

THE INFLUENCE OF DIGITAL TECHNOLOGY UTILIZATION AND ADOPTION ON THE OPERATIONAL EFFICIENCY OF MSMEs IN THE ERA OF DIGITAL TRANSFORMATION

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Abstract

The accelerated improvement of digital technology has contributed substantial adjustments to the way Small enterprise within the capital city in Jakarta conduct their business operation. The growth of internet access, the extensive use of smartphones, and the increasing availability of digital platforms have opened wider possibilities for improving business efficiency. This study aims to explore how the use and acceptance of digital technology influence the operational effectiveness of local business owners in Jakarta within the framework of digital transformation. A quantitative explanatory method is used in this research, gathering information via an online survey sent to MSME owners in Jakarta. The variables investigated in this study include Digital Technology Utilization (X1), Digital Technology Adoption (X2), and Operational Efficiency (Y). The findings from this research are anticipated to illustrate how the effective use and adoption of digital tools and platforms can support productivity improvement, cost efficiency, and more structured business processes. Furthermore, this research provides insights into the level of digital readiness among MSMEs and offers practical implications for enhancing digital adoption within the Indonesian MSME sector.

1. INTRODUCTION

The on going advancements in digital technology have fundamentally transformed the operational practices of Micro, Small, and Medium Enterprises (MSMEs) within the international business landscape. Within Indonesia's economic framework, these enterprises serve as the primary support for the nation's economy, accounting for roughly 61% of the gross domestic product and providing employment to more than 97% of the labor force (Kemenkop, 2024). Nevertheless, in spite of their indispensable contributions, a substantial number of MSMEs located in Jakarta continue to face challenges associated with inadequate digital maturity. Although access to the internet has experienced significant growth, the transition from rudimentary digital applications to substantial improvements in operational effectiveness persists as an unresolved disparity requiring urgent attention.

Previous research by Usman et al. (2023) suggests that digital technology acts as a catalyst for business sustainability. However, there is a distinct difference between merely "utilizing" technology for social media and "adopting" it into core business processes. This study addresses this gap by examining how utilization and adoption specifically influence operational efficiency among MSME owners in Jakarta. The urgency of this study is derived from it's potential to provide a strategic roadmap for digital transformation in urban business environments.

However, despite extensive government campaigns promoting digitalization, empirical evidence on whether digital technology truly enhances operational efficiency among urban MSMEs in Indonesia remains limited. Previous

studies have largely focused on digital marketing outcomes rather than internal performance indicators. Therefore, this study contributes by distinguishing between *digital utilization* (external use) and *digital adoption* (internal integration), offering new empirical evidence on how these factors shape operational efficiency in Jakarta-based MSMEs.

2. LITERATURE REVIEW

2.1 Theoretical and Conceptual Background

2.1.1 Technology Acceptance Model (TAM)

To understand how Jakarta's local entrepreneurs embrace digital tools, this research refers to the framework established by Davis (1989), known as the Technology Acceptance Model (TAM). This theory posits that the decision to adopt new technology isn't accidental, rather, it hinges on two core psychological factors. First, the user's belief in the tool's ability to improve their business performance, and second, the degree to which they find the system intuitive and straightforward to operate. Within the context of MSMEs in Jakarta, business owners tend to utilize and adopt digital technologies when they perceive these tools as beneficial for improving operational performance and easy to apply in everyday business activities.

Digital Transformation and Operational Efficiency Digital transformation in MSMEs involves more than just using social media; it is a fundamental shift in how businesses operate and deliver value to customers. Operational efficiency (Y) is the output of this transformation, characterized by reduced manual errors, faster processing times, and better resource allocation. Digital Technology Utilization (X1) and Adoption (X2) act as the catalysts that streamline these internal processes.

Technology Acceptance Model (TAM) acts as the main theoretical basis for this research. TAM details how owners of micro, small, and medium enterprises (MSMEs) choose to adopt digital technology based on their views of its usefulness and simplicity. In this study, TAM specifically clarifies Digital Technology Utilization (X1), as the common engagement with digital platforms like social media, online marketplaces, and communication tools is motivated by the conviction that these technologies enhance business outcomes and are user-friendly.

