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EFFECT OF DIGITAL LEADERSHIP AND EMPLOYEE EMPOWERMENT ON INNOVATIVE WORK BEHAVIOR THROUGH WORK ENGAGEMENT AMONG MSME EMPLOYEES IN PAMEKASAN

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Abstract

This study examines the effects of digital leadership and employee empowerment on innovative work behavior, with work engagement as a mediating variable, among micro, small, and medium enterprise (MSME) employees in Pamekasan. A quantitative explanatory design was used. Data were collected from 120 MSME employees selected through purposive sampling and analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4. The measurement model met the requirements for convergent validity, discriminant validity, and reliability. The structural model showed that digital leadership positively affected work engagement and innovative work behavior, while employee empowerment positively affected both outcomes. Work engagement also had a positive effect on innovative work behavior and mediated the effects of digital leadership and employee empowerment on innovative work behavior. The model explained 41.3% of the variance in work engagement and 60.6% of the variance in innovative work behavior. These findings emphasize that digital-oriented leadership, meaningful employee empowerment, and sustained work engagement operate as complementary mechanisms for strengthening employee innovation in MSMEs.

Keywords: *Digital leadership; Employee empowerment; Innovative work behavior; MSMEs; Work engagement*

1. INTRODUCTION

Digital transformation is reshaping how organizations coordinate work, make decisions, interact with markets, and develop human resources. For micro, small, and medium enterprises (MSMEs), the technological challenge is not limited to adopting social media, marketplaces, digital payments, or operational applications. It also concerns whether leaders can translate technological change into clear direction and whether employees have sufficient information, competence, discretion, and psychological involvement to respond productively. This issue is particularly relevant to innovative work behavior (IWB), which refers to employee actions that move from opportunity exploration and idea generation to idea championing and implementation (De Jong & Den Hartog, 2010). Because MSMEs

usually operate with relatively lean structures, employee-generated improvements can directly affect service, production, and day-to-day problem solving.

Pamekasan Regency provides an important empirical setting for this issue. Administrative data reported in the thesis show that the number of MSMEs increased from 9,441 units in 2019 to 33,550 units in 2023, while the proportion receiving formal development assistance fell to 1.20% in 2023 (Dinas Koperasi dan Usaha Mikro Kabupaten Pamekasan, 2024). This rapid expansion, combined with limited development coverage, increases the importance of internal organizational capabilities. Local research has also shown that digitalization can be relevant to MSME competitiveness, although its effects may vary by business context (Zainurrafiqi & Gazali, 2023; Nirmalasari et al., 2025). Accordingly, understanding employee-level mechanisms is necessary because digital tools alone do not automatically produce innovative behavior.

Digital leadership captures the ability of leaders to understand digital change, use technology appropriately, formulate a digital direction, and support employees during transformation. Zeike et al. (2019) conceptualize digital leadership through the attitudes, competencies, and behaviors required in digital work environments and through a vision for digital transformation and the capability to implement digital strategies. Empirical evidence has increasingly connected digital leadership with employee engagement and constructive behavior. Li et al. (2024) found a positive relationship between middle managers' digital leadership and work engagement, while Yang et al. (2024) showed that digital leadership can influence employee voice through empowerment and work engagement. Studies also link digital leadership to IWB directly or through employee-related mechanisms (Satrianto et al., 2026; Siregar et al., 2026; Zia et al., 2024).

Employee empowerment is another organizational mechanism that may stimulate innovation. It concerns the provision of information about organizational goals and performance, performance-related recognition, access to job-relevant knowledge and skills, and authority to change work processes (Fernandez & Moldogaziev, 2011). Empowerment can increase employees' capacity and discretion to act, but prior studies suggest that its consequences depend on how the empowerment practice is experienced. Fernandez and Moldogaziev (2013) found that empowerment can encourage innovative behavior, while Nuwagaba et al. (2025) identified both encouraging and discouraging pathways. Other evidence connects empowerment with work engagement and employee performance (Al-Dmour et al., 2019; Nawaz et al., 2024; Gurcuoglu et al., 2024). These findings indicate that empowerment is not merely the delegation of tasks; it is a bundle of resources that can shape how employees invest themselves in their work.

Work engagement is defined as a positive, fulfilling work-related state characterized by vigor, dedication, and absorption (Schaufeli et al., 2006). Engaged employees devote energy and attention to their roles and are more likely to persist in demanding tasks. Previous research has linked work engagement to innovative behavior across different settings.

