Customer Shopping Behavior on E-Commerce Effectiveness Using the Information System Success Theory Approach

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Abstract

In addressing the purpose of this research, it seeks to unravel the intricacies of payment systems in e-commerce, particularly focusing on the challenges posed by the indirect nature of transactions. The design and methodology of the study involve a comprehensive examination of customer perceptions and concerns, emphasising payment security and privacy in the digital landscape. This investigation stems from recognising that security is a linchpin for the successful development of Internet-based payment systems. Within the discourse of e-commerce, customer apprehensions regarding the security of their payment and financial information, encompassing details like credit card transaction numbers, are prevalent. As the e-commerce market in Indonesia experiences rapid growth, exemplified by the leadership of Tokopedia, the competition among companies and organisations intensifies. The endeavour to satisfy customers becomes a formidable challenge for many, underscoring the need for nuanced insights into the factors influencing customer satisfaction. Adopting the Information System Success Theory as a theoretical framework, this study posits that customer concerns about the payment system significantly impact the perceived quality of service. In this context, quality serves as a yardstick for measuring effectiveness by delving into the intricate layers of customer satisfaction. The research employs Structural Equation Modelling (SEM) as the chosen methodology, engaging with the perspectives of 100 respondents to derive meaningful conclusions. Despite its contributions, the study acknowledges its limitations, including the inherent subjectivity in customer perceptions. Nevertheless, the implications drawn from this research carry significance for the ongoing refinement and enhancement of e-commerce payment systems, providing valuable insights for practitioners, researchers, and policymakers navigating the dynamic intersection of technology and consumer satisfaction in the digital age.

Keywords: Information System Success Theory, payment system security, service quality, product quality, effectiveness.

Introduction

Rapid technological progress has resulted in fundamental changes in various aspects of people's daily lives. Different traditions previously carried out conventionally have rapidly transformed into the digital world. Of course, this situation brings significant challenges, but it also opens up great opportunities for the business world to provide comfort and convenience to customers. In addition, rapid progress in mobile communications technology continues quickly. This phenomenon has resulted in an enhanced shopping experience, turning the purchasing process into something simpler and more convenient than ever before.

Moreover, with the increasing number of COVID-19 cases globally, people are likely to adopt non-contact payments and digital transactions to avoid physical contact that can spread the virus and reduce the risk of transmission. As a result, the pandemic has influenced individual consumer behavior as well as increased the popularity of contactless payment methods. In response to this dynamic, various sectors are increasingly actively implementing online purchasing models to meet customer needs more efficiently and quickly.

This phenomenon makes the use of e-commerce increasingly widespread. By utilizing e-commerce platforms, consumers can easily shop anywhere and anytime. Data shows that e-commerce transaction activity continues to grow positively. Bank Indonesia (BI) noted that during the first half of 2022, the total value of e-commerce transactions reached IDR 227.8 trillion, an increase of 22.1% compared to the same period in the previous year. Based on research from Google, Temasek, and Bain & Company, the e-commerce sector economy in Indonesia will reach a value of US$59 billion in 2022, equivalent to 76.62% of Indonesia's total digital economy, which reached US$77 billion. One of Indonesia's early players in e-commerce was Tokopedia, which adopted a marketplace system. Tokopedia is now a leader in the Indonesian e-commerce market. Data from iPrice shows that in the second quarter of 2022, Tokopedia recorded an average of 158.3 million website visitors per month, the highest figure among its competitors.
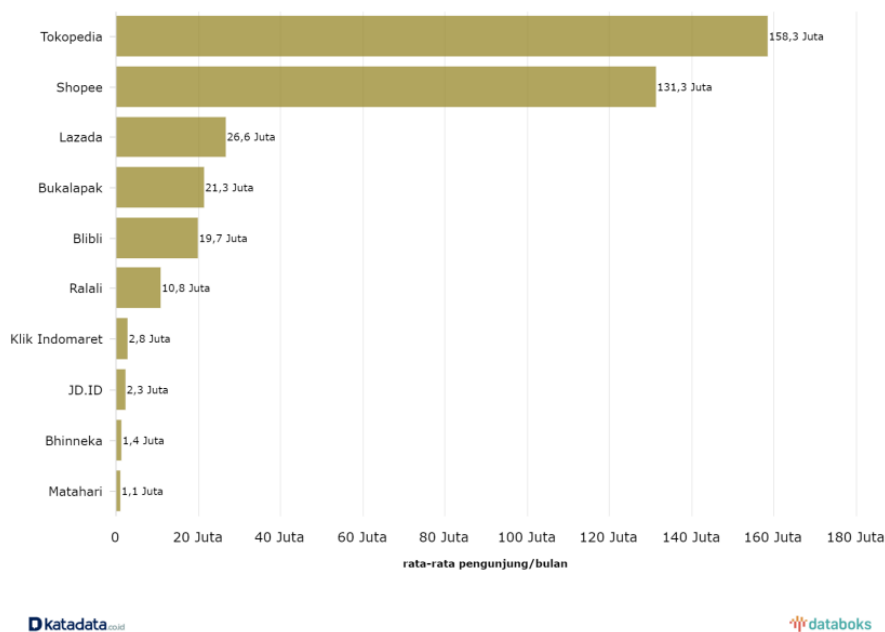
Source : katadata
Figure 1. Graph of average visitors per month

