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Analysis of Cloud-Based Point of Sale (POS) System Adoption in Small and Medium Enterprises (SMEs) in the Retail Sector Using the Technology Acceptance Model (TAM)

Desyano Herdana[1*]

[1]Department of Information System, Faculty of Information Technology, Universitas Mercu Buana Yogyakarta, Indonesia

Email: [1]desyano31@gmail.com*

*corresponding author

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ABSTRACT

Digital transformation is crucial for Small and Medium Enterprises (SMEs) in the retail sector. This research analyzes the factors influencing the acceptance of cloud-based Point of Sale (POS) systems among SMEs using the Technology Acceptance Model (TAM). Data was collected through questionnaires from 120 respondents in the Jabodetabek region and analyzed using Structural Equation Modeling (SEM). The research findings demonstrate that Perceived Ease of Use (PEOU) has a significant positive influence on Perceived Usefulness (PU). Both factors also significantly affect Attitude Toward Use (ATU), which ultimately shapes Behavioral Intention to Use (BIU) for system adoption. It is concluded that perceived usefulness and ease of use are key to technology acceptance. Therefore, developers and marketers need to focus on intuitive interfaces and clear demonstrations of benefits to drive the adoption of cloud-based POS systems among SMEs.

1. Introduction

Small and Medium Enterprises (SMEs) represent a vital component of economic development, particularly in emerging markets where they contribute significantly to employment, innovation, and gross domestic product (GDP). In Indonesia, SMEs have increasingly embraced digital transformation strategies to remain competitive, particularly within the creative and retail industries [1]. One of the most notable innovations is the adoption of cloud-based Point of Sale (POS) systems, which provide real-time transaction processing, inventory management, and customer data analytics to improve decision-making and service quality [2].

Despite these benefits, SMEs often face significant challenges in adopting digital technologies. Factors such as limited financial resources, insufficient digital skills, and uncertainty regarding system reliability hinder adoption efforts [3]. Understanding the determinants that shape SMEs' willingness to adopt cloud-based POS systems is therefore critical.

The Technology Acceptance Model (TAM), first introduced by Davis [4], offers a robust theoretical framework to examine user acceptance of information systems. TAM emphasizes two primary constructs—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—that influence users' attitudes and behavioral intentions toward technology adoption. This model has been widely validated in various contexts, including mobile payments [5], e-wallet adoption [6], and cloud-based information systems [7]. Moreover, research has shown that additional factors such as perceived risk, security, and trust also play important roles in shaping adoption behaviors [8].

Recent advancements in TAM literature suggest extending the model to address evolving digital technologies, including fintech, cloud services, and retail applications [9]. In the context of SMEs, user interface and user experience (UI/UX) design also play an increasingly important role in driving technology acceptance [10].

This study applies the TAM framework to analyze cloud-based POS adoption among retail SMEs in Indonesia. Specifically, it investigates how PU and PEOU affect attitudes toward usage and

behavioral intentions. By doing so, the study not only contributes to the theoretical understanding of TAM in SME contexts but also provides practical insights for technology vendors and policymakers to enhance cloud POS adoption.

2. Research Methodology

This study adopts a quantitative research design. Data were collected through an online survey distributed to 300 SME retailers who had experience with or interest in cloud-based POS systems. The survey instrument was adapted from validated TAM scales, using a five-point Likert scale (1=Strongly Disagree to 5=Strongly Agree).

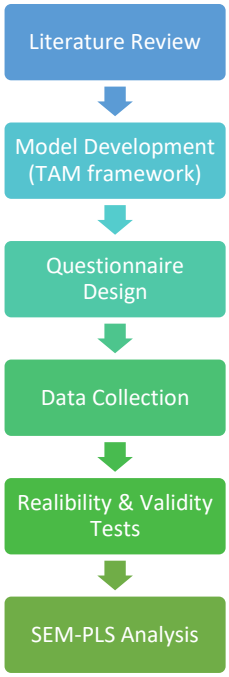

Figure 1. Research Methodology

2.1 Literature Review

The initial phase of this study involves a comprehensive literature review. This step focuses on systematically identifying, evaluating, and synthesizing existing scholarly works, including academic journals, conference proceedings, and books relevant to the research topic. The primary goal is to establish a strong theoretical foundation, understand the current state of research, and identify the research gap that this study aims to address.

