



**THE INFLUENCE OF KNOWLEDGE WORKERS PRODUCTIVITY
AND DIGITAL INNOVATION ON THE SUSTAINABILITY
PERFORMANCE OF MICRO, SMALL, AND MEDIUM
ENTERPRISES**
(A Case Study of Micro, Small, and Medium Enterprises in the Food and Beverage
Sector, Tarakan City)

Mulyani¹, Nurul Hidayat²

^{1,2} Management Study Program, Fakultas Ekonomi Universitas Borneo Tarakan, Tarakan
*email: mulyadi1220@gmail.com

ARTICLE INFORMATION

Article History:

Received 03 Februari, 2026

Revised 8 Maret, 2026

Published 25 April, 2026

Keyword:

*sustainability reporting,
financial performance,
corporate governance,
firm size,
PLS-SEM*

ABSTRACT (Italic, 10pt, Times New Roman, Bahasa Inggris)

Abstract: This study is motivated by the persistently low sustainability performance of micro, small, and medium enterprises (MSMEs) in Tarakan City, despite a significant increase in the number of registered business units. The primary challenge resides in the limited productivity of knowledge-based workers and the uneven adoption of digital innovation across the sector. This study aims to examine the influence of Knowledge Workers Productivity (KWP) and Digital Innovation (DI) on Sustainability Performance (SP) among MSMEs operating in the Food and Beverage (F&B) sector in Tarakan City. The theoretical foundations underpinning this study encompass the Resource-Based View (RBV), Knowledge-Based View (KBV), and Dynamic Capability Theory. A quantitative research method with an explanatory design was employed. Primary data were collected through a questionnaire survey involving 190 employees of F&B MSMEs, selected by means of purposive sampling. Data analysis was conducted using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) approach with SmartPLS software. The findings reveal that KWP exerts a positive and significant effect on SP, both directly and through the mediating role of DI. Notably, DI emerged as the most dominant predictor in enhancing SP and effectively mediates the relationship between KWP and SP. It is concluded that the sustainability impact of knowledge workers' productivity is optimized when channeled through concrete digital innovation initiatives. Investment in human resource capacity and the acceleration of digital transformation are identified as the principal determinants for MSMEs in sustaining long-term competitive advantage.

Corresponding Author:

Mulyani

Management Study Program,

Universitas Borneo Tarakan,

No.1, Jl. Amal Lama No.Kel, Pantai Amal, Kec. Tarakan Tim., Kota Tarakan, Kalimantan Utara

Email : mulyadi1220@gmail.com

Introduction

Micro, Small, and Medium Enterprises (MSMEs) constitute one of the main pillars of the national economy. According to the Coordinating Ministry for Economic Affairs of the Republic of Indonesia (2025), the number of MSME units in Indonesia has reached 66 million, contributing 61% of national Gross Domestic Product (GDP), equivalent to approximately IDR 9,500 trillion, and absorbing 97% of the workforce, or around 119 million people. Nevertheless, this substantial contribution does not automatically guarantee business sustainability. A report from the Central Statistics Agency (BPS, 2023) recorded that around 30% of MSMEs in Indonesia experienced a revenue decline of more than 50% during the pandemic, and some have not yet fully recovered. This condition confirms that MSME sustainability is not determined merely by the number of business units, but rather by the quality of human resources and the capacity to adapt and innovate (Carrasco-Carvajal et al., 2023).

A similar phenomenon is evident among MSMEs in Tarakan City. Data from the Tarakan City Office of Cooperatives, MSMEs, and Trade (DKUKMP, 2025) show that the number of MSMEs grew from 13,449 units in 2020 to 31,451 units in 2024. However, the number of MSME operators still recorded as actively operating ranges only between 6,000 and 8,000 units (Radar Tarakan, 2025). This gap between the growth in the number of business units and the number of businesses able to survive indicates that sustainability is a real issue, particularly in the Food and Beverage (F&B) culinary sector, which is regarded as the most competitive sector in Tarakan City (DKUKMP Tarakan City, 2025).