Tokopedia is a well-known e-commerce platform that has designed various product options accessible to users. Through principles such as marketplace, official stores, instant commerce, interactive commerce, and out-of-town trade (rural commerce), Tokopedia presents a variety of product choices to its consumers. In its operations, this platform adheres to an online sales model approach from consumer to consumer (C2C), which embodies the concept that consumers can sell products directly to other consumers through Tokopedia. This principle creates an environment where buying and selling transactions can be established between individuals now, emphasizing interaction and trade on a consumer-to-consumer scale.
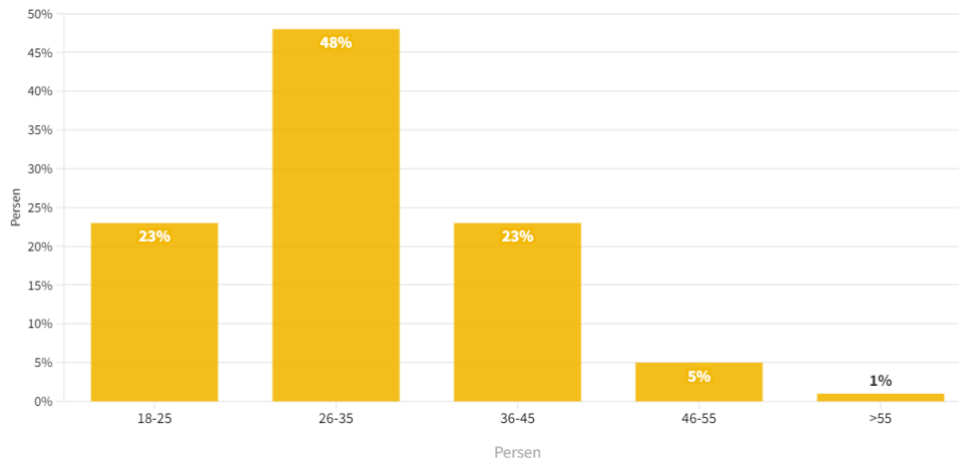
Source : dataIndonesia.id
Figure 2. Graph of shopping data by age

Based on information from dataIndonesia.id, this picture shows that the millennial generation is the most active group in online purchases on e-commerce platforms. In this case, the 26-35-year age group contributed 48% of total e-commerce transactions. Meanwhile, consumers aged 18-25 years and 36-45 years also participated, with a share of 23% each.

Nowadays, e-commerce platforms have undergone a fundamental transformation from simply being a list of products to becoming friends involved in consumers' lifestyles by providing information that has significant value and more individualized recommendations. The rapid growth in the e-commerce industry, which is ongoing, is accompanied by increasingly widespread adoption by companies and organizations. However, in reality, only a few of these entities succeed in fully meeting customer expectations and desires. This research adopts the Information System Success Theory framework developed by (DeLone & McLean, 2003). In this theoretical framework, various factors function as indicators of the success of an information system, and this is the basis for carrying out this research.

