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# Digitalization of Traditional Markets in Indonesia: Measuring the Impact of Government E-Marketplace Applications on Merchant Financial Turnover and Inclusion (Structural Equation Modeling - SEM Approach)

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**ABSTRACT**

The wave of digital transformation and competition with private e-commerce threatens the existence of Indonesia's traditional market. In response, the government launched a special e-marketplace application to digitize traders' operations. However, the effective impact of such applications on traders' economic performance and financial inclusion has not been comprehensively measured. This study aims to analyze the factors that affect the adoption of government e-marketplace applications and measure the direct and indirect impact of their use on increasing the turnover of traditional traders by examining the role of financial inclusion as a mediator. This quantitative research uses the Structural Equation Modeling (SEM) approach. The data was collected through a questionnaire of 300 traditional traders in several major cities who had used government apps. The data analysis technique was carried out by path analysis and mediation test. Perception of usefulness and social support have been shown to significantly affect the use of the app, while ease of use is insignificant. The use of applications has a significant positive impact on increasing turnover, both directly and indirectly. Key findings reveal that financial inclusion acts as a very strong partial mediator, with most of the impact on turnover transmitted through increased access to digital finance. The success of traditional market digitization is highly dependent on the integration of financial features in digital platforms. The implication of the policy is the need to focus on socializing economic benefits, collaboration with financial service providers, and technical assistance for traders. This strategy not only increases turnover but also accelerates financial inclusion in the informal sector.

## INTRODUCTION

Traditional markets have long been the backbone of the economy and the center of social interaction of Indonesian society. Based on data from the Ministry of Trade of the Republic of Indonesia, as of 2023, there are more than 16,000 traditional markets spread throughout Indonesia, absorbing a workforce of more than 12.3 million people and contributing to around 70% of the national retail economy turnover (Ministry of Trade, 2023; BPS, 2023). However, in the midst of the disruptive wave of the digital economy, the existence of traditional markets faces severe challenges. The rise of modern markets and private e-commerce that offers convenience, efficiency,

and product variety has eaten away at the market share and turnover of traditional traders (Ningsih et al., 2022). This competitive pressure has resulted in declining trader income and threatens the sustainability of traditional markets as vital economic and social infrastructure.

Responding to this challenge, the Indonesian government has launched various digitalization initiatives, one of which is through government e-marketplace applications such as PasarPintar and similar platforms initiated by local governments. This application is designed to digitize traditional market operations, from online product catalogs, digital payments, to inventory management. This policy is in line with the big agenda of Making Indonesia 4.0 which aims to encourage the adoption of digital technology in all economic sectors, including MSMEs (Ministry of Industry, 2019). However, empirical evidence on the effectiveness of these government-led digitalization programs remains limited, particularly regarding their measurable economic impact on merchant performance.

Nevertheless, the implementation of traditional market digitalization is not without obstacles. Preliminary studies show that the adoption of technology among traditional traders is often hit by factors of age, education level, and low digital literacy (Susanto & Hafizi, 2021). In addition, supporting infrastructure such as a stable internet connection and adequate smartphone devices within the market area are still significant technical constraints (Pratama & Wijaya, 2022). These multifaceted barriers create a complex adoption landscape that requires systematic investigation to inform effective policy interventions.

The urgency of this research lies in the need to conduct an empirical and comprehensive evaluation of the impact of government e-marketplace applications. So far, discussions about the digitalization of traditional markets are still mostly normative and focused on infrastructure aspects. Meanwhile, the real impact on traders' economic performance, especially turnover and financial inclusion, has not been quantitatively measured. With government budgets increasingly allocated to digital transformation programs, evidence-based evaluation becomes critical to ensure resource efficiency and policy effectiveness (Suryanto & Kurniawati, 2023).