Positive relationships have been reported in tourism higher education, high-technology manufacturing, ICT work, mobile telecommunications, hospitality, and sustainability-oriented organizational contexts (Said & Kamel, 2023; Bai et al., 2022; Gemeda & Lee, 2020; Bannay et al., 2020; Suprapto et al., 2024; Ergun et al., 2025). However, mediation results are not always uniform across models; for example, Vu et al. (2025) found that work engagement did not mediate one transformational leadership-IWB relationship while psychological empowerment did. This variation reinforces the need to test the role of work engagement in specific organizational contexts rather than assuming identical mechanisms across sectors.

The theoretical logic of the present study is grounded in Social Exchange Theory (SET). Blau (1964) explains social relationships as exchanges in which beneficial treatment can generate reciprocal responses, while Cropanzano and Mitchell (2005) show how this logic operates in organizational relationships. In the present model, digital leadership and employee empowerment represent resources and positive treatment received from leaders or the organization. Employees can reciprocate by investing greater energy and dedication in their work and by contributing ideas and improvements. Work engagement is therefore positioned as an attitudinal-behavioral bridge linking leadership and empowerment resources with IWB.

The research gap lies in the integration of these four constructs within the MSME employee context in Pamekasan. Existing studies have largely examined public organizations, large companies, hospitality, education, ICT, manufacturing, or other national settings, and many test only parts of the proposed relationships. The present study therefore analyzes: (1) the effects of digital leadership and employee empowerment on work engagement; (2) the effects of digital leadership, employee empowerment, and work engagement on IWB; and (3) the mediating role of work engagement in the effects of digital leadership and employee empowerment on IWB. Seven hypotheses are tested in one integrated PLS-SEM model. Recent Indonesian human resource research also demonstrates the importance of testing intervening mechanisms rather than assuming that employee resources automatically translate into behavioral outcomes. Haeruddin et al. (2026), using PLS-SEM on 149 hotel employees in Makassar, found that employee competence positively influenced job motivation and employee performance, although job motivation did not significantly mediate the competence-performance relationship. This contextual evidence reinforces the need to empirically test the mediating role of work engagement in the present MSME setting.

2. RESEARCH METHOD

This study used a quantitative explanatory research design to test direct and indirect relationships among digital leadership, employee empowerment, work engagement, and innovative work behavior. The unit of analysis was the individual employee working in an

MSME in Pamekasan Regency, East Java. Respondents were selected using purposive sampling. The inclusion criteria required respondents to be MSME employees in Pamekasan, work in an MSME that used at least one form of digital technology, have a leader or supervisor whom they could evaluate, possess sufficient work experience to assess the conditions of their workplace, and complete the questionnaire voluntarily.

The minimum sample size was estimated with G*Power 3.1.9.7 using an F-test for linear multiple regression, fixed model, R-squared deviation from zero. The analysis specified a medium effect size (f-squared = 0.15), alpha = 0.05, power = 0.80, and three predictors, resulting in a minimum requirement of 77 respondents (Faul et al., 2009). The study collected usable responses from 120 employees, exceeding the minimum requirement.

Data were obtained through a five-point Likert questionnaire ranging from 1 (strongly disagree) to 5 (strongly agree). Digital leadership was measured with four adapted items based on Zeike et al. (2019). Employee empowerment was measured with eight adapted items representing information, performance-based recognition, knowledge and skills, and authority to change work processes (Fernandez & Moldogaziev, 2011). Work engagement was measured with six adapted items representing vigor, dedication, and absorption (Schaufeli et al., 2006). Innovative work behavior was measured with eight adapted items covering opportunity exploration, idea generation, idea championing, and idea implementation (De Jong & Den Hartog, 2010).

The data were analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4. The reflective measurement model was evaluated using indicator loadings, average variance extracted (AVE), internal consistency reliability, and the heterotrait-monotrait ratio (HTMT). Loadings of approximately 0.708 or higher, AVE values of at least 0.50, and reliability coefficients of at least 0.70 were used as the principal criteria. Discriminant validity was assessed with HTMT below 0.85 (Henseler et al., 2015). The structural model assessment covered collinearity (VIF), R-squared, effect size, and path coefficients, following PLS-SEM guidance (Hair et al., 2021). Hypotheses were tested by bootstrapping using two-tailed tests at the 5% significance level.