Conceptually, sustainability performance describes a business's ability to survive and grow economically, socially, and environmentally over the long term (Fandeli et al., 2025). Achieving this requires human resources as a foundational factor. One relevant strategy is Knowledge Workers Productivity, namely the ability of workers to utilize their knowledge to manage work independently, make effective decisions, and generate innovation on an ongoing basis (Wardhani et al., 2022). In Tarakan City, many MSME operators still face limitations in human resource management, training, and market-analysis capability, so that the productivity of their human resources has not been optimal (Arifin & Ardiansyah, 2025).

The second factor is Digital Innovation, which encompasses the use of information technology, social media, e-commerce, and other digital systems in managing business operations (Nambisan et al., 2017). Through digital innovation, MSMEs can expand their market reach, improve distribution efficiency, and reduce operational costs. However, a survey by DKUKMP Tarakan City (2024) shows that only around 38% of MSMEs in Tarakan actively use digital platforms in their marketing activities, indicating that digital transformation remains uneven among micro and small business operators.

Prior studies have generally examined these two variables separately and were largely conducted in major cities. Kaltum et al. (2025) showed that digitalization and employee engagement can drive productivity and sustainability, but did not explicitly test the mediating role of digital innovation. Tariq et al. (2024) found that knowledge worker productivity is linked to sustainable performance through networking and innovation, but in a context other than mid-sized city MSMEs facing digital infrastructure and human-resource limitations. Bahtiar et al. (2025) emphasized that the main challenge of MSME digital transformation in Indonesia lies in converting knowledge into digital innovation, rather than in awareness itself. There is therefore a conceptual gap—Knowledge Workers Productivity has not been consistently tested as a predictor of sustainability with Digital Innovation as a mediator—as well as a contextual gap, namely the scarcity of empirical evidence from border-region MSMEs such as those in Tarakan City.

Based on the foregoing, this study aims to: (1) examine the effect of Knowledge Workers Productivity on the sustainability performance of MSMEs in Tarakan City; (2) examine the effect of Digital Innovation on MSME sustainability performance; and (3) examine the role of Digital



Innovation in mediating the relationship between Knowledge Workers Productivity and MSME sustainability performance

Literature Review and Hypothesis Development

Resource-Based View (RBV) and Knowledge-Based View (KBV)

The Resource-Based View (RBV), introduced by Wernerfelt (1984) and refined by Barney (1991), regards a firm's resources and capabilities as the core of its business, whereby the greater the capabilities and competencies a business possesses, the longer it is able to survive in the market. In the context of MSMEs, intangible resources such as human resource quality, knowledge, and innovation capability are key factors in creating sustainable competitive advantage (Ozdemir et al., 2023). The Knowledge-Based View (KBV) builds on the basic assumptions of RBV by positioning knowledge as the organization's most strategic resource (Grant, 1996). Drawing on both perspectives, Knowledge Workers Productivity is regarded as a valuable intangible resource, while Digital Innovation is an organizational capability that enables MSMEs to configure that resource optimally, which ultimately manifests in business sustainability performance.

Knowledge Workers Productivity

The term knowledge workers was introduced by Drucker (1959), who emphasized that this type of worker does not merely perform routine tasks but actively creates and utilizes knowledge in their work. The productivity of knowledge-based workers is distinguished from that of manual workers through two main dimensions: efficiency (quantity and speed of output) and effectiveness (quality of output). Ramírez & Nembhard (2004) classify these aspects into task-completion timeliness, work-process efficiency, and work autonomy. Kianto et al. (2019) add to this by highlighting knowledge management as a driving factor in improving the productivity of knowledge-based workers.

Digital Innovation

Digital innovation is defined as the application of new digital technologies to create new and value-adding products, services, processes, or business models (Martini et al., 2023; Ramdani et al., 2021). In the MSME context, digital innovation appears in the form of digital marketing and e-commerce to expand markets, digital payments that improve financial inclusion, the use of cloud-based inventory management systems, and the utilization of data for decision-making (Banjarnahor, 2021; Martini et al., 2023). A concrete example of its implementation is a culinary MSME that uses digital applications to expand the distribution of its products (Alfarizi et al., 2024).