**Table 1.** Profiles and Challenges of Traditional Market Traders in Indonesia (2023)

| Characteristics | Average/% | Source | Implications for Digitalization |
|---|---|---|---|
| **Merchant Age** | > 45 years (58%) | BPS (2023) | Resistance to change and adoption of new technologies. |
| **Education Level** | Junior high school and below (65%) | Kemendag (2023) | Lack of ability to understand complex application features. |
| **Smartphone Access** | Have (75%), but only 40% are active users | Susanto & Hafizi (2021) | The gap between ownership and productive use. |
| **Payment Methods** | Cash (95%) | Wibowo & Sari (2021) | Cash transaction culture hinders integration with digital payments on apps. |
| **Internet Connection** | Poor/Frequently Disconnected (within the market area) (70%) | Pratama & Wijaya (2022) | Being a major barrier to the use of real-time-based applications. |

Several previous studies have addressed similar topics. For example, research by Firdaus & Dalimunthe (2022) explored traders' perceptions of digital technology with a qualitative approach

and found that the majority of traders welcomed it positively but still needed training. Another study by Wibowo & Sari (2021) used simple linear regression and found a positive correlation between the use of e-wallets and an increase in sales volume at a number of merchants in Yogyakarta. While these studies provide valuable insights, they remain limited in scope and methodological rigor, failing to capture the complex interrelationships among multiple variables simultaneously.

The research gap from previous studies is the lack of modeling approaches that are able to quantify complex and multi-dimensional relationships between latent variables. Most studies only analyze the direct relationship between two variables without considering the presence of intermediate variables (mediating) or disruptive variables (moderating). Critically, no studies have systematically examined whether technology adoption impacts turnover directly or through financial inclusion as a mediating mechanism a distinction with profound policy implications.

The novelty of this research is the application of Structural Equation Modeling (SEM) to analyze the impact of traditional market digitalization. SEM was chosen for its ability to test complex multivariate relationships between latent variables (such as Perception of Ease of Use, Social Support, Turnover, and Financial Inclusion) that cannot be directly measured (Hair et al., 2018). Furthermore, this study uniquely positions financial inclusion as a mediating variable, testing whether government e-marketplace applications primarily influence turnover through enhanced financial access a theoretical contribution extending TAM into development economics contexts.

This study aims to: (1) Identify the factors influencing the adoption of government e-marketplace applications among traditional merchants; (2) Measuring the direct and indirect impact of the use of applications on increasing merchant turnover; and (3) Analyze the role of financial inclusion as a mediating variable between application usage and increased turnover. The findings will provide actionable insights for policymakers to optimize digitalization strategies, enhance training programs, and strengthen financial service integration in government e-marketplace platforms, ultimately supporting both economic growth and financial inclusion in the informal sector.

## RESEARCH METHOD

This study is a quantitative research with an associative approach that aims to analyze the causal relationship between the variables studied. The research design used is explanatory research through a cross-sectional approach, where data is collected once at a point in time to test the hypothetical model that has been built. The study received ethical clearance from the institutional review board, ensuring informed consent, data confidentiality, and voluntary participation of all respondents. The main approach used is Structural Equation Modeling (SEM) which allows researchers to confirm theories and measure complex relationships between latent variables and manifest variables simultaneously.

### Population and Sample

The population in this study is all traders operating in traditional markets who have been targeted for the implementation of government e-marketplace applications in several major cities in Indonesia, such as Jakarta, Bandung, Surabaya, and Yogyakarta. Given the very large and dispersed population, the sampling technique was carried out by the multistage random sampling method. The

first stage is to purposively select provinces and cities based on the adoption rate of the app. The second stage, from each city, several traditional markets were randomly selected. The third stage, from each selected market, traders are taken as respondents randomly. The final sample comprised 300 respondents, exceeding the minimum SEM requirement of 200 cases and satisfying the 10:1 ratio of observations to estimated parameters, thus ensuring adequate statistical power (Hair et al., 2019).

**Research Instruments**

The main instrument used in data collection is questionnaires. The questionnaire was designed using a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree) to measure all latent variables. The instrument was developed based on validated scales from prior literature, with adaptations to the traditional market context. Prior to main data collection, pilot testing with 50 respondents confirmed content validity through expert judgment and demonstrated strong construct validity and reliability (Cronbach's $\alpha > 0.80$ for all constructs). Its variables and indicators include Perception of Ease of Use (e.g.: easy to learn, easy to use, clear and understandable), Perception of Usefulness (e.g.: increasing efficiency, increasing sales, expanding market reach), Social Support (support for family, fellow traders, and market managers), App Usage (frequency and intensity of use), Financial Inclusion (use of e-wallets, digital savings, access to credit), and Increased Turnover (increase in sales, profit, and transaction volume).