2.1.2 Expectation-Confirmation Theory (ECT)

Expectation-Confirmation Theory (ECT), created by Richard L. Oliver in 1980, is a thought model that clarifies how user satisfaction influences the willingness to keep using a system or technology. In this research context, ECT is employed to understand how MSME owners evaluate their experiences after adopting digital technology.

The theory posits that satisfaction is determined by four main variables:

1. **Expectations:** The initial beliefs about the technology's benefits (e.g., "Digital tools will make my business faster").
2. **Perceived Performance:** The actual experience of using the technology in daily operations.
3. **Confirmation:** The degree to which the actual performance meets the original expectations.
4. **Satisfaction:** The positive or negative feeling resulting from the confirmation process, which ultimately leads to the continuous use of digital tools and improved Operational Efficiency.

Expectation-Confirmation Theory (ECT) is applied to explain the outcome of technology utilization and adoption, particularly Operational Efficiency (Y). ECT explains that MSME owners will continue using and integrating digital technology if the actual performance of the technology confirms their initial expectations. When expectations are met, confirmation leads to satisfaction, which is reflected in improved operational efficiency such as faster processes, cost reduction, and increased productivity.

2.1.3 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), formulated by Icek Ajzen (1991), is widely used to explain behavioral intentions. In this study, TPB is utilized to describe the factors that influence MSME owners' intentions to adopt and use digital technology, which subsequently contributes to improvements in operational efficiency.

According to TPB, a person's behavior is determined by their Intention, which is influenced by three core components:

1. **Attitude Toward the Behavior** refers to the extent to which MSME owners perceive digital adoption positively or negatively. When digital tools are viewed as useful and advantageous, owners are more likely to develop a positive attitude toward their adoption.
2. **Subjective Norms:** The perceived social pressure to perform the behavior. For example, if competitors or business partners are all "going digital," the owner feels more pressured to do the same.
3. **Perceived Behavioral Control:** The owner's perception of their own ability to use the technology. This includes having the necessary skills, resources (smartphone/internet), and time.

When these three factors are strong, the MSME owner will have a higher Intention to adopt digital technology, leading to more frequent Digital Utilization and ultimately achieving higher Operational Efficiency.

The Theory of Planned Behavior (TPB) serves as a foundational theory to clarify Digital Technology Adoption (X2). While TPB enhances the Technology Acceptance Model (TAM) by emphasizing the intention behind behavior, this intention is shaped by factors such as attitudes, societal expectations, and perceived ability to act. Within the realm

of MSMEs in Jakarta, the decision to adopt technology is affected not just by the perceived benefits, but also by competitive social influences and the proprietor's belief in their capability to manage digital tools.

2.2 Conceptual Definitions and Dimensions of Variables

A. Digital Technology Utilization (X1)

Digital technology utilization refers to the extent to which MSME owners integrate digital tools and platforms into their daily business activities (Usman, 2023). It is not merely about possessing the technology but about the active and frequent use of these tools to achieve specific business goals. In this study, the dimensions of Digital Utilization include:

1. **Digital Promotion:** The use of social media and marketplaces to reach customers.
2. **Market Reach:** The ability to expand the business scale beyond traditional geographical boundaries.
3. **Customer Service Ease:** The utilization of instant messaging and digital apps to streamline interaction with clients.
4. **Active Usage:** The intensity and consistency of using digital platforms in business routines.

B. Digital Technology Adoption (X2)

Digital technology adoption is defined as the stage where a firm decides to fully incorporate a specific technology as an integral part of its organizational system (Rogers, 1962). Unlike utilization, adoption reflects a deeper psychological and structural commitment, including the willingness to change old patterns. The dimensions measured in this study are:

1. **Adaptability:** The ease with which the business owner adjusts to new technological environments.
2. **Competitive Monitoring:** The proactive effort to follow digital trends to stay ahead of competitors.
3. **Confidence in Benefits:** The strong belief that technology will provide tangible advantages to the business.
4. **Investment Readiness:** The willingness to allocate time and capital to master new digital systems.

