping

Note: Path coefficients (β) and explained variances (R^2) are based on SmartPLS 4 bootstrapping results. (Source: Author)

5. Discussion

This study examined how digital leadership influences employee innovative behavior in service firms through the mediating roles of knowledge sharing and work engagement. The empirical results support all seven hypotheses, confirming that digital leadership directly enhances employee innovative behavior and indirectly influences it through both knowledge-related and motivational mechanisms. Overall, the findings highlight that employee innovation in service firms is not driven by digital leadership alone, but also by the extent to which leaders stimulate knowledge exchange and strengthen employees' engagement at work.

First, the positive effect of digital leadership on knowledge sharing confirms that digitally oriented leaders can create conditions that encourage employees to exchange information, experiences, customer insights, and service improvement ideas. This finding is consistent with the Knowledge-Based View, which argues that knowledge becomes a strategic resource when it is shared and applied within the organization (Grant, 1996). It also supports prior studies showing that leadership, communication climate, and organizational support influence knowledge-sharing behavior (Bock et al., 2005; Van den Hooff & De Ridder, 2004; Wang & Noe, 2010). In the service context, this result is particularly meaningful because employees often rely on shared knowledge to solve customer problems, improve service processes, and respond quickly to digital service demands.

Second, digital leadership was found to positively influence work engagement. This result supports Job Demands-Resources Theory, which suggests that leadership support and work resources enhance employees' energy, dedication, and involvement (Bakker & Demerouti, 2007; Schaufeli et al., 2002). In technology-enabled workplaces, digital leaders help employees understand digital change, reduce uncertainty, and use digital tools more meaningfully. This finding is consistent with recent studies indicating that digital leadership can strengthen work

engagement and innovation-related outcomes (Karafakioğlu & Fındıklı, 2024; Wang et al., 2025). Therefore, digital leadership should be viewed not only as a technology-oriented leadership capability but also as an important motivational resource for employees.

Third, the results show that digital leadership has a significant direct effect on employee innovative behavior. This finding confirms that leaders who articulate a digital vision, support digital learning, encourage experimentation, and provide technological resources can motivate employees to generate, promote, and implement new ideas. The result aligns with Social Exchange Theory, which suggests that employees tend to reciprocate supportive leadership through constructive and extra-role behaviors (Blau, 1964). It is also consistent with recent empirical evidence showing that digital leadership fosters innovative work behavior through psychological empowerment, psychological ownership, and job crafting (Gao & Gao, 2024; Sebetci, 2025; Wang et al., 2025).

Fourth, both knowledge sharing and work engagement positively affect employee innovative behavior. Knowledge sharing enables employees to access diverse information and combine different insights into new service solutions, while work engagement provides the energy and persistence needed to transform ideas into practice. Notably, work engagement shows a stronger effect on employee innovative behavior than knowledge sharing, suggesting that motivation and involvement may be especially important for innovation in service firms. This finding is consistent with prior studies linking work engagement and knowledge sharing to innovative work behavior (Elamin et al., 2024; Sari et al., 2021).

Finally, the mediation results show that knowledge sharing and work engagement partially mediate the relationship between digital leadership and employee innovative behavior. The indirect effect through work engagement is stronger than that through knowledge sharing, indicating that digital leadership promotes innovation more powerfully when it enhances employees' psychological and motivational attachment to their work. Theoretically, this study contributes by integrating Social Exchange Theory, the Knowledge-Based View, and Job Demands–Resources Theory to explain how digital leadership translates into employee innovation. Practically, service firms should develop digital leaders who can simultaneously promote digital collaboration, knowledge sharing, employee engagement, and innovation-oriented work behavior.

6. Conclusion, Implications, Limitations and Future Research

6.1. Conclusion

This study examined the effect of digital leadership on employee innovative behavior in service firms, with knowledge sharing and work engagement as mediating mechanisms. The empirical results supported all proposed hypotheses. Digital leadership positively influenced knowledge sharing, work engagement, and employee innovative behavior. In addition, both knowledge sharing and work engagement positively affected employee innovative behavior. The mediation results further confirmed that knowledge sharing and work engagement partially mediated the relationship between digital leadership and employee innovative behavior. These findings indicate that digital leadership promotes employee innovation not only directly, but also indirectly by encouraging employees to exchange knowledge and become more engaged in their work. Overall, the study confirms that digital leadership is an important driver of innovation-oriented employee behavior in technology-enabled service contexts.