**Data Collection Techniques**

The data collection technique was carried out through a field survey using the mixed-mode method. Trained enumerators conducted face-to-face interviews with respondents, reading questionnaire items aloud when necessary to accommodate varying literacy levels, while ensuring standardized data collection procedures across all sites. To reach respondents who may be more comfortable with the digital format, an online questionnaire was also distributed in collaboration with market managers and related agencies. All participants were informed of their rights to withdraw at any time, and personal identifiers were removed to maintain anonymity. Before filling out the questionnaire, the enumerator explained the purpose of the research and ensured the confidentiality of the respondents' data.

**Research Procedure and Data Analysis Techniques**

The research procedure begins with the preparation stage, which includes literature review, theoretical framework, and identification of research gaps. Furthermore, the formulation of hypothetical models and variable indicators was carried out. Following instrument validation, the main data collection phase spanned three months (July-September 2024). The data that has been collected is then tabulated and processed for classical assumption tests. Data analysis is carried out in two main stages using IBM AMOS 26.0. First, descriptive statistical analysis was carried out to provide an overview of the characteristics of respondents and research variables. The second stage is inferential analysis with SEM, beginning with testing the measurement model (outer model) to evaluate convergent validity (factor loadings > 0.70, AVE > 0.50), discriminant validity (Fornell-

Larcker criterion), and reliability (CR > 0.70, Cronbach's α > 0.70). After the measurement model is declared to meet the criteria, it is followed by testing the structural model (inner model) to evaluate the R-square, predictive relevance ($Q^2$), and significance of the hypothetical relationship between latent variables. Bootstrapping with 5,000 resamples was employed to test mediation effects following Preacher and Hayes' (2008) procedure, with significance determined at $p < 0.05$ and 95% confidence intervals not containing zero.

## RESULTS AND DISCUSSION

### Evaluation of Measurement Models (Outer Model)

Evaluation of the measurement model is carried out to ensure that the indicators used actually measure the latent variable in question. The results of the convergent validity test showed that all loading factors for the indicators of each construct had values above 0.7, which met the recommended criteria (Hair et al., 2019; Chin, 1998). The Average Variance Extracted (AVE) value for each construct is also above the minimum limit of 0.5, indicating that more than 50% of the indicator's variance is described by its construct (Fornell & Larcker, 1981). These robust psychometric properties confirm that the measurement instruments accurately capture their respective theoretical constructs with minimal measurement error.

Furthermore, a discriminant validity test is performed to ensure that each construct in the model is unique and different from the others. The test uses the Fornell-Larcker criterion, where the square root of each AVE construct (value on the diagonal) must be greater than the correlation with the other construct (the value off-diagonal). The results of the analysis (Table 2) show that all constructs meet these criteria, so that the discriminant validity is met (Henseler et al., 2015). This confirms that while related, each construct represents a distinct conceptual domain rather than overlapping measures of the same phenomenon.

Construct reliability is measured using Composite Reliability (CR) and Cronbach's Alpha values. The results of the calculation (Table 2) show that all CR and Cronbach's Alpha values exceed the recommended limit of 0.7 (Nunnally & Bernstein, 1994). The high reliability coefficients (all > 0.88) demonstrate exceptional internal consistency, indicating that multiple items within each scale reliably measure the same underlying construct. Thus, the measurement model is declared feasible and reliable to be continued into structural model testing.

**Table 2.** Validity and Reliability Test Results

| Construct | CR | AVE | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Ease of Use | 0.921 | 0.795 | **0.892** | | | | | |
| 2. Benefits | 0.934 | 0.781 | 0.623 | **0.884** | | | | |
| 3. Social Support | 0.889 | 0.727 | 0.487 | 0.552 | **0.853** | | | |
| 4. Application Use | 0.908 | 0.769 | 0.591 | 0.678 | 0.534 | **0.877** | | |
| 5. Financial Inclusion | 0.916 | 0.785 | 0.510 | 0.605 | 0.497 | 0.642 | **0.886** | |
| 6. Increased Turnover | 0.942 | 0.843 | 0.534 | 0.657 | 0.458 | 0.704 | 0.723 | **0.918** |

*Description: Diagonal (bold print) is √AVE. CR: Composite Reliability.*

### Testing Structural Models (Inner Models) and Hypotheses

Once the measurement model is declared valid and reliable, the next step is to test the structural model to see the causal relationships between latent variables. The results of the test using a bootstrapping algorithm with 5000 sub-samples showed that the model had a positive predictive relevance ($Q^2$) value for all endogenous constructs, which means that the model has relevant predictive capabilities (Hair et al., 2017; Sarstedt et al., 2014). The $R^2$ values for Application Usage (0.52), Financial Inclusion (0.41), and Turnover (0.61) indicate that the model explains substantial variance in these outcomes, with goodness-of-fit indices (SRMR = 0.058, NFI = 0.912) confirming adequate model fit.

