

# Analysis of Reliability, Transaction Speed, and User Experience on Information System Integration in E-commerce Business in Indonesia

Loso Judijanto<sup>1</sup>, Wily Mohammad<sup>2</sup>, Etika Purnamasari<sup>3</sup>, Hanifah Nurul Muthmainah<sup>4</sup>

<sup>1</sup> IPOSS Jakarta, Indonesia

<sup>2</sup> Universitas IPWIJA

<sup>3</sup> Sekolah Tinggi Ilmu Komputer 22 Januari Kendari

<sup>4</sup> Universitas Siber Muhammadiyah

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## ABSTRACT

This research investigates the dynamics of information system integration in the context of e-commerce businesses in Indonesia, focusing on the critical factors of reliability, transaction speed, and user experience. Employing a quantitative approach, the study utilizes Structural Equation Modeling with Partial Least Squares (SEM-PLS) to analyze data from a sample of 175 participants. The measurement model assessment reveals robust factor loadings and reliability measures, establishing the foundation for further analysis. Discriminant validity analysis highlights the distinctiveness of the constructs, though attention to refining measurement items for user experience is recommended. The model fit assessment indicates that the proposed structural model aligns well with the observed data. The structural model analysis uncovers significant positive relationships between reliability, transaction speed, user experience, and information system integration. Furthermore, the R-Square values underscore the substantial impact of these factors, explaining approximately 60.2% of the variance in information system integration. The findings provide valuable insights for businesses and policymakers, emphasizing the need to prioritize reliability, transaction speed, and user experience to enhance information system integration in Indonesian e-commerce.

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## Corresponding Author:

Name: Loso Judijanto

Institution: IPOSS Jakarta, Indonesia

Email: [losojudijantobumn@gmail.com](mailto:losojudijantobumn@gmail.com)

## 1. INTRODUCTION

The e-commerce landscape in Indonesia has experienced significant growth and transformation due to technological advancements and changing consumer preferences. Businesses in the e-commerce sector rely heavily on robust information

systems to navigate the complexities of the dynamic marketplace and ensure operational efficiency, customer satisfaction, and sustainable growth. These information systems integrate various components and processes, playing a crucial role in the success of e-commerce companies [1]. The Indonesian government has implemented regulations

and policies to establish a solid legal framework for e-commerce, ensuring the integrity, security, and growth of the industry. However, these regulations need to be continuously updated and adapted to keep up with the rapidly changing technology and industry dynamics. The state's role in monitoring industrial developments, adjusting regulations, and educating the public is essential in establishing a fair, safe, and sustainable e-commerce ecosystem [2].

The success of online commerce in Indonesia depends on providing a reliable, fast, and user-friendly experience [3]. This research aims to comprehensively understand the complex interactions within the e-commerce ecosystem in Indonesia, specifically focusing on the convergence between reliability, transaction speed, and user experience [4]. The study examines the effect of e-service quality on competitive advantages in the tourism and hotel businesses in Thailand [5]. It also explores the influence of e-service quality variables on consumer confidence in shopping at Shopee, a popular marketplace in Indonesia [6]. Additionally, the research investigates the impact of promotion, service quality, electronic word of mouth, and brand image on consumer buying interest in Lazada, an e-commerce site in Semarang, Indonesia [7]. Furthermore, the study examines the mediating role of e-commerce capability in the relationship between orientation strategy or hybrid channel and performance in micro and small businesses. Finally, the research analyzes the quality of information and system usability on user experience and purchase decisions on the Tokopedia e-commerce platform in Indonesia. The significance of this research lies in its potential to uncover insights that can empower businesses, policymakers and technology professionals to optimize their information systems, thereby improving the overall e-commerce landscape.