Within the framework of the e-commerce ecosystem, one facility with an integral role is the payment system. A significant part of this payment concept lies in creating convenience in the shopping experience for consumers. On e-commerce platforms, the payment process approach has been developed to provide a variety of payment methods that eliminate the possibility for customers to pay directly to the seller or entity running the e-commerce system (Purnama, 2012). In practice, payment transactions in e-commerce are generally carried out through various online payment methods, which involve transfers via bank accounts, credit cards, cellphone-based banking services, and various other payment alternatives. Therefore, the basic concept of a payment system refers to the mechanism that regulates the transfer of funds from one entity to another in e-commerce ((Purnama, 2012).

Because customers cannot pay directly, some problems usually arise in consumers' minds, namely payment security and payment privacy. Security is an essential requirement for successfully developing payment systems via the Internet. Internet users often mention concerns about payment security and financial information, such as credit card transaction numbers and details (Shon & Swatman, 1998). Meanwhile, according to service, the difference between the expected service and the service received (Akbardi, 2011). Akbardi (2011) conducted research on the quality of information, systems, and services on the effectiveness of e-commerce. The research results show that the effectiveness of e-commerce significantly influences service quality.

In the context of this research, the term quality is given meaning as a parameter or standard used to measure the level of effectiveness by gathering information through assessing

the level of satisfaction experienced by consumers. *Quality* can be defined as the extent to which a product or service can meet or exceed customers' expectations. More profoundly, the quality aspect has dimensions related to the level of conformity, namely the extent to which the product can achieve specific predetermined design standards (Sebastianelli & Tamimi, 2002).

Literature Review and Hypotheses

Information Systems Success Theory

Assessing the performance or efficiency of information systems is essential in understanding the value and success of management efforts and investments in information systems (DeLone & McLean, 2003). The importance of the level of customer satisfaction is also reflected in this view, emphasizing that product quality, service, and price impact customer satisfaction. The performance of web-based information systems is evaluated by measuring user satisfaction. The DeLone and McLean model is a tool used to measure the success of information systems, which is known as a simple model but is considered to have substantial validity. DeLone and McLean identified six variables that build information system success.
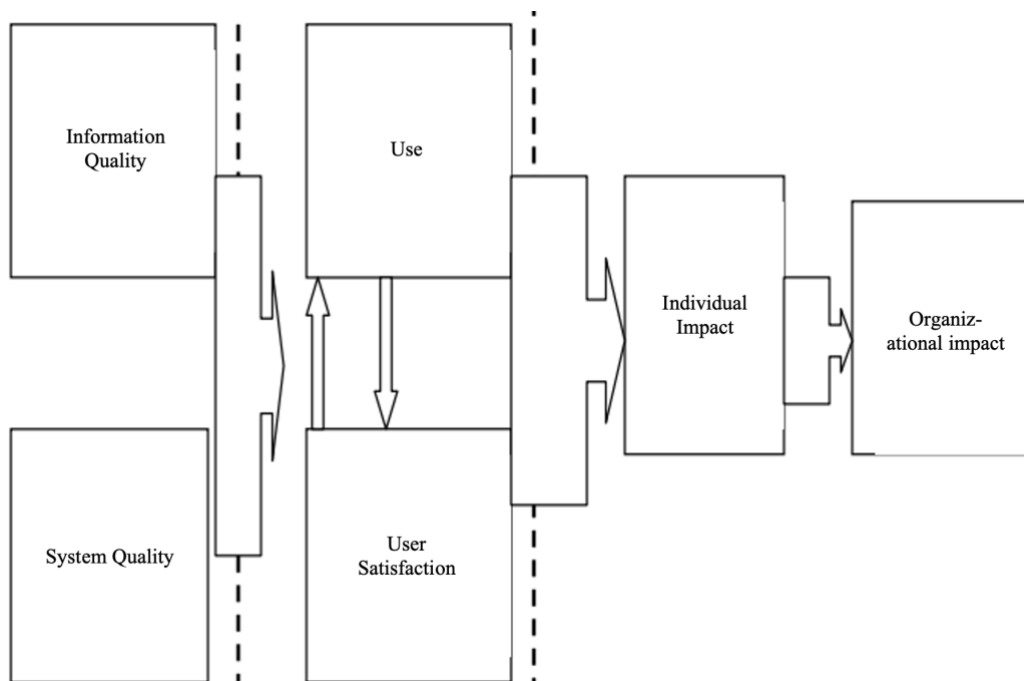
Figure 3. DeLone and McLean model