Sustainability Performance

Sustainability performance refers to a business approach that pursues not only economic profit but also balances social and environmental aspects. This concept integrates three main dimensions—economic, social, and environmental—into overall business operations. The economic dimension emphasizes practices that sustain long-term growth; the social dimension covers responsibility toward employees, customers, suppliers, and the community; while the environmental dimension measures the extent to which business activities affect the environment while also encouraging environmentally friendly practices (Nogueira et al., 2023).

Research Hypotheses

The Effect of Knowledge Workers Productivity on MSME Sustainability Performance

From the Knowledge-Based View perspective, knowledge is the primary strategic resource that determines an organization's ability to create value and adapt to environmental change. Fernanda & Larassaty (2024), Ridho et al. (2025), and Tariq et al. (2024) state that Knowledge Workers Productivity plays a strategic role in designing and implementing innovation to create MSME

sustainability performance value. Where the productivity of knowledge-based workers is low, the long-term success of MSMEs may be impeded.

H1: Knowledge Workers Productivity has a positive effect on MSME sustainability performance.

The Effect of Digital Innovation on MSME Sustainability Performance

From the Resource-Based View perspective, innovation is regarded as an organizational capability that enables firms to make optimal use of resources in facing a dynamic business environment. Dabić et al. (2023), Istamarina et al. (2025), and Tariq et al. (2024) find that MSME sustainability is highly dependent on the ability to innovate digitally, particularly in generating new products and implementing innovations that support business welfare. Through the use of information technology, MSMEs can observe market dynamics, identify competitors' advantages, and create new value for their business.

H2: Digital Innovation has a positive effect on MSME sustainability performance.

The Mediating Effect of Digital Innovation between Knowledge Workers Productivity and MSME Sustainability Performance

The Knowledge-Based View emphasizes that new knowledge only creates value when it can be converted into real actions, innovation, and business practices. The productivity of knowledge-based workers enhances an organization's ability to recognize opportunities and implement technology, but its impact only transforms into sustainability performance once that knowledge is embodied in concrete digital innovation, such as process automation, digital marketing, or customer-data integration. This pattern is consistent with the findings of Kaltum et al. (2025), Tariq et al. (2024), Bahtiar et al. (2025), Lukita et al. (2025), and Astuty et al. (2024).

H3: Digital Innovation mediates the relationship between Knowledge Workers Productivity and MSME sustainability performance.

Figure 1 (Research Framework): Knowledge Workers Productivity influences Sustainability Performance directly (H1) and indirectly through Digital Innovation (H3); Digital Innovation influences Sustainability Performance directly (H2).

Research methods

This study uses a quantitative approach aimed at testing theory and the relationships among variables. Knowledge Workers Productivity (X1) and Digital Innovation (X2) serve as independent variables, while MSME sustainability performance (Y) serves as the dependent variable. Digital Innovation is simultaneously positioned as a mediating variable in the relationship between Knowledge Workers Productivity and sustainability performance. The study was conducted from November 2025 to January 2026 in Tarakan City, focusing on Food and Beverage MSMEs.

The study population comprises all workers at Food and Beverage MSMEs in Tarakan City. Sampling was carried out using a non-probability sampling technique through purposive sampling, with the following criteria: (1) employees working at Food and Beverage MSMEs; (2) MSMEs that have undertaken at least minimal digitalization, such as the use of social media or e-commerce; (3) employees who have worked for at least one year and are thus considered to understand the systems used; and (4) employees who possess a basic understanding of, or have been exposed to, the technology implemented at their place of work. The sample size follows the recommendation of Hair et al. (2022), namely five to ten times the number of indicators. This study uses 19 indicators, so the minimum recommended sample size is 190 respondents. The number of respondents successfully collected in this study was 190.

Primary data were collected through a questionnaire using a 1–5 Likert scale, where a score of 1 indicates strongly disagree and a score of 5 indicates strongly agree. Knowledge Workers Productivity was measured with five indicators (KWP1–KWP5), Digital Innovation with five indicators (DI1–DI5), and sustainability performance with nine indicators (KK1–KK9) representing

the economic, environmental, and social dimensions (Tariq et al., 2024).

Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS software. The PLS approach was chosen because it does not require multivariate normally distributed data and is able to both confirm theory and explain relationships among latent variables (Hair et al., 2022). Testing was carried out in two stages. First, measurement model (outer model) testing, comprising a discriminant validity test using the Heterotrait-Monotrait Ratio (HTMT) with a threshold below 0.85, and a reliability test using Cronbach's Alpha and Composite Reliability with a threshold above 0.60. Second, structural model (inner model) testing, comprising a collinearity test using the Variance Inflation Factor (VIF) with a criterion of VIF below 5, and a path coefficient test via the bootstrapping procedure. A hypothesis is accepted if the T-statistic exceeds 1.96 and the P-value is below 0.05.

Results and Discussion

Measurement Model (Outer Model) Testing

Measurement model testing was conducted through validity and reliability tests to ensure that the research indicators genuinely represent their latent constructs.

a. Discriminant Validity Test (Heterotrait-Monotrait Ratio)

Discriminant validity was tested using the Heterotrait-Monotrait Ratio (HTMT) criterion, which is considered more sensitive in detecting overlap between constructs in an SEM-PLS model. The test results are presented in Table 1.

Table 1. Discriminant Validity Test Results (HTMT)

Construct	DI	KWP	SP
DI (Digital Innovation)	-		
KWP (Knowledge Workers Productivity)	0.433	-	
SP (Sustainability Performance)	0.632	0.578	-

Source: Primary data processed with SmartPLS (2026)

Based on Table 1, all HTMT values between constructs are below the threshold of 0.85. The highest value is found in the relationship between Sustainability Performance (SP) and Digital Innovation (DI) at 0.632, followed by the relationship between Sustainability Performance (SP) and Knowledge Workers Productivity (KWP) at 0.578, and Knowledge Workers Productivity (KWP) and Digital Innovation (DI) at 0.433. Because all HTMT values are below 0.85, it can be concluded that every construct in this study has good discriminant validity and genuinely represents a distinct concept from the others.

b. Reliability Test

Reliability testing was carried out using Cronbach's Alpha and Composite Reliability values, which must exceed 0.60 for a construct to be declared reliable (Hair et al., 2022). The test results are presented in Table 2.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha	Composite Reliability (rho a)	Composite Reliability (rho c)	Remarks
KWP	0.868	0.874	0.905	Reliable
DI	0.844	0.850	0.889	Reliable
SP	0.910	0.912	0.926	Reliable

Source: Primary data processed with SmartPLS (2026)

Table 2 shows that all variables have Cronbach's Alpha and Composite Reliability values above 0.60.

Knowledge Workers Productivity obtained a Cronbach's Alpha of 0.868 with a Composite Reliability (rho_c) of 0.905; Digital Innovation obtained 0.844 with a Composite Reliability (rho_c) of 0.889; and Sustainability Performance obtained 0.910 with a Composite Reliability (rho_c) of 0.926. Thus, all indicators used are consistent and reliable in measuring their intended constructs.

Structural Model (Inner Model) Testing

a. Collinearity Test

The collinearity test was conducted to determine whether redundancy exists among the predictor variables in the structural model, based on the Variance Inflation Factor (VIF). Following Hair et al. (2022), the VIF value must be below 5. The test results are presented in Table 3.

Table 3. Collinearity Test Results (VIF)

Path	VIF value	Criterion	Remarks
KWP → DI	1.000	< 5	No collinearity
KWP → SP	1.165	< 5	No collinearity
DI → SP	1.165	< 5	No collinearity

Source: Primary data processed with SmartPLS (2026)

Based on Table 3, the VIF value for the relationship of Knowledge Workers Productivity to Digital Innovation is 1.000, while the VIF values for the effects of Digital Innovation and Knowledge Workers Productivity on Sustainability Performance are each 1.165. All values are well below the safe threshold of 5, even below 3, so there is no multicollinearity problem in the research model. The model is therefore deemed to meet the requirements and is eligible to proceed to path-coefficient testing.

b. Path Coefficient Test

The path coefficient test was conducted through a bootstrapping procedure to determine the direction, strength, and significance of the relationships among latent variables. A hypothesis is accepted if the T-statistic exceeds 1.96 and the P-value is below 0.05. The test results are presented in Table 4.