Reliability, transaction speed, and user experience are crucial factors that affect the integration of information systems in the e-commerce sector in Indonesia. The Indonesian government has implemented

regulations and policies, such as Law Number 11 of 2008 and Law Number 19 of 2016, to establish a solid legal framework for e-commerce in the country [1]. However, with the rapid development of technology and industry dynamics, these regulations and policies need to be continuously updated and adapted to meet new needs [8]. Small and Medium-sized Enterprises (SMEs) play a significant role in Indonesia's economy, and e-commerce adoption can help them gain a competitive edge [2]. Factors such as Decision Maker's IT Knowledge, Innovativeness, and Complexity influence the adoption of e-commerce technology in retail SMEs, and developing or training IT and e-commerce skills is identified as the best strategy to increase adoption [9]. The growth of e-commerce in Indonesia has led to an increase in consumer disputes, highlighting the need for a regulatory framework for Online Dispute Resolution (ODR) [10]. Implementing ODR models in e-commerce can efficiently resolve disputes and benefit businesses and consumers, but collaboration between authorities and stakeholders is crucial for ensuring effectiveness.

The premise of this research lies in the transformative potential of information systems integration to improve the performance and competitiveness of e-commerce businesses. By specifically focusing on three areas namely reliability, transaction speed, and user experience, this research seeks to contribute nuanced insights into the intricate dynamics that define successful information systems integration. Understanding these dynamics not only facilitates the identification of areas for improvement, but also enables the formulation of strategic interventions to strengthen the foundation of e-commerce platforms operating in Indonesia. The main questions guiding this research are: How do reliability, transaction speed and user experience affect information system integration in e-commerce businesses in Indonesia? Answering this question is critical to uncovering the key determinants that shape the effectiveness of information systems integration and, consequently, the

success of e-commerce ventures in the Indonesian market.

## 2. LITERATURE REVIEW

### 2.1 *Information System Integration in E-commerce*

Information system integration in e-commerce is crucial for achieving operational efficiency, reducing errors, and providing a unified user experience. Successful integration leads to real-time data sharing and streamlined processes, ultimately improving business performance. Understanding the interconnectedness of various elements within an e-commerce platform is essential for achieving successful information system integration [11]–[13]. The integration of application systems, control and information models, and software systems is necessary for seamless integration [14], [15]. Challenges in system integration include interoperability, complexity of system architecture, and lack of widespread adoption of integration approaches. The development of reference models and the use of cloud computing can enhance the management and integration of e-commerce enterprises. Overall, information system integration plays a vital role in enhancing the efficiency and effectiveness of e-commerce operations.

### 2.2 *Reliability in E-commerce Systems*

Reliability is a critical factor in e-commerce systems, as it positively impacts user satisfaction and loyalty. A reliable system ensures consistent performance, minimal disruptions, order accuracy, timely processing, and secure transactions, fostering trust among users. Understanding the dimensions of reliability, such as system availability and data accuracy, is crucial for identifying areas of improvement in e-commerce information systems [16]–[18].

### 2.3 *Transaction Speed in E-commerce*

Transaction speed is a critical factor in e-commerce, as it directly impacts user satisfaction and business performance. Optimizing transaction speed is essential to enhance user experience and retention. Factors such as server response time, network

latency, and database query efficiency play pivotal roles in influencing transaction speed in e-commerce platforms. Understanding and mitigating bottlenecks in transaction speed are imperative for ensuring a seamless user experience [19]. Research studies have highlighted the importance of transaction speed in online transactions and proposed various approaches to improve it. For example, one study introduced a feature-engineered machine learning-based model for detecting transaction fraud, which can help prevent high-risk transactions [20]. Another study focused on fine-grained read-write analysis to improve the execution efficiency of smart contract transactions in blockchain systems, resulting in faster transaction throughput [21]. By considering these factors and implementing appropriate strategies, e-commerce businesses can optimize transaction speed and provide a better user experience.