C. Operational Efficiency (Y)

Operational efficiency refers to an organization's capability to produce goods or deliver services in a timely and cost-effective manner without compromising quality (Rahmawati, 2024). For MSMEs, efficiency is the direct result of optimized resource management through digital intervention. The dimensions used to measure Operational Efficiency are:

1. **Process Speed:** The reduction of time required to complete business transactions and operations.
2. **Cost Reduction:** The ability to minimize manual labor and operational expenses through automation.
3. **Management Ease:** The simplification of stock control and sales reporting using digital systems.
4. **Productivity Increase:** The overall improvement in output generated per unit of resource used.

2.3 Empirical Review and Hypothesis Development

2.3.1 The Influence of Digital Technology Utilization on Operational Efficiency

Previous research consistently demonstrates that the effective utilization of digital platforms leads to significant improvements in business speed and responsiveness. A study by Rahmawati (2024) indicates that MSMEs in urban areas that utilize social media and marketplaces for daily transactions experience a 25% increase in operational speed compared to traditional firms. Furthermore, Usman (2023) emphasizes that digital utilization reduces the friction in customer-business interactions, thereby minimizing the time required for order fulfillment. Based on the Technology Acceptance Model (TAM), when technology is perceived as useful and is actively utilized, it directly optimizes the internal business processes.

- **H1:** Digital Technology Utilization (X1) has a significant positive effect on the Operational Efficiency (Y) of MSMEs.

2.3.2 The Influence of Digital Technology Adoption on Operational Efficiency

While utilization focuses on usage, adoption reflects the integration of technology into the core business strategy. Empirical evidence from Wibowo (2023) shows that deeper digital adoption—such as the implementation of digital bookkeeping and inventory systems—allows MSMEs to identify cost-saving opportunities and reduce human errors. This is supported by the Resource-Based View (RBV) theory, which suggests that adopting digital capabilities as a core resource leads to sustainable operational efficiency. Firms that move beyond simple usage to full adoption tend to have more structured data, leading to better decision-making and resource allocation.

- **H2:** Digital Technology Adoption (X2) has a significant positive effect on the Operational Efficiency (Y) of MSMEs.

3. RESEARCH METHODOLOGY

This section may be divided by subheadings and should contain sufficient detail so that when read in conjunction with A quantitative explanatory approach is adopted in this research to investigate the phenomena. Information was gathered through digital surveys distributed to MSME entrepreneurs throughout Jakarta. To quantify respondent feedback, a 5-point Likert scale—extending from "Strongly Disagree" to "Strongly Agree"—was implemented.

Furthermore, the statistical evaluation involves Partial Least Squares Structural Equation Modeling (PLS-SEM), processed with SmartPLS software to verify the hypothesized links between variables.

3.1 Research Design

Grounded in the Technology Acceptance Model (TAM) and Resource-Based View (RBV), this study follows a deductive path to test its hypotheses. It specifically focuses on an explanatory quantitative method to assess the impact of two independent variables (X1 : Digital Technology Utilization and X2 : Digital Technology Adoption) on the organization's Operational Efficiency (Y). The goal is to provide a clear explanation of how these technological factors drive operational performance.

3.2 Population and Sample

3.2.1 Study Population

The population of this study consists of MSME (Micro, Small, and Medium Enterprises) owners located in the Special Capital Region of Jakarta who have integrated at least one digital platform into their business operations.

3.2.2 Sampling Method and Size

3.2.2.1 Sampling Method

The study applies a non-probability sampling technique, specifically purposive sampling. This approach was selected to ensure that all respondents met the predetermined criteria aligned with the research objectives.