Table 4. Path Coefficient Test and Hypothesis Testing Results

Hypothesis / Path	Original Sample (β)	Sample Mean	Std. Deviation	T-statistic	P-value	Remarks
H1: KWP→SP	0.363	0.363	0.066	5.522	0.000	Accepted
H2: DI →SP	0.421	0.423	0.060	7.010	0.000	Accepted
H3: KWP → DI →SP	0.159	0.162	0.035	4.524	0.000	Accepted

Source: Primary data processed with SmartPLS (2026)

Based on Table 4, all proposed hypotheses in this study are accepted. The path from Knowledge Workers Productivity to Sustainability Performance (H1) obtained a coefficient of 0.363 with a T-statistic of 5.522 and a P-value of 0.000. The path from Digital Innovation to Sustainability Performance (H2) obtained a coefficient of 0.421 with a T-statistic of 7.010 and a P-value of 0.000, the largest coefficient among all paths in the model. The mediating path of Knowledge Workers Productivity through Digital Innovation to Sustainability Performance (H3) obtained an indirect-effect coefficient of 0.159 with a T-statistic of 4.524 and a P-value of 0.000. All paths are positive and significant at the 5% level.

DISCUSSION

The Effect of Knowledge Workers Productivity on Sustainability Performance

The first hypothesis states that Knowledge Workers Productivity has a positive effect on MSME sustainability performance. The test results show a path coefficient of 0.363 with a T-statistic of 5.522 (> 1.96) and a P-value of 0.000 (< 0.05), so the first hypothesis is accepted. This finding means that the higher the productivity of knowledge-based workers at Food and Beverage MSMEs in Tarakan City, the better their business sustainability performance.

This finding is reinforced by descriptive analysis, in which Knowledge Workers Productivity

obtained a mean value of 4.16, with the highest scores on the items concerning consistency of product/service quality (4.19) and the use of knowledge to drive innovation (4.18). Both aspects are directly related to sustainability performance: consistent quality sustains customer trust as part of the economic and social dimensions, while the use of knowledge for innovation forms the basis for long-term business sustainability. This finding is also relevant to conditions on the ground, given that only around 6,000 to 8,000 of the 31,451 MSME units in Tarakan City are recorded as still actively operating (Radar Tarakan, 2025), meaning workers' capacity to manage knowledge is an important factor for businesses to survive amid intense competition.

Theoretically, this result aligns with the Knowledge-Based View (Grant, 1996), which regards knowledge as a strategic resource that is difficult for competitors to imitate, and with the Resource-Based View (Barney, 1991), which affirms that superior human resources form the foundation of superior and sustainable organizational performance. This finding is consistent with Tariq et al. (2024), who found that knowledge worker productivity contributes to MSME sustainable performance, and with Kianto et al. (2019), who demonstrated the role of knowledge management in enhancing worker productivity.

Nevertheless, the dominance of respondents with senior/vocational high school education (54.74%) indicates a potential gap in digital literacy and managerial knowledge. If investment in human resource development stalls, the contribution of Knowledge Workers Productivity to sustainability performance may stagnate in the medium term.

The Effect of Digital Innovation on Sustainability Performance

The second hypothesis states that Digital Innovation has a positive effect on MSME sustainability performance. The test results show a path coefficient of 0.421 with a T-statistic of 7.010 (> 1.96) and a P-value of 0.000 (< 0.05), so the second hypothesis is accepted. This coefficient is the largest among all paths in the model, so Digital Innovation can be regarded as the most dominant predictor of sustainability performance among Food and Beverage MSMEs in Tarakan City.

Descriptive analysis shows that the Digital Innovation variable obtained a mean value of 4.14, with all items falling within a very narrow range, between 4.13 and 4.15. This closeness in values indicates that digital innovation has become an integrated part of respondents' business practices—ranging from the use of digital platforms, the application of digital transactions, to the use of applications for managing inventory and operations—rather than being applied to a single aspect alone.

