

# The Impact of Digital Technology Implementation on the Productivity of MSMEs in Jakarta: An Analysis of E-commerce Adoption, Business Process Automation, and Business Growth

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## ABSTRACT

This study explores the complex interrelationships between digital technology, e-commerce adoption, business process automation, and business growth in Micro, Small, and Medium-sized Enterprises (MSMEs) in Jakarta. Using Structural Equation Modeling, the study examines how these variables interact with a sample of businesses. The findings show strong positive correlations, suggesting that companies are more likely to use a whole range of digital technologies when they grow, automate processes, and implement e-commerce strategies. The results have practical ramifications for MSMEs in Jakarta, highlighting the strategic value of technology investment and proposing opportunities for automation and digitization to work together. E-commerce is becoming a more significant part of business operations, and this serves as a potent motivator for more extensive digital reforms. In addition to offering useful insights on the dynamics of digital adoption within the MSME sector, this research offers practical suggestions for companies and policymakers.

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## 1. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) in Jakarta, Indonesia plays a crucial role in driving growth, employment, and innovation. These MSMEs are adapting to the dynamic economic landscape by embracing digital technology, including E-commerce, Business Process Automation (BPA), and other digital productivity technologies. The use of these technologies enables MSMEs to compete effectively in the market and thrive in the face

of increasing competition [1]–[3]. MSMEs are utilizing platforms such as Tokopedia, Instagram, and Google Maps to expand their reach and improve customer communication [4]. The implementation of digital marketing and Android-based bookkeeping systems has also been observed, facilitating the growth of MSMEs and providing access to new entrepreneurs. The financial knowledge, attitudes, and personality of MSME owners and managers have been found to influence their financial management behavior, further

supporting the development of these businesses [5]–[9]. Overall, the integration of digital technology has become a focal point for MSMEs in Jakarta, enabling them to adapt and thrive in the evolving business environment.

As the capital city of Indonesia, Jakarta is experiencing rapid development and growth, leading to various challenges for micro, small, and medium enterprises (MSMEs) in the region. Market dynamics, regulatory frameworks, and business technology readiness are critical factors shaping the trajectory of MSMEs in Jakarta [10], [11]. The city's focus on digital transformation and the integration of information technology (IT) into public administration, as seen in the Jakarta Smart City program, reflects its commitment to addressing these challenges [12], [13]. The program utilizes geospatial data and citizen participation through the Geographic Information System (GIS) to accelerate decision-making processes, such as building establishment letters, supporting the development of a smart city concept [14]. These initiatives aim to enhance the business environment for MSMEs in Jakarta and promote economic growth in the region.

This study is significant because it makes an effort to thoroughly investigate the connection between business growth, automation of business processes, e-commerce acceptance, and the effects of digital productivity technology implementation for MSMEs in Jakarta. Comprehending the interrelationships among these components is essential for companies looking to enhance their competitiveness, as well as policy makers, industry analysts, and technology providers hoping to create an environment that supports long-term corporate growth.

## 2. LITERATURE REVIEW

### 2.1 E-commerce Adoption

Numerous factors impact the adoption of e-commerce by Micro, Small, and Medium-Sized Enterprises (MSMEs). The aforementioned aspects encompass

technological preparedness, financial capacity, regulatory framework, customer conduct, interface usability, secure transaction procedures, and efficacious digital marketing tactics. Adoption is still hampered, though, by issues including scarce resources, worries about data security, and a lack of digital literacy among stakeholders [15]–[17]. For MSMEs in Jakarta, it is essential to comprehend the dynamics of E-commerce adoption since they need to combine taking use of online platforms' potential with minimizing the difficulties involved in integrating them into well-established business structures.

*H1: The adoption of e-commerce has a major and favorable impact on digital technology.*

### 2.2 Business Process Automation (BPA)

For MSMEs, business process automation (BPA) is a game-changer. It offers increased operational efficiency by integrating technology to automate processes, optimize workflows, and lower error rates. Workflow automation and robotic process automation (RPA) are two examples of how business process automation (BPA) has the power to transform operations and save costs while improving decision-making and adaptability to changing market conditions. However, due to integration complexity, change resistance, and the requirement for experienced individuals, implementing BPA can be difficult [18]. Our comprehension of how MSMEs in Jakarta might strategically use automation to obtain a competitive edge will be aided by a summary of the BPA literature.