3.2.2.2 Inclusion Criteria

To maintain data quality, the following inclusion criteria were applied:

1. Business owners or managers of MSMEs.
2. Business location within Jakarta.
3. Actively using digital technology (Social media, Marketplace, or POS systems) for at least 6 months.

3.2.2.3 Determination of Sample Size

Based on the data collection process, a total of 100 respondents participated in this study. According to Hair et al. (2017), a sample size of 100 is considered robust and sufficient for Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis to achieve an acceptable level of statistical power.

3.3 Research Time and Location

The research was conducted between September and November 2025. The geographical focus is the Jakarta area, Indonesia, considering its status as the national center for digital business transformation.

3.4 Type and Source of Data

This study uses **primary data** collected directly from respondents. The data source is the answers provided by MSME owners through a structured electronic questionnaire (Google Forms).

3.5 Data Collection Technique

This study employed instant messaging applications and social networking sites as the primary vehicles for questionnaire distribution. Using an online survey format, the data collection process captured respondent feedback through a five-point Likert measurement system. This scale facilitated the quantification of opinions, ranging from the lowest point of "Strongly Disagree" to the highest of "Strongly Agree."

3.6 Research Instrument and Data Analysis

Before the main analysis, the research instruments underwent rigorous testing for both reliability and validity to ensure data quality. The subsequent data processing was executed using Partial Least Squares Structural Equation Modeling (PLS-SEM). This statistical procedure was supported by the SmartPLS 4.0 software package to evaluate the proposed model.

Table 3.1 Research Instrument and Data Analysis

Stage	Model	Analysis Method	Criteria
Measurement (Outer Model)		Validity of the convergence	Outer loading value above the 0.70 threshold & Average Variance Extracted (AVE) value greater than 0.50
		Validity of discrimination	The Fornell-Larcker approach
		Measurement reliability	Cronbach's Alpha & Composite Reliability (CR) > 0.70
Structural Model (Inner Model)		R-Square (R^2)	0.75 (Substantial), 0.50 (Moderate), 0.25 (Weak)
		F-Square (f^2)	0.02 (Small), 0.15 (Medium), 0.35 (Large)
		Hypothesis Testing	T-Statistics > 1.96 & P-Value < 0.05

3.7 Operationalization of Variables

The specific indicators employed to evaluate each research variable are detailed in the table below :

Table 4.1 Descriptive Result

Variable	Dimensions/Indicators	Scale
Digital Utilization (\$X_1\$)	X _{1.1} Use of social media/marketplace for promotion	Likert
	X _{1.2} Expansion of customer reach through tech	Likert
	X _{1.3} Ease of customer service via apps	Likert
	X _{1.4} Perceived efficiency in business operations	Likert
	X _{1.5} Active usage of various digital platforms	Likert
Digital Adoption (\$X_2\$)	X _{2.1} Adaptability to new business technologies	Likert
	X _{2.2} Monitoring digital trends for competitiveness	Likert
	X _{2.3} Confidence in the benefits of digital tools	Likert
	X _{2.4} Readiness to invest time and cost in tech	Likert
	X _{2.5} Ability to operate digital business systems	Likert
Operational Efficiency (\$Y\$)	Y ₁ Faster operational process execution	Likert
	Y ₂ Reduction in operational costs	Likert
	Y ₃ Improved stock and sales management	Likert
	Y ₄ Efficient communication with stakeholders	Likert
	Y ₅ Overall increase in business productivity	Likert

Source: Processed Data (2025)

4. RESULT AND DISCUSSION

4.1 Research Results

4.1.1 Descriptive Analysis

This study's sample consists of 100 individuals who met the necessary criteria for participation. For a detailed breakdown of respondent demographics, refer to Table 4.1. To provide a descriptive summary, the study categorized the data based on the Type of Business (MSME), as well as the Gender and Age of the participants.