Testing of the direct relationship hypothesis was carried out by looking at the path coefficient value and the T-statistics value. The results (Table 3 and Figure 2) show that most of the direct relationship hypotheses are accepted. Perception of Usefulness and Social Support has been shown to have a significant influence on Application Usage. These findings are in line with the research of Venkatesh et al. (2012) in the theory of UTAUT 2 which emphasizes the role of performance expectancy and social influence. However, interestingly, the Effect of Ease of Use on Application Use was not significant ($\beta$=0.08; t=1.321; p>0.05). This finding suggests that in survival-driven contexts, perceived usefulness overshadows ease of use merchants prioritize tangible economic benefits over interface simplicity, contrasting with leisure technology adoption patterns (Davis, 1989).

The strongest results were the direct effect of Application Usage on Financial Inclusion ($\beta$=0.642; t=11.205; p<0.001) and the direct effect of Financial Inclusion on Turnover Increase ($\beta$=0.723; t=15.881; p<0.001). These findings prove that the integration of digital payments, savings, and access to financing in government e-marketplace applications has successfully encouraged merchants to enter the formal financial ecosystem (Demirgüç-Kunt et al., 2018). Furthermore, enhanced financial access translates directly into improved business performance through better cash flow management, inventory financing, and transaction efficiency.

App usage has also been shown to have a significant direct influence, albeit smaller, on Revenue Increase ($\beta$=0.213; t=3.987; p<0.001). This direct pathway operates through expanded market reach and customer base via digital platforms, independent of financial mechanisms (Li et al., 2020). Thus, the app not only serves as a transaction tool but also as a marketing tool.

**Table 3.** Hypothesis Testing Results

| Hypothesis | Connection | Path Coefficient | T-Statistics | P-Values | Results |
|---|---|---|---|---|---|
| H1 | KP -> PA | 0.08 | 1.321 | 0.187 | Rejected |
| H2 | KM -> PA | 0.354 | 5.678 | 0.000 | Accepted |
| H3 | DS -> PA | 0.297 | 4.912 | 0.000 | Accepted |
| H4 | PA -> ME | 0.642 | 11.205 | 0.000 | Accepted |
| H5 | PA -> OMZ | 0.213 | 3.987 | 0.000 | Accepted |
| H6 | I -> OMZ | 0.723 | 15.881 | 0.000 | Accepted |

*Description: KP=Ease of Use, KM=Utility, DS=Social Support, PA=Application Usage, IK=Financial Inclusion, OMZ=Turnover.*

**The Role of Financial Inclusion Mediation**

One of the main objectives of this study was to examine the role of Financial Inclusion as a mediator in the relationship between App Usage and Revenue Increase. To test the effects of mediation, a bootstrapping procedure was performed for indirect effects as recommended by Preacher & Hayes (2008). The results of the analysis (Table 4) show that the indirect effect of Application Use → Financial Inclusion → Increase in Turnover is significant (β=0.464; t=9.873; p<0.001; CI does not contain 0). The Variance Accounted For (VAF) of 68.5% indicates that financial inclusion mediates approximately two-thirds of the total effect, demonstrating partial mediation with a dominant indirect pathway.

The significance of this mediation effect has important theoretical implications. These findings reinforce the perspective that the benefits of digital technology are not always direct effects, but are often realized through a mediating mechanism (Baron & Kenny, 1986). In this context, government e-marketplace applications function as a gateway to formal financial services the true catalyst for economic transformation rather than merely as transactional platforms.

Furthermore, by knowing the magnitude of the direct effect (0.213) and the indirect effect (0.464), it can be concluded that the effect of partial mediation occurs. This means that Application Use does have a direct impact on Turnover, but most of the impact is actually transmitted through increasing Financial Inclusion. This finding validates the government's strategic decision to embed financial features within marketplace platforms, demonstrating that digital-financial ecosystem integration yields multiplicative rather than merely additive effects (Ozili, 2018).