*H2: Digital technology is significantly and favorably impacted by business process automation.*

### 2.3 Business Growth in MSMEs

For MSMEs, achieving sustainable business growth is a key goal. Studies show that companies that adopt cutting-edge technology have a higher chance of long-term success [19]. It is known that technological developments can spur growth in several areas, including market expansion, increased revenue, and client acquisition [20]. For MSMEs in Jakarta, knowing how technology

adoption and business success relate is important as it gives them insight into how to capitalize on digital prospects.

*H3: Business Growth has a positive and significant influence on Business Growth*

#### **2.4 Implementation of Digital Productivity Technologies**

The implementation of digital productivity technologies, such as cloud computing, data analytics, and artificial intelligence, not only improves efficiency, but also enhances strategic decision-making capabilities [21]–[23]. Cloud computing facilitates remote work and reduces infrastructure costs, while data analytics extracts actionable insights from large data sets [24], [25]. Artificial intelligence, with applications in predictive analytics and process optimization, is a transformative force for businesses in the digital age. These technologies enable businesses to stay ahead of the curve by harnessing the power of data and automation to drive innovation and improve performance. The synthesis of literature on Digital Productivity Technology Implementation will provide a comprehensive understanding of the holistic impact of these technologies on MSMEs in Jakarta.

### **3. METHODS**

This study utilizes a quantitative research design to systematically investigate the relationship between E-commerce adoption, Business Process Automation (BPA), Business Growth, and the impact of Digital Productivity Technology Implementation for Micro, Small, and Medium Enterprises (MSMEs) in Jakarta. Surveys and structured interviews will be the primary data collection methods, which will facilitate the acquisition of numerical data for subsequent analysis. The target population for this study is MSMEs operating in Jakarta. To ensure representation of different industries and business sizes, a stratified random sampling approach will be used. A sample size of 200 MSMEs was determined using appropriate statistical methods to ensure reliability and statistical significance.

#### **3.1 Data Collection**

A structured survey was designed to collect quantitative data on E-commerce adoption, CPA, Business Growth indicators, and Digital Productivity Technology implementation. The survey questionnaire included closed-ended questions to facilitate quantitative analysis. In addition, structured interviews with key stakeholders, including business owners and IT managers, will provide qualitative insights, complementing the quantitative findings.

The survey was conducted electronically, utilizing an online survey platform, and interviews were conducted in person or through virtual meetings. The questions were carefully crafted to elicit detailed responses regarding the level of E-commerce integration, level of CPA implementation, key growth indicators, and experience with Digital Productivity Technology Implementation.

#### **3.2 Data Analysis**

Structural Equation Modeling (SEM) with Partial Least Squares (PLS) is a robust method for exploring complex relationships among variables, especially with small sample sizes. It allows for simultaneous examination of measurement models and structural models, providing insights into the interactions between latent constructs [26]. The analysis involves several steps. First, the raw survey data is processed to address missing values, outliers, and ensure data integrity. Variables are standardized to improve comparability [27]. Next, the measurement model is assessed for reliability and validity, using measures such as the charge factor, Cronbach's alpha, and composite reliability. Convergent and discriminant validity are evaluated using Average Variance Extracted (AVE) and cross-loadings [28]. The structural models are then analyzed to explore the relationships between latent constructs. Path coefficients and their significance are assessed, providing insights into the strength and direction of the relationships. Bootstrap resampling is used to estimate standard errors and assess the significance of path coefficients [29]. Finally,

the overall fit of the SEM-PLS model is evaluated using fit indices such as the fit index (GoF) and normalized fit index (NFI) [30].

#### 4. RESULTS AND DISCUSSION

##### 4.1 Demographic Sample

The demographic profile of the sampled Micro, Small, and Medium-sized Enterprises (MSMEs) in Jakarta is as follows: 37.5% of the businesses are in the manufacturing industry, 30.0% are in retail, and 32.5% are in services. In terms of business size, 45.0% are classified as micro, 35.0% as small, and 20.0% as medium. Regarding years in operation, 27.5% of the MSMEs have been operating for 1-5 years, 37.5% for 6-10 years, 20.0% for 11-15 years, and 15.0% for 16 years or more.