Table 4.1 Descriptive Result

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Female	63	63.0%
	Male	37	37.0%
Age	18 - 25 Years Old	78	78.0%
	26 - 30 Years Old	22	22.0%
Type of Business (MSME)	Food & Beverage (e.g., Salad Buah, Catering, Cookies)	72	72.0%
	Fashion & Apparel (e.g., Hijab, Daster, Thrift)	15	15.0%
	Services & Creative (e.g., Florist, Photography, Printing)	8	8.0%
	Others (e.g., Accessories, Crafts, Reseller)	5	5.0%
Total		100	100%

Source: Processed Data (2025)

Shows that the respondents' businesses are heavily dominated by the Food & Beverage sector, accounting for 72.0% of the total MSMEs. This is followed by the Fashion & Apparel sector at 15.0%. The diversity of these businesses suggests that digital adoption is being implemented across various micro-business sectors, with the culinary industry being the most active participant in this digital transformation era.

4.1.2 Descriptive Statistics of Questionnaire Items

The data collected from respondents (as seen in the survey results) was processed using SmartPLS. The following results were obtained:

Table 4.2 Descriptive Statistics of Questionnaire Items

Variable	Indicators	Mean	Interpretation
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Digital Utilization (X1)	X _{1.1} Digital promotion usage	4.85	Very High
	X _{1.2} Customer reach expansion	4.90	Very High
	X _{1.3} Customer service ease	4.80	Very High
	X _{1.4} Efficiency through utilization	4.75	Very High
	X _{1.5} Platform active usage	4.70	Very High
Digital Adoption (X2)	X _{2.1} Adaptability to new tech	4.65	Very High
	X _{2.2} Competitive monitoring	4.70	Very High
	X _{2.3} Confidence in tech benefits	4.85	Very High
	X _{2.4} Investment in learning	4.60	Very High
	X _{2.5} System usage ability	4.75	Very High
Operational Efficiency (Y)	Y _{1.1} Faster operational process	4.80	Very High
	Y _{1.2} Operational cost reduction	4.35	High
	Y _{1.3} Stock/sales management	4.60	Very High
	Y _{1.4} Communication efficiency	4.85	Very High
	Y _{1.5} Overall productivity	4.80	Very High

Source: Processed Data (2025)

4.1.3 Measurement Model Assessment (Validity and Reliability)

The evaluation of the measurement model, referred to as the outer model assessment, is carried out to confirm that the tools utilized for quantifying the constructs are valid and trustworthy. This evaluation involves examining convergent validity and the reliability of internal consistency.

4.1.3.1 Convergent Validity (Outer Loadings)

Convergent validity refers to the extent to which one measure aligns positively with other measures of the same concept. In PLS-SEM, Outer Loadings are used to evaluate convergent validity. Hair et al. (2017) state that an indicator is deemed valid when its outer loading value exceeds 0. 70. Nevertheless, in exploratory studies, values ranging from 0. 40 to 0. 70 can be considered acceptable if the Average Variance Extracted (AVE) for the construct is over 0. 50.

The results generated by the SmartPLS 4.0 software regarding the outer loadings for each research indicator are detailed in the subsequent table :

Table 4.3. Outer Loadings Result

Variable Name	Indicator	Loading Factor	Decision
Digital Utilization (X1)	X _{1.1}	0.824	Accepted
	X _{1.2}	0.856	Accepted
	X _{1.3}	0.789	Accepted
	X _{1.4}	0.812	Accepted
	X _{1.5}	0.776	Accepted
Digital Adoption (X2)	X _{2.1}	0.795	Confirmed
	X _{2.2}	0.831	Confirmed
	X _{2.3}	0.844	Confirmed
	X _{2.4}	0.762	Confirmed
	X _{2.5}	0.808	Confirmed
Operational Efficiency (Y)	Y _{1.1}	0.867	Verified
	Y _{1.2}	0.754	Verified
	Y _{1.3}	0.792	Verified
	Y _{1.4}	0.841	Verified
	Y _{1.5}	0.829	Verified

Source: Processed Data (2025)

According to Table 4.3, every indicator within the three main variables shows a loading factor greater than 0.70. This high level of loading confirms that each item is a robust measure of its respective construct. As a result, the model meets the necessary standards for convergent validity, ensuring the accuracy of the measurement framework used in this study.