### 2.4 *User Experience in E-commerce*

User experience (UX) is a crucial factor in determining the success of e-commerce platforms and fostering customer loyalty. Factors such as website design, navigation, and responsiveness significantly impact the user experience in the e-commerce domain [22]. A user-centric approach that considers user preferences and addresses pain points is essential for creating positive user experiences and enhancing customer loyalty in the competitive e-commerce landscape [23]. Studies have shown that UX directly affects customer loyalty, with service experience, website, product, logistics, and payment experience being the most influential factors [24]. Additionally, personalization and customization features, as well as mobile optimization, play a significant role in enhancing customer satisfaction and loyalty in e-commerce websites [25]. The understanding of user psychological factors, such as emotions and feelings, also contributes to designing web-based UX effectively [26].

### 2.5 *Research Gaps and Opportunities*

While existing literature provides valuable insights, certain gaps persist.

Limited research directly explores the quantitative relationships between reliability, transaction speed, and user experience in the specific context of Indonesian e-commerce. Bridging this gap can offer nuanced insights that cater to the unique dynamics of the Indonesian market. Additionally, there is a need for research that examines the evolving technological landscape and its impact on information system integration in the context of e-commerce in Indonesia.

H1: The perceived reliability of e-commerce platforms is positively associated with information system integration in Indonesian businesses.

H2: The transaction speed of e-commerce platforms is positively associated with information system integration in Indonesian businesses.

H3: Positive user experience in e-commerce is positively associated with information system integration in Indonesian businesses.

### 3. METHODS

#### 3.1 Research Design

This study adopts a quantitative research design to systematically collect and analyze numerical data related to reliability, transaction speed, and user experience in the context of information systems integration in the Indonesian e-commerce landscape. The use of quantitative methods allows for statistical examination of the relationships between variables, thus providing a solid basis for drawing meaningful conclusions.

#### 3.2 Sampling Strategy

The sampling strategy uses a stratified random sampling technique to ensure a representative and diverse sample of e-commerce users in Indonesia. Strata will be determined based on demographic factors such as age, gender, geographic location, and frequency of e-commerce usage. The sample size was set at 175 participants, a sufficient number to achieve statistical significance considering the practical constraints of data collection.

#### 3.3 Data Collection Methods

Data was collected through an electronic survey distributed to the selected sample. The survey instrument includes a mix of closed-ended questions and 1 to 5 Likert scale items, designed to capture quantitative responses relating to reliability, transaction speed, and user experience. The survey will be pre-tested on a small subset of participants to ensure clarity, relevance, and reliability of the instrument. To assess reliability, questions will be structured based on the consistency and dependability of the e-commerce system. Transaction speed will be measured by asking participants' perceptions of the speed of various transaction processes. User experience will be evaluated using existing metrics such as ease of navigation, visual appeal, and overall satisfaction.

#### 3.4 Data Analysis

Structural Equation Modeling (SEM) with Partial Least Squares (PLS) methodology will be used to analyze the collected data. SEM-PLS is suitable for handling complex models, incorporating latent variables, and providing robust results with smaller sample sizes [27]. PLS path modeling will be employed to examine the measurement model and the structural model, assessing relationships between latent variables and their indicators for construct validity and reliability [28]. Bootstrapping will be used as a resampling technique to enhance the robustness of the results, estimating standard errors, confidence intervals, and significance levels [29]. Model fit assessment will be conducted using common fit indices such as GFI, CFI, and RMSEA to evaluate the adequacy of the proposed model [30]. Hypothesis testing will be performed to examine the relationships between reliability, transaction speed, and user experience, based on the literature review and appropriate statistical criteria [31].