##### 4.2 Measurement Model

The measurement model in SEM-PLS is used to assess the results of the measurement model, including factor loading, Cronbach's alpha, composite

reliability, and average variance extracted (AVE) for each latent construct. The assessment of the measurement model involves examining the basic dimensions for construct variables, validating the dimensions, and determining the number of dimensions for each construct [31]. It also includes assessing internal consistency reliability, convergent validity, and discriminant validity based on HTMT criterion [32]. Additionally, the assessment of formative measurement models involves evaluating convergent validity, indicator collinearity, and the statistical significance and relevance of the indicator weights [33]. Confirmatory composite analysis (CCA) is an alternative approach used to confirm both reflective and formative measurement models in PLS-SEM, offering advantages for developing and updating measures [34]. In the context of technical competency, the measurement model was validated using a reflective model, assessing convergent validity and discriminant validity [35].

Table 1. Validity and Reliability

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Digital Technology	DT.1	0.882	0.905	0.940	0.840
	DT.2	0.937			
	DT.3	0.930			
E-commerce Adoption	EA.1	EA.1	0.798	0.878	0.706
	EA.2	EA.2			
	EA.3	EA.3			
Business Process Automation	BPA.1	0.853	0.775	0.865	0.681
	BPA.2	0.794			
	BPA.3	0.826			
Business Growth	BG.1	0.889	0.840	0.903	0.757
	BG.2	0.870			
	BG.3	0.852			

The loading factors for each item of Digital Technology (DT) are high, indicating a strong relationship between the observed variables and the underlying latent construct. Cronbach's alpha value of 0.905 suggests a high level of internal consistency among the items measuring DT. The composite reliability

of 0.940 indicates that the items are highly reliable in measuring DT. The AVE value of 0.840 explains a substantial amount of variance in the observed variables of DT. For E-commerce Adoption (EA), the loading factors are substantial, indicating a strong association between the observed variables

and the latent construct. Cronbach's alpha value of 0.878 suggests good internal consistency among the items measuring EA. The composite reliability of 0.706 indicates reasonable reliability among the items. The AVE value of 0.706 suggests that the observed variables collectively measure EA well. For Business Process Automation (BPA), the loading factors are notable, indicating a strong association between the observed variables and the latent construct. Cronbach's alpha value of 0.775 suggests satisfactory internal consistency among the items measuring BPA. The composite reliability of

0.865 indicates reasonable reliability among the items. The AVE value of 0.681 suggests that a moderate amount of variance in the observed variables is explained by BPA. For Business Growth (BG), the loading factors are substantial, indicating a strong association between the observed variables and the latent construct. Cronbach's alpha value of 0.840 suggests good internal consistency among the items measuring BG. The composite reliability of 0.903 indicates strong reliability among the items. The AVE value of 0.757 suggests that a significant amount of variance in the observed variables is explained by BG.

Table 2. Discrimination Validity

	Business Growth	Business Process Automation	Digital Technology	E-commerce Adoption
Business Growth	0.870			
Business Process Automation	0.752	0.825		
Digital Technology	0.655	0.710	0.917	
E-commerce Adoption	0.647	0.814	0.756	0.841

As anticipated, all of the correlations between each concept and itself are 1.0. The relationships between many constructs (e.g., Digital Technology, E-commerce Adoption, and Business Growth with BPA) that are off-

diagonal are moderate, but not overly so. The fact that these numbers (0.870, 0.655, and 0.647) fall below the 1.0 cutoff point suggests discriminant validity.

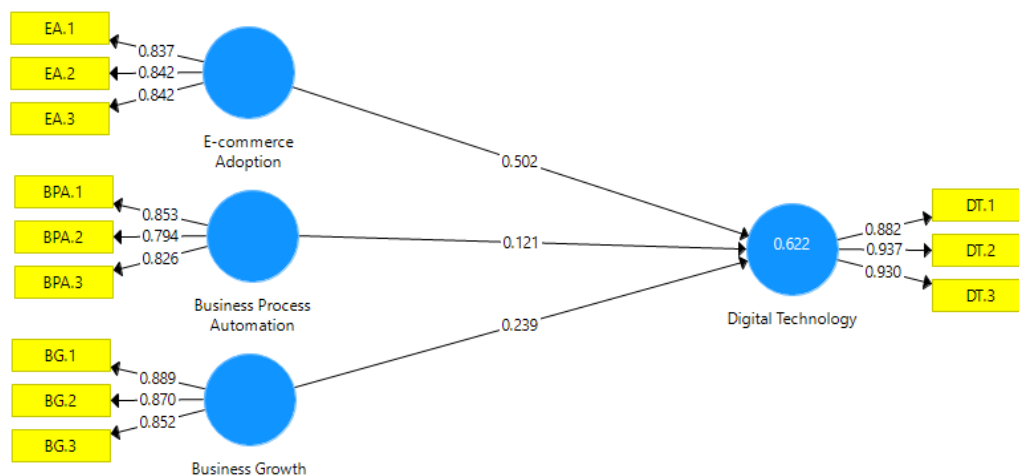


Figure 1. Internal Model Assessment

4.3 Model Fit

The model fit index provides information on how well the proposed structural model fits the observed data. Fit indices are used to evaluate the goodness of