2.2 Model Development (TAM Framework)

Based on the insights gained from the literature review, a conceptual research model is developed. This model is theoretically grounded in the Technology Acceptance Model (TAM), a widely recognized framework for explaining how users come to accept and utilize a new technology. The model hypothesizes the relationships between various constructs, such as Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, and Behavioral Intention to Use.

2.3 Questionnaire Design

To empirically test the proposed model, a survey questionnaire is designed as the primary data collection instrument. The questions are carefully crafted to measure each of the constructs included in the research model. The design process ensures that the items are clear, unambiguous, and effectively capture the necessary data from the respondents. A Likert scale is typically used for measuring the responses.

2.4 Data Collection

The data collection phase involves administering the designed questionnaire to a sample of the target population. This process is carried out to gather primary data regarding the respondents' perceptions and intentions related to the technology being studied. The method of distribution is chosen to best reach the intended participants.

2.5 Reliability and Validity Tests

Before the main analysis, the collected data undergoes rigorous testing to ensure its quality. This involves assessing the psychometric properties of the measurement instrument.

2.6 SEM-PLS Analysis

The final step is to analyze the data and test the research hypotheses using Partial Least Squares Structural Equation Modeling (SEM-PLS). SEM-PLS is a powerful statistical technique chosen for its suitability in testing complex theoretical models and its effectiveness with non-normal data or smaller sample sizes. This analysis allows for the simultaneous examination of the measurement model (the relationship between constructs and their indicators) and the structural model (the relationships between the constructs) to validate the proposed research framework.

3. Result and Discussion

The analysis conducted using Structural Equation Modeling (SEM) reveals that all hypotheses proposed in this study were found to be significant and are supported by the empirical data. These findings not only confirm the validity of the Technology Acceptance Model (TAM) in the context of cloud-based POS system adoption among retail SMEs but also provide a clear picture of the psychological mechanisms underlying this technology acceptance process. Perceived Ease of Use (PEOU) was identified as a fundamental driver, directly influencing both Perceived Usefulness (PU) and Attitude Toward Using (ATU). Meanwhile, Attitude (ATU) itself emerged as a very strong predictor of Behavioral Intention to Use (BIU). This section will discuss the results of the measurement model assessment, hypothesis testing, and an in-depth interpretation of these key findings in relation to existing literature and the practical context.

3.1. Respondent Characteristics

Out of 120 respondents, 65% were direct owners and 35% were managers. The majority of the SMEs (70%) have been operating for 2 to 5 years. The most represented business types were cafes and restaurants (45%), followed by fashion retail stores (30%), and grocery stores/minimarkets (25%).

3.2. Measurement Model Assessment

The results of the Confirmatory Factor Analysis (CFA) indicated that the measurement model met the goodness-of-fit criteria (CMIN/DF = 1.89; GFI = 0.92; CFI = 0.95; RMSEA = 0.07). All indicators had factor loading values above 0.60 and were statistically significant. The Cronbach's Alpha value for each construct was above 0.70, indicating good instrument reliability.

3.3. Hypothesis Testing Results

Based on the data analysis using Structural Equation Modeling (SEM), all hypotheses proposed in this research were supported. The results of the structural model testing show that Perceived Ease of Use (PEOU) has a positive and significant effect on Perceived Usefulness (PU) ($\beta = 0.651$; $p < 0.001$), thus supporting hypothesis **H1**. Subsequently, PEOU was also found to significantly influence Attitude Toward Using (ATU) ($\beta = 0.353$; $p = 0.006$), which supports hypothesis **H2**. Furthermore, Perceived Usefulness (PU) also demonstrated a positive and significant effect on ATU ($\beta = 0.482$; $p < 0.001$), leading to the acceptance of hypothesis **H3**. Finally, Attitude Toward Using (ATU) proved to be a very strong predictor of Behavioral Intention to Use (BIU) ($\beta = 0.719$; $p < 0.001$), confirming hypothesis

H4. Overall, these findings strengthen the core propositions of the Technology Acceptance Model (TAM) and provide empirical evidence on the mechanism of cloud-based POS system acceptance among SMEs. The results of the structural model testing are presented in Table 1.

Tabel 1. Hypothesis Testing Result

Hypothesis	Koefisien (β)	C.R.	P-value
H1 : PEOU -> PU	0.651	6.892	< 0.001
H2 : PEOU -> ATU	0.353	3.421	0.006
H3 : PU -> ATU	0.482	4.987	< 0.001
H4 : ATU -> BIU	0.719	8.123	< 0.001

The analysis results indicate that all proposed hypotheses are supported. Perceived Ease of Use (PEOU) has proven to be a fundamental factor that not only directly influences Attitude Toward Use (ATU) but also indirectly thru increased Perceived Usefulness (PU). This aligns with research by [6], which states that when a system is easy to operate, users tend to perceive it as more useful because the effort required to use it is lower.