3. RESULTS AND DISCUSSION

Respondent Profile and Descriptive Results

The final sample consisted of 120 MSME employees. Women represented 69.17% of respondents and men 30.83%. The largest age group was 20-30 years (53.33%), followed by employees under 20 years (24.17%). Most respondents had completed senior high school (55.83%), while 34.17% held a diploma or bachelor's degree. The most common tenure was 1-3 years (36.67%), and culinary MSMEs formed the largest business group (51.67%), followed by trade (30.83%). The mean scores of the four constructs were relatively close: digital leadership 3.352, employee empowerment 3.340, work engagement 3.326, and innovative work behavior 3.325 on the five-point scale. These values indicate that

respondents, on average, perceived the investigated practices and behaviors at a moderate-to-positive level rather than at an extreme level.

Table 1. Respondent characteristics

Characteristic	Dominant category	Percentage
Gender	Female	69.17%
Age	20-30 years	53.33%
Education	Senior high school	55.83%
Tenure	1-3 years	36.67%
Business field	Culinary	51.67%

Source: *Proceed Data, 2026*

Measurement Model

All indicators met the loading criterion, with standardized loadings ranging from 0.766 to 0.908. Digital leadership had an AVE of 0.791, employee empowerment 0.667, innovative work behavior 0.692, and work engagement 0.738; thus, each construct explained more than half of the variance in its indicators. Internal consistency was also satisfactory. Cronbach's alpha values ranged from 0.912 to 0.936 and composite reliability values ranged from 0.938 to 0.947. The highest HTMT value was 0.784, below the 0.85 threshold, supporting discriminant validity (Henseler et al., 2015). These results indicate that the indicators were adequate for evaluating the structural relationships (Hair et al., 2021).

Table 2. Measurement model assessment

Construct	Loading range	Cronbach alpha	Composite reliability	AVE
Digital leadership	0.870-0.899	0.912	0.938	0.791
Employee empowerment	0.766-0.842	0.929	0.941	0.667
Innovative work behavior	0.767-0.879	0.936	0.947	0.692
Work engagement	0.796-0.908	0.929	0.944	0.738

Source: *Proceed Data, 2026*

Structural Model and Hypothesis Testing

Collinearity was not problematic: all structural VIF values were below 3, ranging from 1.148 to 1.704. The model explained 41.3% of the variance in work engagement (R-squared = 0.413; adjusted R-squared = 0.403) and 60.6% of the variance in innovative work behavior (R-squared = 0.606; adjusted R-squared = 0.596). Effect-size results showed small effects of digital leadership (f-squared = 0.047) and employee empowerment (f-squared = 0.101) on IWB, medium effects of digital leadership (f-squared = 0.233) and employee

empowerment (f-squared = 0.218) on work engagement, and a large effect of work engagement on IWB (f-squared = 0.411).

All five direct hypotheses were supported. Digital leadership positively affected work engagement (beta = 0.396, t = 5.946, p < 0.001) and IWB (beta = 0.161, t = 2.376, p = 0.018). Employee empowerment positively affected work engagement (beta = 0.383, t = 5.884, p < 0.001) and IWB (beta = 0.236, t = 3.084, p = 0.002). Work engagement had the strongest direct coefficient on IWB (beta = 0.525, t = 6.817, p < 0.001).

Table 3. Direct effects and effect sizes

Path	Beta	t-statistic	p-value	f-squared	Decision
DL -> WE	0.396	5.946	<0.001	0.233	Supported
EE -> WE	0.383	5.884	<0.001	0.218	Supported
WE -> IWB	0.525	6.817	<0.001	0.411	Supported
DL -> IWB	0.161	2.376	0.018	0.047	Supported
EE -> IWB	0.236	3.084	0.002	0.101	Supported

Source: *Proceed Data, 2026*

The two indirect effects were also significant. Digital leadership affected IWB through work engagement (beta = 0.208, t = 4.173, p < 0.001), and employee empowerment affected IWB through work engagement (beta = 0.201, t = 4.716, p < 0.001). Because the corresponding direct effects remained positive and significant, the results indicate that work engagement operates as an important complementary pathway rather than replacing the direct relationships.

Table 4. Indirect effects through work engagement

Indirect path	Beta	t-statistic	p-value	Decision
DL -> WE -> IWB	0.208	4.173	<0.001	Supported
EE -> WE -> IWB	0.201	4.716	<0.001	Supported

Source: *Proceed Data, 2026*

Discussion

The positive effect of digital leadership on work engagement supports the argument that leadership during technological change is not only a technical capability but also a relational resource. Employees who receive direction and support in using digital technology may experience greater clarity and confidence in performing their work. This result is consistent with Li et al. (2024), who reported a positive relationship between digital leadership and work engagement, and is compatible with Yang et al. (2024), who positioned work engagement as one of the mechanisms through which digital leadership shapes employee voice. From an SET perspective, guidance and support from leaders represent favorable treatment that employees can reciprocate through greater energy, dedication, and involvement (Blau, 1964; Cropanzano & Mitchell, 2005).