fit between the estimated model and the saturated model, which represents a model with perfect fit. Researchers often rely on fit indices such as chi-square ( $\chi^2$ ), comparative fit index (CFI), root mean squared error of

approximation (RMSEA), and standardized root mean squared residual (SRMR) to assess model fit [36]–[38]. These fit indices help researchers determine the extent to which the estimated model adequately represents the observed data. By comparing the fit indices of the estimated model to those of the saturated model, researchers can assess the overall fit of the model and make inferences about its validity [39].

Table 3. Model Fit Test

	<b>Saturated Model</b>	<b>Estimated Model</b>
SRMR	0.103	0.103
d_ULS	0.830	0.830
d_G	0.437	0.437
Chi-Square	312.153	312.153
NFI	0.724	0.724

The values of SRMR, d\_ULS, d\_G, and Chi-Square are used to assess the fit of the saturated and estimated models. For the saturated model, the SRMR value of 0.103 suggests a good fit, while the d\_ULS value of 0.830 indicates how well the model explains the observed data. The d\_G value of 0.437 also provides a measure of fit. However, the chi-square value of 312.153 is not directly applicable in the context of a saturated model. For the estimated model, the SRMR value remains the same at 0.103, indicating a similar fit to the saturated model. The d\_ULS and d\_G values also remain consistent at 0.830 and 0.437, respectively. The chi-square value of 312.153 is consistent with the saturated model. Additionally, the NFI value of 0.724 indicates

the proportionate improvement in fit relative to the null model.

Table 4. R Square

	<b>R Square</b>	<b>R Square Adjusted</b>
Digital Technology	0.622	0.612

Metrics used to assess how well a regression model explains the variance in the dependent variable include R-Square ( $R^2$ ) and Adjusted R-Square ( $R^2$  adjusted). These metrics are commonly employed in the framework of Structural Equation Modeling (SEM) to evaluate the percentage of the endogenous variable's variance that can be attributed to its predictors. The predictors in the model account for roughly 62.2% of the variance in digital technology, according to the  $R^2$  value of 0.622 for this field. Stated differently, 62.2% of the observed variability in digital technology may be explained by the model. By accounting for the number of predictors, the modified  $R^2$  value of 0.612 takes the complexity of the model into account. This adjusted result gives a more cautious estimate of the model's ability to generalize to new data, and it is marginally less than the raw  $R^2$ .

**4.4 Structural Model**

Structural model analysis involves examining the paths between the latent constructs in the structural equation model of this study. The information provided includes the coefficients for the paths, sample means, standard deviations, T statistics, and p-values for the three paths.

Table 5. Hypothesis Testing

	<b>Original Sample (O)</b>	<b>Sample Mean (M)</b>	<b>Standard Deviation (STDEV)</b>	<b>T Statistics ( O/STDEV )</b>	<b>P Values</b>
Business Growth -> Digital Technology	0.439	0.433	0.102	3.434	0.000
Business Process Automation -> Digital Technology	0.321	0.336	0.116	2.241	0.001
E-commerce Adoption -> Digital Technology	0.502	0.497	0.098	5.137	0.000

Positive route coefficients for each of the three paths—business growth to digital

technology, business process automation to digital technology, and e-commerce adoption to digital technology—indicate a positive correlation between the corresponding latent components. These path coefficients are statistically significant because each path's T statistics are rather high and the matching p values are all very low (0.000). An appreciation of the size and importance of the links in the structural model is aided by the sample mean, standard deviation, and T statistics.