The implementation of information systems in companies is influenced by factors that influence the success or failure of information systems due to variations between organizational units (Watson et al., 2010). The success of an information system is assessed based on its suitability to user needs. Evaluation of the success of an information system is designed to analyze its use. Therefore, evaluating the success of an information system can be done through a simple model, but its validity is recognized. This model is also by the theory of (DeLone & McLean, 2003) ho developed a parsimony model named "Information System Success: The Quest for the Dependent Variable." The six elements, factors, or components of DeLone and McLean's theoretical model include:

a. System quality

A system is a group of elements closely related to each other, working together to achieve specific goals or targets. Goals can relate to broad aspects, while targets focus on a more limited scope. In essence, a system consists of at least three main elements: input, process, and output. Assessment of system quality is used to measure the performance of the information processing process itself (DeLone & McLean, 2003). System quality indicators include convenience of access, system flexibility, and system reliability. Access convenience refers to user comfort in accessing or using a system. System flexibility refers to the feasibility and attractiveness of a method according to users. System reliability reflects a reliable system that produces consistent results on repeated tests or experiments.

b. Information quality

Information is data that has been organized or interpreted for use in the decision-making process. Information is also known as data that has been processed or has meaning. Information refers to data that has been processed to increase the knowledge of the individual who uses it. Information quality is used to evaluate the quality of output results from information systems (DeLone & McLean, 2003). Information quality indicators involve accuracy, currency, timeliness, and completeness. Accuracy reflects that information should be free from errors and not confusing. Actuality means that information must be appropriate to the current time and context. Timeliness relates to submitted information that must be on time because outdated information loses relevance. Completeness indicates that information must have comprehensive content involving volume and content aspects.

c. Service quality EUC

The presence of end-user computing (EUC) impacts changing the role of the information systems department (information provider), which goes beyond providing information to becoming a service provider. (Service quality evaluation is used to evaluate the quality of the support supplied by information system providers to information system users (DeLone & McLean, 2003). Service Quality is integral to the overall success of an information system. If system developers provide excellent service, characterized by quick responsiveness, empathy, and effective follow-up, users are more likely to feel comfortable and satisfied in using the system. The quality of service significantly influences user perceptions, user satisfaction, and, ultimately, the success of the information system.

d. Use

Use can be analyzed from two points of view, namely actual use and perceived use (DeLone & McLean, 2003). Some studies apply an actual usage approach by measuring the number of information requests or tracking the frequency of user connections. In addition, there is also the use of the perceived use approach. This approach involves using a questionnaire that users fill out about their experiences using the information system. Use in this context refers to utilizing an information system and its output by users (DeLone & McLean, 2003). Usage indicators include the number of requests for information (number of inquiries) and frequency of use. The number of information requests describes the user's efforts to obtain or find specific information in the information system. Meanwhile, frequency of use reflects how often users access and utilize information systems.

e. User satisfaction

User satisfaction refers to the user's response to the system and use of the output from the information system (DeLone & McLean, 2003). User satisfaction is closely related to users' attitudes towards using information systems. User satisfaction indicators

include meeting user expectations (according to user expectations) and the level of user satisfaction. Meeting user expectations indicates that the information system has achieved and exceeded the expectations and desires of users. User satisfaction involves the user's level of satisfaction or feeling of pleasure because their desires have been fulfilled.

f. Net be-nefit

Net benefits refer to the results resulting from the existence and use of information systems (DeLone & McLean, 2003). Net benefit indicators include effectiveness and efficiency. Effectiveness reflects the impact and results that can be provided to users. Efficiency refers to being precise and efficient in producing something without wasting time, effort, and money.

This model evaluates these six dimensions not separately but as a unit where one dimension influences the other dimensions.