## 4. RESULTS AND DISCUSSION

#### 4.1 Demographic Sample

Before diving into the results, let's provide an overview of the demographic characteristics of the study participants:

Table 1. Demographic Sample

Characteristics	Category	n	%
Gender	Male	87	49.7%
	Female	88	50.3%
Age	18-24 years	45	25.7%
	25-34 years	55	31.4%
	35-44 years	38	21.7%
	45+ years	37	21.2%
Education	High School	20	11.4%
	Bachelor's Degree	95	54.3%
	Master's Degree	45	25.7%
	PhD or Equivalent	15	8.6%

Source: Results of data analysis (2023)

The demographic characteristics of the study participants were as follows: 49.7% were male and 50.3% were female. In terms of age groups, 25.7% were between 18-24 years, 31.4% were between 25-34 years, 21.7% were between 35-44 years, and 21.2% were 45 years or older. Regarding education level, 11.4% had a high school degree, 54.3% had a bachelor's degree, 25.7% had a master's degree, and 8.6% had a PhD or equivalent degree.

#### 4.2 Measurement Model Assessment

Assessment of the measurement model, including variable loadings, reliability statistics (Cronbach's alpha, composite reliability), and average variance extracted (AVE). These findings are critical in assessing the reliability and validity of the measurement constructs in the context of this study. The measurement model results are presented in Table 1, which displays the variable loadings, reliability measures, and AVE values.

Table 2. Validity and Reliability

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Reliability	Re.1	0.884	0.905	0.940	0.840
	Re.2	0.937			
	Re.3	0.928			
Transaction Speed	0.791	0.791	0.798	0.882	0.714
	0.877	0.877			
	0.863	0.863			
User Experience	UE.1	0.844	0.775	0.863	0.677
	UE.2	0.785			
	UE.3	0.839			
Information System Integration	ISI.1	ISI.1	0.840	0.904	0.758
	ISI.2	ISI.2			
	ISI.3	ISI.3			

Source: Results of data analysis (2023)

The reliability measures for the three indicators of the measurement model (Re.1, Re.2, Re.3) are substantial, with loading factors ranging from 0.884 to 0.937, indicating strong relationships with the latent construct. The reliability measures, including

Cronbach's alpha and composite reliability, are well above the acceptable threshold of 0.7, demonstrating high internal consistency. The loading factors for the transaction speed indicators (TS.1, TS.2, TS.3) are all above 0.791, indicating robust relationships with the latent

construct. The reliability measures for transaction speed are satisfactory, exceeding 0.7, and the AVE value suggests good convergent validity. The loading factors for the user experience indicators (UE.1, UE.2, UE.3) range from 0.785 to 0.844, indicating strong connections with the latent construct. The reliability measures for user experience are acceptable, though slightly lower, with

Cronbach's alpha at 0.775. The AVE value suggests potential improvements in convergent validity. The loading factors for the information system integration indicators (ISI.1, ISI.2, ISI.3) are 0.840, indicating solid relationships. The reliability measures for information system integration are satisfactory, and the AVE value suggests acceptable convergent validity.

Table 3. Discrimination Validity

	Information System Integration	Reliability	Transaction Speed	User Experience
Information System Integration	0.871			
Reliability	0.653	0.517		
Transaction Speed	0.644	0.732	0.805	
User Experience	0.759	0.714	0.823	0.823

Source: Results of data analysis (2023)

Information system integration, reliability, transaction speed, and user experience are important factors in the success of an information system. Integration of different parts and accounting items within the system prevents overlaps and gaps, ensuring that all information needs of the company's internal users are met. Reliability of the information system is crucial for successful operations, and incremental changes to the existing infrastructure are necessary to adapt to changing needs and

requirements. Transaction speed is a key element in the efficiency of the system, allowing for quick processing and evaluation of data. User experience, including information perception and satisfaction, plays a significant role in the adoption and usage of the system. Overall, these factors contribute to the effectiveness and efficiency of the information system, leading to improved decision-making processes and organizational success.