A statistically significant association between Business Growth and Digital Technology is suggested by a T statistic of 3.434 and a p-value of 0.000, based on the path coefficient of 0.439. Similarly, a statistically significant association between digital technology and business process automation is supported by a p-value of 0.001 and a T statistic of 2.241, with a path coefficient of 0.321 indicating a positive relationship. Furthermore, a T-statistic of 5.137 and a p-value of 0.000 show a statistically significant link between E-commerce Adoption and Digital Technology, with a path coefficient of 0.502 indicating a positive relationship.

#### DISCUSSION

The structural model results provide valuable insights into the relationships between Business Growth, Business Process Automation, E-commerce Adoption, and Digital Technology in the context of Micro, Small, and Medium Enterprises (MSMEs) in Jakarta.

#### *Digital Technology Integration and Business Growth*

The positive relationship between business growth and digital technology adoption suggests that MSMEs experiencing growth are more likely to invest in and adopt digital technologies, supporting research [40], [41]. This is in line with broader business trends that recognize the strategic importance of technology in improving efficiency, expanding market reach, and remaining competitive [42]. MSMEs that adopt digital technology tend to have better financial performance [41]. Digital technology adoption has a positive influence on economic

performance and the corporate environment [43]. In addition, digital technology mediates the effect of business strategy on MSME performance, enabling online marketing and increased sales [44]–[46]. The adoption of new digital technologies can lead to changes in corporate strategy, with greater adoption resulting in greater strategy changes. Overall, the adoption of digital technologies is seen as a strategic move for MSMEs to drive growth and improve performance in the global market.

#### *The Effect of Business Process Automation on Digital Technology Adoption*

The integration of business process automation and digital technology is positively correlated. SMEs that adopt automation processes are more likely to embrace a broader range of digital technologies, leading to improved operational efficiency and reduced manual errors. This integration lays the foundation for a more technologically advanced business environment [41], [47].

#### *E-commerce Adoption as a Catalyst for Digital Technology*

The strong positive relationship between e-commerce adoption and digital technology adoption suggests that SMEs actively engaged in e-commerce are more likely to embrace digital technologies for comprehensive digital transformation. E-commerce serves as a gateway to the digital world, driving businesses towards a broader adoption of digital technologies [16], [48].

#### *Implications for MSMEs in Jakarta*

##### Strategic Technology Investment

The findings above underscore the importance of technology investment for MSMEs in Jakarta. As businesses grow, investing in and utilizing digital technology is integral to sustaining and accelerating that growth.

#### *Synergy Between Automation and Digitalization*

MSMEs can benefit from strategically integrating business process automation with broader digitization initiatives. This synergy improves overall operational efficiency,

reduces costs, and positions businesses for long-term competitiveness.

### *E-commerce as a Driver of Digital Transformation*

For MSMEs looking to embark on a digital transformation journey, an emphasis on e-commerce adoption can be a catalyst. E-commerce activities not only expand market reach but also set the stage for the adoption of digital technologies across the board.

### *Limitations and Future Research*

While the results of this study provide valuable insights, it is important to recognize some limitations. The scope of this study may not cover all factors that may influence technology adoption among MSMEs in Jakarta. Future research could explore additional variables, consider external contextual factors, and use a mixed methods approach to gain a more comprehensive understanding.

## 5. CONCLUSION

In this study, we looked at the complex interactions that exist between digital technology, e-commerce adoption, business process automation, and company growth among Jakarta's diverse population of Micro, Small, and Medium-sized Enterprises (MSMEs). By means of meticulous Structural Equation Modeling, we have discovered noteworthy and affirmative correlations that shed light on the trajectory of technological

advancement in these businesses. Businesses that prioritize growth appear to be more willing to invest in state-of-the-art technologies, as seen by the positive correlation found between digital technology adoption and business growth. Furthermore, the report underscores the mutually beneficial association between digitalization and business process automation, stressing the interdependence of these essential elements. Additionally, the study emphasizes how important e-commerce adoption is as a major force behind digital transformation. MSMEs set the stage for a broader adoption of digital technology by actively participating in e-commerce. The ramifications for Jakarta's MSMEs are significant, highlighting the strategic value of technology investment and offering chances for automation and digitalization to work together.

As we rejoice in these discoveries, we also recognize the limitations of the study and urge more research to fully explore the multitude of factors affecting MSMEs' use of technology. The results offer practical advice for companies trying to negotiate the digital terrain and for legislators hoping to create a climate that encourages technical advancement and expansion. In summary, this study adds to the growing body of knowledge about digital transformation by offering a sophisticated perspective of the forces at work in Jakarta's thriving MSME sector.

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