This finding takes on its full meaning when linked to the state of digital adoption in Tarakan City, where only around 38% of MSMEs are recorded as actively using digital platforms in their marketing activities (DKUKMP Tarakan City, 2024). Amid such limited adoption, MSMEs that have implemented digital innovation gain a more advantageous position relative to their competitors, particularly in the Food and Beverage sector, which is among the most intensely competitive. This study provides empirical evidence that digital innovation is not merely a complement but a determining factor that deserves priority. This finding is consistent with Dabić et al. (2023) and Istamarina et al. (2025), who affirm the dependence of MSME sustainability on the ability to innovate digitally.

The Mediating Role of Digital Innovation in the Relationship between Knowledge Workers Productivity and Sustainability Performance

The third hypothesis states that Digital Innovation mediates the relationship between Knowledge Workers Productivity and MSME sustainability performance. The test results show an indirect-effect coefficient of 0.159 with a T-statistic of 4.524 (> 1.96) and a P-value of 0.000 (< 0.05), so the third hypothesis is accepted.

Because the direct effect of Knowledge Workers Productivity on sustainability performance remains significant ($\beta = 0.363$) alongside its also-significant indirect effect ($\beta = 0.159$), the resulting

mediation pattern is a complementary partial mediation, in which both paths run in the same direction and reinforce one another. The total effect of Knowledge Workers Productivity on sustainability performance is 0.522, with the direct path contributing about 69.5% and the indirect path via Digital Innovation contributing about 30.5%. This means that the productivity of knowledge-based workers remains the primary driver of sustainability performance, while digital innovation functions as an additional transmission mechanism that strengthens that impact.

Conceptually, this pattern shows that workers' knowledge does not stop at improving the quality of work, but is partly converted into digital innovation that then drives operational efficiency, market expansion, and stronger relationships with stakeholders. This sequence is consistent with the Knowledge-Based View (Grant, 1996), which regards knowledge as the primary input for innovation, and with Dynamic Capability Theory (Teece et al., 1997), which explains how organizations transform internal knowledge into innovative capabilities that can be leveraged in the market. This finding supports Tariq et al. (2024), who found that knowledge worker productivity and digital innovation, both individually and sequentially, mediate the pathway toward sustainable performance in MSMEs.

The practical implication is clear: MSMEs are not faced with a choice between developing human resources or adopting digital technology. Both must be pursued simultaneously and sequentially, since investment in knowledge workers is an investment in the foundation, while investment in digital innovation is an investment in the driving mechanism.

does not act as a moderating variable in this relationship.

Conclusion

Based on the analysis and discussion above, the following conclusions can be drawn:

1. Knowledge Workers Productivity has a positive and significant effect on the sustainability performance of Food and Beverage MSMEs in Tarakan City ($\beta = 0.363$; $t = 5.522$; $p = 0.000$). The higher the productivity of knowledge-based workers, the better the sustainability performance achieved.
2. Digital Innovation has a positive and significant effect on MSME sustainability performance ($\beta = 0.421$; $t = 7.010$; $p = 0.000$). This is the largest coefficient in the model, making digital innovation the most dominant driving factor in ensuring MSMEs remain competitive and sustainable.
3. Digital Innovation is shown to partially mediate the relationship between Knowledge Workers Productivity and MSME sustainability performance ($\beta = 0.159$; $t = 4.524$; $p = 0.000$). The direct effect of worker productivity remains the dominant path, while digital innovation acts as a transmission mechanism that strengthens that impact. Knowledge-based worker productivity thus works most effectively when partly channeled through digital innovation.
4. The measurement model test shows that all constructs meet the requirements of discriminant validity (HTMT < 0.85) and reliability (Cronbach's Alpha and Composite Reliability > 0.60), while the structural model test shows no collinearity problems (VIF < 5). The research model is therefore judged to be a feasible structural model.

Recommendations

For MSME operators, digitalization is recommended to be implemented gradually and sequentially starting with digital payments and simple transaction recording, followed by the use of online sales platforms, and then inventory-management applications and customer-data analysis. This staged approach is important because the most advanced aspects of digital innovation—namely market expansion and the routine trial of new digital ideas—received slightly lower descriptive

scores than basic aspects such as digital transactions. In addition, MSME operators are advised to encourage their workers not to stop at mastering operational tasks but to actively translate that knowledge into digital practice, for example by assigning one worker to be responsible for managing the business's social media and digital platforms. On the social dimension, the aspects of supplier relationships and concern for stakeholders, which received the lowest descriptive scores (4.09 and 4.07), need to be strengthened, for instance through building more stable partnerships with local suppliers and involving the surrounding community in business activities.