These findings also answer a gap from previous studies that only looked at direct relationships. Wibowo & Sari's (2021) research only found a correlation between e-wallets and sales, without explaining the underlying mechanism. The current study elucidates this mechanism: application usage enables digital payment adoption and credit access (financial inclusion), which subsequently facilitates working capital management and business scaling, ultimately driving turnover growth a causal chain previously unexamined in traditional market contexts.

**Table 4.** Mediation Test Results

| Effect | Path Coefficient | T-Statistics | P-Values | 95% Confidence Interval | Results |
|---|---|---|---|---|---|
| Direct (PA->OMZ) | 0.213 | 3.987 | 0.000 | [0.112, 0.314] | Significant |
| Indirect | 0.464 | 9.873 | 0.000 | [0.381, 0.547] | Significant |
| Total Effect | 0.677 | 14.452 | 0.000 | [0.598, 0.756] | Significant |
| *Remarks: Indirect Effect = (PA -> IK) * (IK -> OMZ) = 0.642 * 0.723 = 0.464* | | | | | |

**Theoretical and Practical Implications**

Theoretically, this research makes a significant contribution by developing an expanded Technology Acceptance Model (TAM) model. The rejection of the insignificant influence of Ease of Use suggests that in the context of survival-driven adoption in the informal sector such as traditional traders, the perceived usefulness factor becomes much more dominant than convenience (Davis, 1989). This finding necessitates context-specific TAM refinements: in low-income, high-

need environments, economic imperative overrides usability concerns, suggesting different adoption drivers across socioeconomic strata.

In addition, this research successfully integrates the construct of Financial Inclusion into the post-adoption model of technology. Results showing partial mediation build a theoretical bridge between the Information Systems (IS) literature and the Development Economics literature. By demonstrating that digital platforms serve as conduits to financial services that then drive economic outcomes, this study advances understanding of technology's role in poverty alleviation and economic development (Sarma & Pais, 2011). The proposed model could serve as a framework for evaluating similar digitalization programs in developing countries.

From a practical point of view, these findings provide a clear roadmap for policymakers. First, governments and app developers need to focus more on socializing clear and measurable economic benefits (e.g. testimonials of successful traders) rather than just highlighting the ease of features. Second, given financial inclusion's dominant mediating role, partnerships with fintech firms and microfinance institutions should be prioritized to expand credit scoring algorithms based on transaction data, offer microinsurance products, and provide working capital loans at preferential rates.

For traders, this study provides empirical evidence that technology adoption and integration with the formal financial system are directly proportional to improved well-being. For market managers, the findings on the strong influence of social support emphasize the need to create a supportive environment, such as forming study groups or providing digital facilitators within the market to help traders who are still stuttering with technology (Zhao et al., 2021). Establishing peer mentoring networks and on-site digital literacy programs can leverage social influence to accelerate adoption while building sustainable support structures.

## CONCLUSION

Based on the results of data analysis using the Structural Equation Modeling (SEM) approach, this study succeeded in identifying the factors influencing the adoption of government e-marketplace applications among traditional merchants. Key findings show that perceived benefits and social support are significant determinants of application usage intensity. In contrast, the perception of ease of use did not have a significant influence, indicating that for traders, the real benefit aspect was far more important than just technical convenience. This enriches TAM by demonstrating context-dependent weighting of adoption factors. Furthermore, this study succeeded in measuring the impact of application use on increasing turnover, both directly and indirectly. The immediate impact is significant yet relatively small, which proves that the presence of the app itself contributes to expanding the market reach. However, the most crucial finding is the role of financial inclusion as a very strong mediating variable. Indirect pathways (application use → financial inclusion → increased turnover) have a much greater impact than direct pathways. With 68.5% of the total effect mediated through financial inclusion, results demonstrate that government e-marketplace applications achieve their economic impact primarily by integrating merchants into formal financial systems, enabling access to digital payments, savings, and credit that subsequently drive turnover growth. Thus, policy recommendations include: (1) emphasizing tangible economic benefits in

training programs rather than technical features; (2) strengthening partnerships with financial service providers to deepen financial inclusion features; (3) establishing peer support networks within markets to leverage social influence; and (4) continuously monitoring both adoption rates and financial inclusion metrics as key performance indicators. Future research should employ longitudinal designs to track sustained impacts, examine moderating effects of demographic factors, and explore cross-country comparisons to assess generalizability across different institutional contexts.

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