6.2. Theoretical implications

This study provides several theoretical contributions. First, it extends digital leadership literature by demonstrating that digital leadership is not only associated with digital transformation at the organizational level, but also plays an important role in shaping employee-level innovative behavior. Second, the study contributes to employee innovative behavior research by identifying two complementary mechanisms: knowledge sharing and work engagement. While knowledge sharing represents the social and knowledge-based pathway, work engagement represents the motivational pathway through which digital leadership enhances innovation. Third, the findings support the integration of Social Exchange Theory, the Knowledge-Based View, and Job Demands–Resources

Theory. From Social Exchange Theory, employees reciprocate supportive digital leadership through constructive and innovative behaviors. From the Knowledge-Based View, digital leadership creates conditions for knowledge exchange and application. From Job Demands–Resources Theory, digital leadership functions as a job resource that strengthens employees' energy, dedication, and involvement. Thus, the study offers a more comprehensive explanation of how digital leadership translates into employee innovative behavior.

6.3. Managerial implications

The findings offer important implications for managers in service firms. First, service firms should develop digital leadership capability among managers and supervisors. Leaders need to communicate a clear digital vision, support employees in using digital tools, encourage experimentation, and create openness toward digital change. Second, firms should build knowledge-sharing routines because knowledge sharing significantly enhances employee innovative behavior. Practical actions may include internal knowledge-sharing platforms, cross-functional meetings, service improvement forums, peer learning sessions, and digital communities of practice. Third, managers should pay attention to work engagement because it showed a stronger effect on employee innovative behavior than knowledge sharing. This implies that employees are more likely to innovate when they feel energetic, dedicated, and deeply involved in their work. Service firms should therefore create supportive work environments, provide autonomy, recognize innovative efforts, and reduce uncertainty during digital transformation. Finally, digital leadership should not be limited to technology adoption. Effective digital leaders should combine technology support with human-centered practices that promote collaboration, motivation, learning, and innovation.

6.4. Policy implications

For policymakers and business support agencies, the findings suggest that digital transformation programs for service firms should include leadership and workforce development components. Training programs should not focus only on digital tools, platforms, or infrastructure, but also on digital leadership, employee engagement, knowledge sharing, and innovation management. Industry associations, chambers of commerce, and professional training institutions can organize workshops to help service managers lead digital change, motivate employees, and build innovation-oriented workplace cultures. These initiatives may be especially useful for small and medium-sized service firms that lack formal digital transformation and human resource development systems.

6.5. Limitations

Despite its contributions, this study has several limitations. First, the cross-sectional design limits the ability to make strong causal claims. Future longitudinal studies could better explain how digital leadership, knowledge sharing, work engagement, and innovative behavior develop over time. Second, the study relied on self-reported survey data, which may create potential common method bias or subjective evaluation. Future research should combine employee surveys with supervisor ratings or objective innovation indicators. Third, the study focused on service firms, so the findings may not be fully generalizable to manufacturing or public sector organizations. Fourth, the model examined only two mediating mechanisms. Other mechanisms, such as psychological empowerment, job crafting, digital literacy, organizational agility, or innovation climate, may also explain the effect of digital leadership on innovative behavior.

6.6. Future research

Future studies should examine this model using longitudinal or multi-source data to strengthen causal inference and reduce common method bias. Comparative research across different service industries, firm sizes, and levels of digital transformation would also provide deeper insights into boundary conditions. Future studies may extend the model by adding other mediators, such as psychological empowerment, digital competence, job crafting, organizational learning, or innovation climate. In addition, moderating variables such as digital culture, technology readiness, perceived organizational support, environmental dynamism, or leadership style could be examined to clarify when digital leadership has stronger or weaker effects on employee innovative behavior.

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