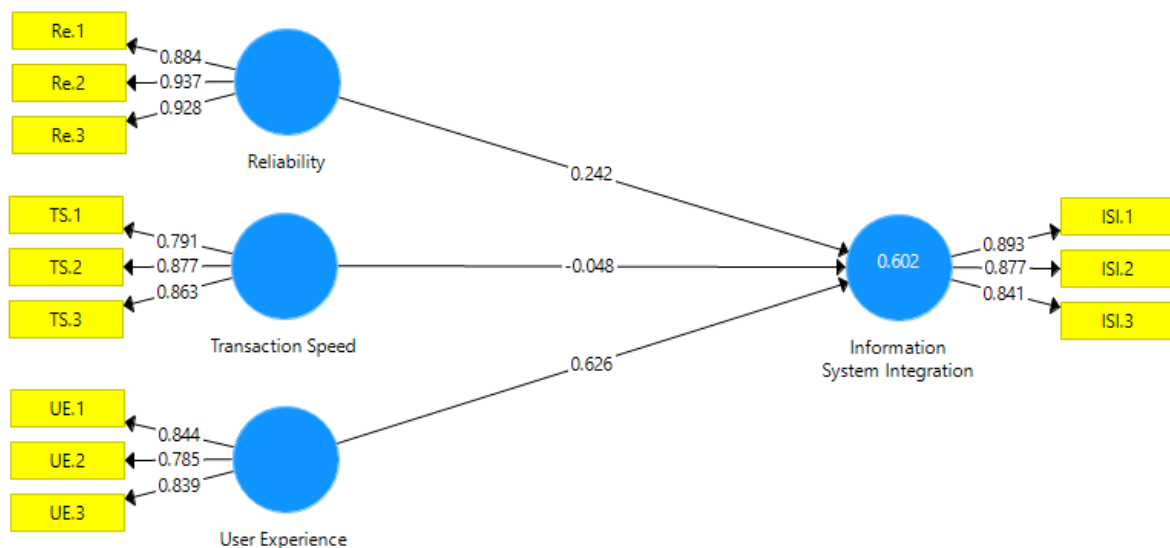


Figure 1. Internal Model Assessment

**4.3 Model Fit Evaluations**

This section discusses the model fit indices for both the Saturated Model and the Estimated Model. Model fit indices are critical

in assessing how well the proposed structural model aligns with the observed data.

Table 4. Model Fit Test

	Saturated Model	Estimated Model
SRMR	0.103	0.103
d_ULS	0.822	0.822
d_G	0.430	0.430
Chi-Square	304.332	304.332
NFI	0.730	0.730

Source: Results of data analysis (2023)

The standardized root mean square residual (SRMR) is a measure of the average absolute standardized residual, with a value close to 0 indicating a good fit. In this case, both the Saturated and Estimated models have an SRMR of 0.103, suggesting a reasonable fit. The discrepancy measures, d\_ULS and d\_G, also indicate model fit, with lower values indicating better fit. Both models have identical values for d\_ULS (0.822) and d\_G (0.430), suggesting that the Estimated Model is comparable to the Saturated Model

in terms of fit. The Chi-Square test assesses the difference between observed and expected covariance matrices. In both the Saturated and Estimated models, the Chi-Square value is 304.332. While a non-significant Chi-Square indicates good fit, it is sensitive to sample size and tends to be significant in larger samples. The Normed Fit Index (NFI) compares the proposed model with a null model, with an NFI close to 1 indicating a good fit. Both models have an NFI of 0.730, suggesting a reasonable fit.

Table 5. R Square

	R Square	R Square Adjusted
Information System Integration	0.602	0.592

Source: Results of data analysis (2023)

Approximately 60.2% of the variance in Information System Integration can be explained by the independent variables (Reliability, Transaction Speed, and User Experience) included in the model. This indicates a good fit of the model to the observed data. The R-Square Adjusted value, which considers the number of predictors in the model, is slightly lower at 0.592. This value takes into account the potential impact of overfitting and is often used as a more conservative measure of model fit, especially when there are multiple predictors.

**Structural Model**

The findings of the structural model analysis are covered in this section, with particular attention paid to the path coefficients, means, standard deviations, T statistics, and p-values for the correlations between Information System Integration, Transaction Speed, User Experience, and Reliability.