Payment System Security

Payment is an essential factor in buying and selling transactions. Ease of transactions is one of the convenience factors in shopping, especially in payments. The most convenient payment method for users is to make payments directly to the seller, but in e-commerce, customers cannot pay directly to the seller or companies that have an e-commerce system; the method is to use online payment systems such as bank transfers, credit cards, m-banking and others (Purnama, 2012). Payment systems are central to the economic structure and function as a fundamental basis for trading activities (Hancock et al., 1999). The payment system is expected to facilitate the completion of trade transactions by using various payment innovations, replacing the barter concept, and providing various media for exchanging value. Markets and economies are highly dependent on payment systems to enable smooth trade and exchange between various institutions and consumers in the market for goods and services. Apart from that, the payment system is also expected to be able to manage and facilitate the flow of funds, both on a domestic and international scale, to productive investments through financial markets, including money and capital markets.

Service Quality

Service quality has a significant impact on system use. If system developers provide good service to users, such as showing empathy and quick responses, users will feel comfortable using the system. Therefore, the better the developer's service, the greater the use of the system by users. The level of service can be measured by comparing perceptions of the expected service. If the service received is in line with expectations, the service quality is considered excellent and satisfactory.

Conversely, if service exceeds expectations, it is considered optimal quality (Akbardi, 2011). If the level of service quality received is below expectations, it is interpreted as low and unsatisfactory service quality. Service quality in information systems refers to the services provided by information system developers and their responses to system problems. There are several indicators of service quality:

a. Guarantee

Focuses on technicians' ability to develop quality information systems, ensuring smooth performance for users.

b. Empathy

Involves a caring attitude on the part of the information system developer towards users, especially in responding to questions regarding the system being built.

Product Quality

Products refer to assets that include visible and non-visible characteristics, including packaging, color, quality, price, brand, and seller service and reputation (Watson et al., 2010). It is crucial for companies to continuously improve the quality of their products or services because this improvement has the potential to produce satisfaction for consumers with the products or services they purchase and ultimately can influence consumers' decisions to make repeat purchases. The characteristics of a product are an essential factor influencing consumers' ability to ascertain and evaluate whether an online product is being traded, which will directly influence their satisfaction (Ba & Johansson, 2008). Product quality is a critical aspect of e-commerce because it is one of the essential aspects that makes an e-commerce company more competitive; in other words, the company must show the added value of a product to compete in the market, especially the online market.

Effectiveness
Effectiveness is the ability to carry out the tasks and functions (operational activities, programs, or missions) of an organization or similar entity without experiencing pressure or conflict during its implementation. The effectiveness of an information system in meeting user needs impacts user satisfaction with the system. The effectiveness of this information system is reflected in its ability to achieve the goals or objectives expected by the user. *Effectiveness* is defined as achieving organizational goals using efficient resources, which are assessed in terms of input, process, and output (Arisand, 2018). *Effectiveness* is a parameter that indicates the extent to which achievements have been achieved in terms of quantity, quality, and time. A system refers to a series of interconnected components that interact to achieve a specific goal. A system is a group of elements consisting of two or more components or subdivisions that interact with each other and have similar goals and functions.

Based on this description, this research formulates the first hypothesis as follows:
H1: *There is a positive relationship between payment system security and the effectiveness of e-commerce.*
This implies that higher levels of payment system security in e-commerce will result in a more effective execution of transactions and overall performance of the e-commerce platform.
H2: *There exists a positive correlation between service quality and the effectiveness of e-commerce.*
This suggests that higher levels of service quality in e-commerce platforms will lead to increased effectiveness in terms of user satisfaction, transaction processing, and overall performance.
H3: *There is a positive association between product quality and the effectiveness of e-commerce.*
This implies that higher levels of product quality in e-commerce offerings will contribute to increased effectiveness, encompassing customer satisfaction, transaction success, and overall performance of the e-commerce platform.