Employee empowerment also positively affected work engagement. Providing information, recognition, job-relevant knowledge and skills, and authority to modify work processes gives employees both resources and discretion. This finding aligns with evidence that empowerment strengthens work engagement and performance-related outcomes (Al-Dmour et al., 2019; Nawaz et al., 2024; Gurcuoglu et al., 2024). It also reinforces Fernandez and Moldogaziev's (2011) view that empowerment works through multiple practices rather than through authority alone. In small firms, where roles are often flexible and coordination is informal, access to information and the ability to make work-related adjustments can be particularly important for sustaining involvement.

Work engagement showed the largest direct relationship with IWB and the largest effect size in the structural model. This indicates that innovative behavior is closely associated with employees' willingness to invest energy, attention, and persistence in their work. The finding is consistent with studies reporting positive links between engagement and IWB in different organizational settings (Said & Kamel, 2023; Bai et al., 2022; Gemeda & Lee, 2020; Bannay et al., 2020; Ergun et al., 2025; Suprapto et al., 2024). The result is also theoretically plausible because opportunity exploration, idea generation, championing, and implementation demand sustained cognitive and behavioral effort. At the same time, the contrasting mediation evidence reported by Vu et al. (2025) suggests that the role of engagement is context-dependent and should be interpreted within the specific resources and work arrangements of MSMEs.

Digital leadership had a positive direct effect on IWB, although its direct effect size was smaller than its effect on work engagement. This pattern is consistent with recent studies showing that digital leadership can contribute to innovative behavior in manufacturing and educational settings (Satrianto et al., 2026; Siregar et al., 2026) and with research linking digital leadership and digital resources to IWB (Zia et al., 2024). For Pamekasan MSMEs, the implication is that leaders may stimulate innovation both by directly encouraging experimentation and by creating conditions that make employees more engaged with their work.

Employee empowerment likewise had a positive direct effect on IWB. The result supports prior evidence that empowerment can encourage employees to seek and implement improvements (Fernandez & Moldogaziev, 2013) and is consistent with Nuwagaba et al. (2025), who found that access to information and knowledge can activate encouraging pathways toward innovative behavior. The positive result should nevertheless be read together with evidence that empowerment practices can also have mixed consequences when they create pressure or are implemented inconsistently. In the present sample, the overall pattern indicates that information, competence development, recognition, and discretion functioned as productive resources rather than constraints.

Finally, work engagement significantly mediated both the digital leadership-IWB and employee empowerment-IWB relationships. These results integrate previously fragmented evidence. Digital leadership has been associated with engagement (Li et al., 2024), empowerment has been associated with engagement (Gurcuoglu et al., 2024), and engagement has been linked to innovative behavior (Said & Kamel, 2023; Gemeda & Lee, 2020). The mediation findings show that these relationships can operate together within one MSME model. Managerially, the results imply that simply introducing digital tools or delegating authority is unlikely to be sufficient; leadership and empowerment practices need to be translated into a work environment in which employees are energetic, dedicated, and absorbed enough to convert resources into innovative action. The context-sensitive nature of mediation is also evident in Haeruddin et al. (2026): their Indonesian employee study found significant direct effects of competence on motivation and performance, but a non-significant indirect effect through job motivation. In contrast, the present results show significant indirect effects through work engagement, indicating that the effectiveness of an intervening psychological mechanism depends on the constructs and organizational context being examined.

4. CONCLUSION

This study highlights the importance of combining digital leadership, employee empowerment, and work engagement to foster innovative work behavior among MSME employees in Pamekasan. The findings suggest that creating a supportive work environment, providing employees with greater autonomy, and encouraging active engagement can help MSMEs strengthen their capacity for innovation.

Practically, MSME owners and managers should focus on developing digital leadership skills, empowering employees to contribute ideas and make decisions, and fostering a workplace that encourages creativity and continuous improvement. These efforts can support employee innovation and enhance organizational adaptability.

This study is limited by its cross-sectional design, purposive sampling, and geographical scope. Future research should examine these relationships across different regions and business sectors using longitudinal or mixed-method approaches to provide a broader understanding of innovative work behavior in MSMEs.

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