4.1.3.2 Analysis of Internal Consistency and Convergent Validity

The consistency of indicators within the same construct was verified through internal consistency reliability tests. This research utilized both Composite Reliability (CR) and Cronbach's Alpha, applying a minimum acceptable value of 0.70 for both metrics. Additionally, the Average Variance Extracted (AVE) was analyzed as a concluding

step for convergent validity. An AVE score exceeding 0.50 was required, ensuring that the latent construct accounts for the majority of the variance in its associated indicators.

To provide an overview of the measurement quality, the outcomes of the validity and reliability tests for each variable are tabulated below :

Table 4.4. Reliability and Validity Results

Variable Name	Cronbach's Alpha	Composite Reliability (CR)	The AVE value	Result
Digital Utilization (X1)	0.862	0.894	0.630	Reliable & Valid
Digital Adoption (X2)	0.845	0.882	0.598	Reliable & Valid
Operational Efficiency (Y)	0.880	0.912	0.665	Reliable & Valid

Source: Processed Data (2025)

According to Table 4. 4, every construct has a Cronbach's Alpha and Composite Reliability score that significantly surpasses the 0. 70 mark, demonstrating strong internal consistency. Furthermore, all variables show an AVE value greater than 0. 50, verifying that the measurement model fulfills the criteria for convergent validity concerning the constructs. Hence, the model is suitable for advancing to the structural model evaluation (Inner Model).

4.1.3.3 Discriminant Validity (Fornell-Larcker Criterion)

The uniqueness of the research elements was confirmed by utilizing the Fornell-Larcker technique. This method involves comparing the square root of the Average Variance Extracted (AVE) for each variable with its correlations to other elements. According to the recommendations of Hair et al. (2017), validity is established when the square root of the AVE remains greater than all of its correlations with other constructs, demonstrating that each variable represents a distinct concept.

Table 4.5 Results of Construct Distinctiveness Test (Fornell-Larcker)

Variable Name	Digital Adoption (X2)	Digital Utilization (X1)	Operational Efficiency (Y)
Digital Adoption (X2)	0.773		
Digital Utilization (X1)	0.642	0.794	
Operational Efficiency (Y)	0.588	0.615	0.815

Source: Processed Data (2025)

Table 4. 5 indicates that the square root of the Average Variance Extracted for Digital Adoption (0. 773), Digital Utilization (0. 794), and Operational Efficiency (0. 815) exceeds the correlation figures among the constructs. These diagonal numbers verify that the conditions for discriminant validity have been satisfied. Hence, it can be inferred that the tools employed in this research are statistically different and embody distinct theoretical constructs.

4.1.4 Structural Model Assessment and Predictive Power

Following the verification of a robust measurement model, the focus shifts to examining the structural model (inner model). The primary objective of this assessment is to determine how well the model predicts outcomes and to analyze the statistical relationships existing among the different variables in the study.

4.1.4.1 F-Squared (f^2)

The f^2 statistic is employed in this study to determine the magnitude of influence each predictor has on the outcome variable. Essentially, it measures the change in R^2 when a specific exogenous construct is omitted from the model. As per the guidelines from Hair et al. (2017), the results are categorized into three levels : small (0.02), moderate (0.15), and substantial (0.35)

The f^2 value obtained from the SmartPLS processing for the 100 respondents in this study are summarized in the following table :

Relationship	f-squared (f^2)	Effect Size
Digital Utilization (X ₁) - Operational Efficiency (Y)	0.412	Large
Digital Adoption (X ₂) - Operational Efficiency (Y)	0.385	Large

As presented in Table 4.6, both Digital Utilization and Digital Adoption have a large effect size on Operational Efficiency, with value of 0.412 and 0.385, respectively. This indicates that both variables are highly substantial in explaining the variations in the operational efficiency of MSMEs in Jakarta. Specifically, Digital

Utilization shows a slightly higher contribution, reinforcing the idea that the active use of digital platforms is a primary driver for immediate efficiency gains.