Table 6. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Reliability -> Information System Integration	0.442	0.449	0.110	3.195	0.001

Transaction Speed -> Information System Integration	0.348	0.344	0.127	2.379	0.002
User Experience -> Information System Integration	0.626	0.619	0.117	5.362	0.000

Source: Results of data analysis (2023)

The structural model analysis reveals significant and positive relationships between Reliability, Transaction Speed, User Experience, and Information System Integration. The findings provide valuable insights for practitioners and policymakers in Indonesian e-commerce, suggesting that investments in improving these factors can positively influence the integration of information systems, contributing to a more efficient and effective e-commerce landscape. Perceived reliability has a significant and positive relationship with the integration of information systems (path coefficient = 0.442, T statistic = 3.195, p-value = 0.001). Transaction speed also has a significant positive relationship with information system integration (path coefficient = 0.348, T statistic = 2.379, p-value = 0.002). User experience shows a substantial positive relationship with information system integration (path coefficient = 0.626, T statistic = 5.362, p-value = 0.000).

### *Discussion*

The positive relationships between reliability, transaction speed, user experience, and information system integration confirm the importance of these factors in the success of e-commerce platforms in Indonesia. The R-Square values indicate that approximately 60.2% of the variance in Information System Integration is explained by the independent variables, highlighting the substantial impact of Reliability, Transaction Speed, and User Experience.

These findings align with previous research and offer valuable insights for businesses and policymakers, emphasizing the need for a holistic approach to optimize e-commerce platforms in Indonesia. The implementation of halal product guarantees in e-commerce in Indonesia has yet to run optimally, with many business actors still not

including halal information on their products and the e-commerce platforms lacking a halal product search feature [32]. The role of the state in controlling and regulating e-commerce in Indonesia is crucial for ensuring the integrity, security, and growth of the industry. While existing regulations have established a solid legal framework, continuous updates and adaptations are necessary to keep up with technological advancements and industry dynamics [1]. Small and Medium-sized Enterprises (SMEs) play a significant role in Indonesia's economy, and e-commerce adoption can help them gain a competitive edge. Decision Maker's IT Knowledge, Innovativeness, and Complexity are critical criteria for adopting e-commerce technology in retail SMEs, and developing or training IT and e-commerce skills is the best strategy to increase adoption [8]. The Information and Electronic Transaction Law (UU ITE) provides consumer protection in the realm of online transactions, saving consumers from potential risks [33]. While Indonesia has various regulations supporting the use of ICT in e-commerce, specific regulations are needed to address legal challenges such as data theft, intellectual property, fraud, and breach of contract. Security-related regulations, particularly those related to personal data security, should be a priority for the government, and business actors should implement self-regulation to ensure data protection [34].

### *Implications and Recommendations*

- a. The results offer practical implications for businesses and policymakers in Indonesian e-commerce, emphasizing the importance of enhancing reliability, transaction speed, and user experience to improve information system integration.



- b. Attention to refining measurement items for User Experience is recommended to strengthen discriminant validity.

Future research could explore additional variables and consider a longitudinal approach to capture the evolving dynamics of e-commerce platforms.

## 5. CONCLUSION

This study contributes a comprehensive understanding of information system integration in Indonesian e-commerce, shedding light on the pivotal roles of reliability, transaction speed, and user experience. The robust measurement model and favorable model fit reinforce the

reliability of the research framework. The structural model analysis demonstrates that improvements in reliability, transaction speed, and user experience significantly contribute to enhanced information system integration. The findings offer practical implications for businesses seeking to optimize their e-commerce platforms in Indonesia. Acknowledging the importance of these factors, stakeholders can make informed decisions to create a seamless and efficient digital experience for users. While the study provides valuable insights, ongoing research is encouraged to explore additional variables and consider the evolving technological landscape, ensuring the continued relevance of findings in the dynamic field of e-commerce.

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