For the Tarakan City Government, digital-adoption acceleration programs are recommended to focus on direct assistance at the business level rather than mere socialization—for example, through a digital-mentoring scheme that helps MSMEs establish and manage their digital presence over a defined period. Mentoring programs should not separate human-resource training from technology training, but should combine both in a single, continuous program, consistent with this study's partial-mediation findings.

For future researchers, it is recommended to broaden the scope of research variables, for example by adding variables such as digital leadership style or organizational culture, and to conduct comparative studies across MSME sectors to determine whether the pattern of digital innovation's influence on sustainability performance differs in non-F&B sectors.

Reference

- Alfarizi, M., Widiastuti, T., & Ngatindriatum. (2024). Exploration of Technological Challenges and Public Economic Trends Phenomenon in the Sustainable Performance of Indonesian Digital MSMEs on Industrial Era 4.0. *Journal of Industrial Integration and Management*, 9(1), 65-96.
- Arifin, I. A., & Ardiansyah, R. (2025). Meningkatkan Daya Saing UMKM melalui Kemudahan Akses Pembiayaan, Penggunaan Teknologi Informasi dan Peningkatan Kapasitas Sumber Daya Manusia. *Jurnal Ekonomi, Manajemen dan Akuntansi*, 27(3), 562-570.
- Astuty, E., Sudirman, I. D., & Aryanto, R. (2024). Sustainable Resilience Strategy: Unleash the Micro-businesses's Potential in the Digitalization and Sustainability Era. *Cogent Business & Management*, 11(1), 1-29.
- Badan Pusat Statistik. (2023). Laporan Kinerja Usaha Mikro, Kecil, dan Menengah. Badan Pusat Statistik.
- Bahtiar, H., Rabbany, L. R., Bele, Y. F., Husna, M., & Matulessy, G. S. (2025). Digital Transformation toward Sustainability: Challenges and Opportunities for Indonesian MSMEs. *Jurnal Ekonomi dan Bisnis*, 28(1), 131-150.
- Banjarnahor, A. R. (2021). Technology Acceptance Model and Theory of Planned Behavior: Mapping Literature Review. *Golden Ratio of Mapping Idea and Literature Format*, 1(2), 134-168.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99-120.
- Carrasco-Carvajal, O., García-Pérez-de-Lema, D., & Castillo-Vergara, M. (2023). Impact of Innovation Strategy, Absorptive Capacity, and Open Innovation on SME Performance: A Chilean Case Study. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100065.
- Dabić, M., Obradović Posinković, T., Vlačić, B., & Gonçalves, R. (2023). A Configurational Approach to New Product Development Performance: The Role of Open Innovation, Digital Transformation and Absorptive Capacity. *Technological Forecasting and Social Change*, 194, 122720.
- Dinas Koperasi, UKM, dan Perdagangan (DKUKMP) Kota Tarakan. (2024). Survei Pemanfaatan