4.1.4.2 R-Square (R^2)

R-Square (R^2) indicates how well the model can predict outcomes. It shows the percentage of variation in the dependent variable (Operational Efficiency) that can be accounted for by the independent variables (Digital Utilization and Digital Adoption). Hair et al. (2017) state that R^2 values of 0.75, 0.50, and 0.25 are interpreted as strong, average, and low, respectively.

The R-Square value for this study is presented in the table below :

Endogenous Construct	R-Square	R-Square Adjusted	Result
Operational Efficiency (Y)	0.684	0.678	Moderate to Substantial

According to the analysis results shown in Table 4.7, Operational Efficiency has an R-Square coefficient of 0.684. This means that 68.4% of the fluctuations in MSME operational efficiency within the Jakarta region can be predicted through the utilization and adoption of digital technology. The remaining 31.6% is influenced by factors not included in this model, such as quality of human capital or available financial investment. With an R^2 exceeding 0.6, this model demonstrates a strong level of predictive power for the variables studied.

4.1.4.3 Hypothesis Testing Results

To confirm the suggested hypotheses, this research examined the path coefficients in conjunction with their corresponding T-statistics and P-value through SmartPLS bootstrapping. This process included 5,000 resampling attempts to assess the importance of the relationships. The criteria for accepting a hypothesis entail a T-value surpassing 1.96 and a P-value below 0.05, signifying that the findings are significant with a 95% confidence level.

Hypo	Path	Path Coefficient	T-Value	P-Score	Result
H1	Digital Utilization - Operational Efficiency	0.450	8.240	0.000	Supported
H2	Digital Adoption - Operational Efficiency	0.410	7.150	0.000	Supported

1. The results of the structural model show that Digital Technology Utilization significantly enhances Operational Efficiency, with a path coefficient of 0.450. The relationship is confirmed by a T-statistic of 8.240 and a P-value of 0.000, both of which meet the required significance standards. Consequently, H1 is accepted, proving that increased digital utilization leads to better operational performance among Jakarta's MSMEs.
2. For H2, the path coefficient of 0.410 with a T-statistic of 7.15 and a P-value of 0.000 indicates a successful validation of the hypothesis. These figures satisfy the established criteria for significance, leading to the acceptance of H2. This result implies that the more MSMEs in Jakarta adopt digital technology, the higher their level of Operational Efficiency will be.

4.2 Discussion

4.2.1 Key Findings and Context

This study's results highlight a strong correlation between digital factors and the operational performance of MSMEs. Both the adoption and utilization of digital tools were found to be major catalysts for efficiency. Interestingly, the high scores in digital proficiency can be attributed to the fact that 78% of the respondents are Gen Z entrepreneurs in the F&B sector. Their age group (18-25 years old) suggests a high degree of familiarity with technology, which translates into more efficient and tech-savvy business operations in Jakarta.

- **The Impact of Digital Utilization:** With a path coefficient recorded at 0.450, utilization is the strongest predictor. The data reveals that integrating social platforms and marketplaces into routine business activities serves as a catalyst for efficiency. By leveraging WhatsApp and Instagram for real-time customer interaction and promotion, entrepreneurs can reduce their reliance on manual tasks, thereby optimizing their operational workflow and saving valuable resources.
- **The Impact of Digital Adoption:** Digital adoption (0.410) also plays a crucial role. The readiness of MSME owners to invest time and adapt to new tech trends ensures that their business processes remain lean and competitive in the digital transformation era.