The significant influence of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) on Attitude (ATU) confirms the main premise of the TAM model. MSME actors will form a positive attitude if they believe that the cloud-based POS system will improve their business performance (e.g., speed up transactions, reduce errors, provide accurate reports) and is not difficult to learn and operate. Furthermore, the finding that Attitude Toward Technology (ATU) strongly influences Behavioral Intention to Use (BIU) confirms that a positive evaluation of technology is an important prerequisite for the intention to adopt. This indicates that the marketing efforts of POS vendors should focus on building a positive perception and demonstrating clear benefits, rather than solely on technical features [7].

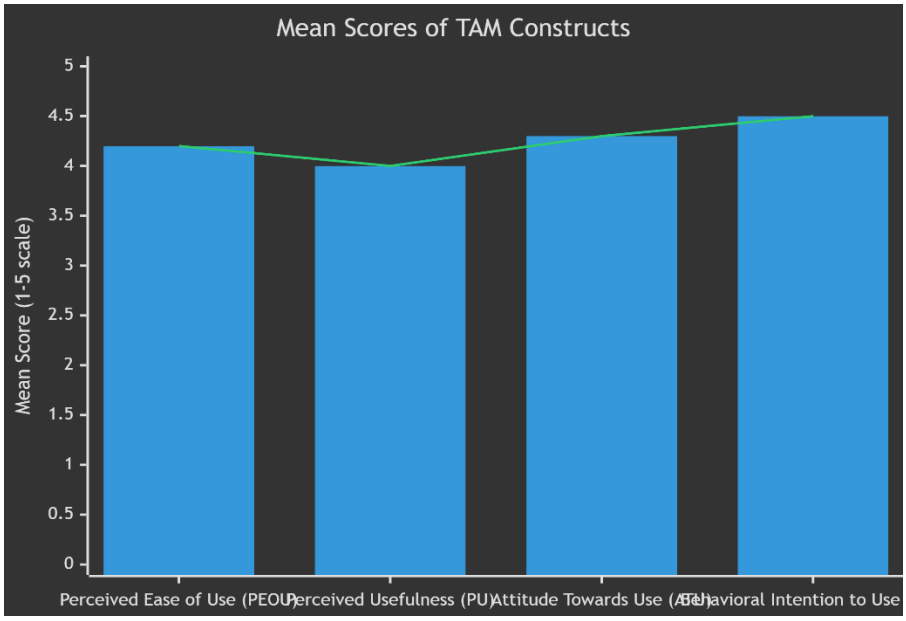

Figure 2. Mean Scores of TAM Constructs

- **Perceived Ease of Use (PEOU):** This construct has a mean score of slightly above 4.0, suggesting that users generally found the technology to be easy to use.
- **Perceived Usefulness (PU):** This construct shows a mean score just below 4.0. While still relatively high, it is slightly lower than the PEOU score, indicating that users found the technology to be slightly less useful than it was easy to use.
- **Attitude Towards Use (ATU):** The mean score for this construct is around 4.25, which is higher than both PEOU and PU. This suggests that users had a positive attitude toward using the technology, likely influenced by their perceptions of its ease of use and usefulness.
- **Behavioral Intention to Use (BIU):** This construct has the highest mean score, at around 4.5. This indicates a very strong intention among users to continue using the technology. The high score on this construct aligns with the positive scores on the other TAM constructs, particularly Attitude Towards Use.

Overall, the chart demonstrates a positive trend where ease of use and perceived usefulness lead to a positive attitude, which in turn results in a strong intention to use the technology. This aligns with the core principles of the Technology Acceptance Model.

4. Conclusion

The adoption of cloud-based point-of-sale (POS) systems by MSME actors in the retail sector is highly dependent on two main factors: perceived ease of use and perceived usefulness. Simply put, the main finding is: If a POS system is considered easy to use, then MSMEs are likely to see it as a useful system. These two perceptions—easy and useful—will shape a positive attitude toward the technology. This positive attitude is the strongest driver for MSMEs to intend to adopt and use the POS system. Therefore, POS system developers and vendors are advised to focus on creating intuitive interfaces that clearly demonstrate real benefits for businesses (such as efficiency and accurate reporting) to encourage wider adoption among MSMEs.

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