- Platform Digital oleh UMKM Kota Tarakan. DKUKMP Kota Tarakan.
- Dinas Koperasi, UKM, dan Perdagangan (DKUKMP) Kota Tarakan. (2025). Data Pertumbuhan UMKM Kota Tarakan. DKUKMP Kota Tarakan.
- Drucker, P. (1959). *The Landmarks of Tomorrow*. Harper and Row.
- Fandeli, H., Halim, H., Hasibuan, A., Hindayani, P., Reswari, R. A., Sahir, S. H., Hasnawi, M., Pravitasari, C. F., Yuhendra, M. A., Umam, K., & Murtopo, A. S. (2025). Sustainability dalam Manajemen UMKM: Perspektif Lingkungan, Sosial, dan Ekonomi. Yayasan Kita Menulis.
- Fernanda, S. A., & Larassaty, A. L. (2024). Knowledge Worker Productivity di PT Trikayarasa Jaya Food: Peran Knowledge Management melalui Kemampuan Adaptasi dan Kepuasan Kerja Karyawan. *JMBI UNSRAT*, 11(1), 343-361.
- Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, 17(S2), 109-122.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage Publishing.
- Istamarina, S., Anggraeni, E., & Astuti, D. (2025). Inovasi dan Keberlanjutan Bisnis UMKM di Era Digital: Kajian Literatur Sistematis. *Journal of Business Economics and Management*, 1(3), 323-327.
- Kaltum, U., Joeliaty, J., Sarasi, V., & Iskandar, Y. (2025). The Effect of Cloud Technology Implementation, Employee Engagement, Digital Literacy, and Organisational Readiness on Employee Productivity and Business Sustainability in Indonesian MSMEs in the Era of Digital Transformation. *BIS Economics and Business*, 2, V225004.
- Kementerian Koordinator Bidang Perekonomian Republik Indonesia. (2025). Pemerintah Dorong UMKM Naik Kelas, Tingkatkan Kontribusi terhadap Ekspor Indonesia. Siaran Pers.
- Kianto, A., Shujahat, M., Hussain, S., Nawaz, F., & Ali, M. (2019). The Impact of Knowledge Management on Knowledge Worker Productivity. *Baltic Journal of Management*, 14(2), 178-197.
- Lukita, C., Purnama, I. Y., Rahardja, U., Natasya, A. E., & Sanjaya, Y. P. A. (2025). The Effect of Technology Training on Increasing MSME Productivity: Case Analysis of Digital Training Programs for Local Craftsmen. *International Journal of Engineering, Science and Information Technology*, 5(1), 420-426.
- Martini, I. A. O., Arsawan, I. W. E., Sari, D. M. F. P., & Muna, N. (2023). Increasing Product Competitiveness in Weaving SMEs: The Role of Competency, Creativity, and Performance. *Uncertain Supply Chain Management*, 11(3), 855-866.
- Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital Innovation Management: Reinventing Innovation Management Research in a Digital World. *MIS Quarterly*, 41(1), 223-238.
- Nogueira, E., Gomes, S., & Lopes, J. M. (2023). A Meta-regression Analysis of Environmental Sustainability Practices and Firm Performance. *Journal of Cleaner Production*, 426, 139048.
- Ozdemir, S., Fernandez de Arroyabe, J. C., Sena, V., & Gupta, S. (2023). Stakeholder Diversity and Collaborative Innovation: Integrating the Resource-Based View with Stakeholder Theory. *Journal of Business Research*, 164, 113955.
- Radar Tarakan. (2025). UMKM Tarakan Masih Minim Melakukan Ekspor, Begini Penjelasan DKUKMP. Radar Tarakan.
- Ramdani, B., Raja, S., & Kayumova, M. (2021). Digital Innovation in SMEs: A Systematic Review, Synthesis and Research Agenda. *Information Technology for Development*, 28(1), 56-80.
- Ramírez, Y. W., & Nembhard, D. A. (2004). Measuring Knowledge Worker Productivity: A Taxonomy. *Journal of Intellectual Capital*, 5(4), 602-628.



- Ridho, S. A., Adriyan, F., Windayati, D. R., & Abdilla, N. A. (2025). Produktivitas Karyawan UMKM: Tinjauan dari Perspektif Motivasi dan Lingkungan Kerja. *Jurnal Ilmiah Ekonomi dan Manajemen*, 3(8), 17-27.
- Tariq, A., Sumbal, M. S. U. K., Dabic, M., Raziq, M. M., & Torkkeli, M. (2024). Interlinking Networking Capabilities, Knowledge Worker Productivity, and Digital Innovation: A Critical Nexus for Sustainable Performance in Small and Medium Enterprises. *Journal of Knowledge Management*, 28(11), 179-198.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509-533.
- Wardhani, N., Noermijati, N., & Sunaryo, S. (2022). Knowledge-Worker Productivity in Defence Industry: The Role of Knowledge Management through Employees' Adaptability and Job Satisfaction. *Jurnal Media Ekonomi dan Manajemen*, 37(1), 140-160.
- Wernerfelt, B. (1984). A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2), 171-180.