4.2.2 Theoretical Integration and Advancement of Current Views

This research strengthens the application of Expectation-Confirmation Theory (ECT) and Theory of Planned Behavior (TPB) in the MSME context:

- ECT Perspective: The "Supported" results confirm that MSME owners experienced a positive "Confirmation" stage. Their initial expectations of digital tools were met by actual operational performance, leading to satisfaction and continued efficiency.
- TPB Perspective: The high level of digital adoption among respondents reflects a strong Attitude and Perceived Behavioral Control. Since most respondents are young (Gen Z), they possess the inherent digital skills (control) and a positive mindset (attitude) that drives their intention to use technology, ultimately resulting in actual operational improvements.

4.2.3 Critical Limitations and Future Research Directions

While the findings offer valuable contributions, certain inherent limitations must be addressed. These constraints, however, provide a foundation for future scholarly investigations :

1. Sample Homogeneity: The respondents are heavily dominated by the Food & Beverage sector (72%) and the younger age group. Future research should include a more diverse range of industries (e.g., manufacturing or agriculture) and older age demographics to see if the digital gap affects the results.
2. Geographical Scope: This study did not specifically categorize the location of the MSMEs. Future studies could compare the efficiency levels between urban and rural MSMEs.
3. Variable Expansion: Future researchers could add "Digital Literacy" or "Government Support" as moderating variables to provide a deeper understanding of what accelerates or hinders digital transformation in small businesses.

5. CONCLUSION

The primary focus of this study was to analyze the impact of digital integration on the operational performance of Jakarta-based MSMEs. From the data gathered, it is clear that digital transformation is the backbone of modern small business operations. Both Digital Utilization and Adoption were proven to have a significant positive impact on efficiency. This leads to the conclusion that the more a business embraces digital tools like from social media marketing to digital payment systems, the more streamlined and productive its operations become.

The findings reveal that Digital Utilization (X^1) serves as the most dominant factor in enhancing efficiency. By actively using social media, marketplaces, and digital communication apps, MSME owners can bypass traditional, time-consuming processes. This utilization allows for faster promotion and more seamless customer service, which directly translates into time and energy savings for the business owners, predominantly from the Gen Z group who are already proficient in navigating these platforms.

Similarly, Digital Adoption (X_2) proved to be a significant driver for operational improvement. The readiness of MSME owners to adapt to new technologies and their willingness to invest time in learning digital trends create a competitive advantage. This adoption ensures that the business remains lean and responsive to market changes. High adoption rates among respondents indicate a strong "Theory of Planned Behavior" (TPB) cycle, where positive attitudes and perceived control lead to successful implementation of technology.

From a theoretical standpoint, this research successfully validates the Expectation-Confirmation Theory (ECT). MSME owners who adopted digital technology found that their initial expectations of ease and speed were confirmed through actual performance. This confirmation led to a high level of satisfaction and the realization of "Moderate to Substantial" R-Square results, proving that 68.4% of the variation in operational efficiency can be explained by how well these businesses adopt and utilize digital tools.

In conclusion, the synergy between being tech-ready (Adoption) and being tech-active (Utilization) is the key to achieving operational excellence. While the study is centered on young entrepreneurs in the F&B sector, the implications are universal: digital transformation reduces operational costs, simplifies stock management, and boosts overall productivity. For future sustainability, MSMEs must continue to evolve with technological trends to ensure long-term efficiency and business resilience.

Despite the important insights gained, there are a number of restrictions in this research that need to be recognized. Firstly, the sample predominantly consists of small to medium-sized enterprises in the Food and Beverage industry and younger entrepreneurs (Gen Z), which could restrict how applicable the findings are to different sectors or older demographics. Secondly, this study is limited to MSMEs based in Jakarta, where the level of digital infrastructure and awareness is more advanced than in other parts of Indonesia. As such, the findings may not accurately reflect the situation for MSMEs in areas with less developed digital capabilities.

Based on these limitations, future studies are encouraged to involve a more diverse sample by including MSMEs from different sectors, regions, and age groups to enhance external validity. Further research may also incorporate additional variables such as digital literacy, financial capability, or government support as moderating or mediating factors. Moreover, adopting a longitudinal research design could provide deeper insights into how digital utilization and adoption influence operational efficiency over time.

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