Research Method

The research method applied is a descriptive approach, which aims to provide an overview of existing conditions through data collection, data processing, and quantitative analysis to formulate conclusions based on the results of data analysis. This research was conducted around Banyumas Regency, Central Java, with a focus on individuals aged 18-45 years who had used e-commerce services on Tokopedia. Referring to the theory of the Structural Equation Modeling (SEM) method, the research sample consisted of 100 people who acted as

respondents. SEM is an approach usually used to illustrate patterns of statistical relationships between variables and indicators interactions between various variables and directly detect measurement errors(Bechger et al., 2003). This SEM method also allows direct analysis of the relationship between dependent and independent variables. The main aim of this method is to evaluate the suitability of the hypothesis with the data collected and the data collection techniques used, as well as to explain the relationship between the variables in the research comprehensively.
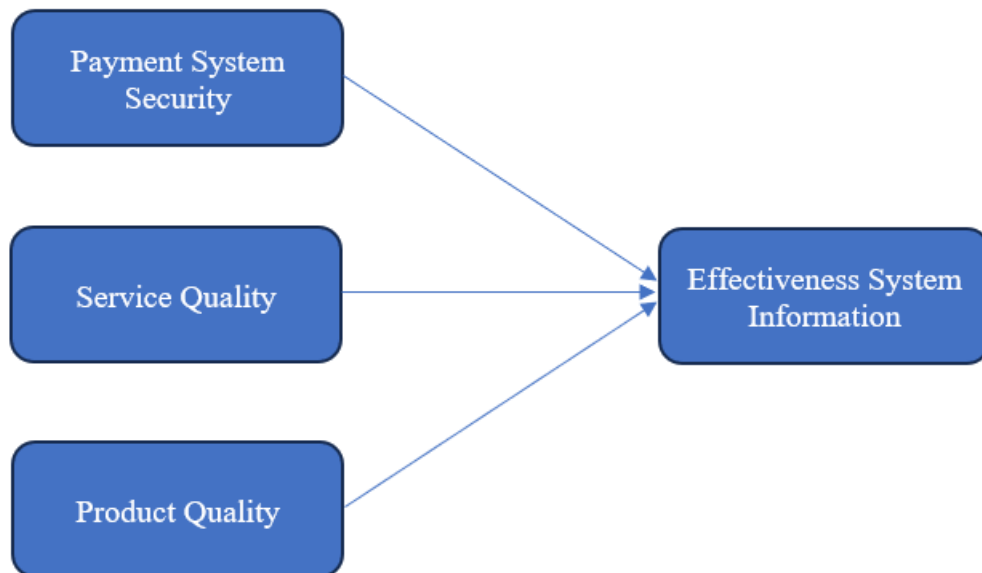

Figure 4. The diagram of the research model

Results and Discussion

Validity test
Convergent Validity
The validity test step using Convergent Validity is essential in the process of analyzing the validity of a construct or variable that is measured involving various indicators. At this stage, the use of convergent validity becomes an essential means to measure the extent to which a group of indicators that are supposed to measure the same aspect can build correlations that have significance between each other. In other words, if the indicators refer to similar dimensions, then there is expected to be a strong and substantial relationship between these elements. Applying the concept of Convergent Validity at the initial stage of research can provide an initial picture of the extent to which these indicators can reflect the same construct. Therefore, the results produced from the Convergent validity test stage at the first literacy stage will show how the relationship and correlation between these indicators are in the context of measuring the variable or construct being studied. The following are the results of Convergent Validity in the first literacy:

Table 1. Convergent Validity

	Information Systems Effectiveness	Payment System Security	Service Quality	Product Quality
KP1			0.875	
KP2			0.887	
KP3			0.871	

KP4			0.810	
KP5			0.752	
KR1				0.927
KR2				0.845
KR3				0.904
KS1		0.799		
KS2		0.757		
KS3		0.854		
KS4		0.878		
KS5		0.867		
KS6		0.855		
SI1	0.849			
SI2	0.874			
SI3	0.928			
SI4	0.877			
SI5	0.850			

Source: SEM

Based on this table, it can be seen that all indicators have an outer loading value > 0.7. This shows that each indicator adequately represents the measured construct and strongly correlates with the central construct. Thus, the convergent validity of the constructs measured in this study has met adequate criteria.

Discriminant Validity

Discriminant Validity is a concept used to ensure that a construct or variable can be clearly distinguished from other constructs or variables measured in a research or analysis. This means indicators measuring a particular construct should correlate more with the same construct than other constructs. The following are the results of the Discriminant Validity analysis :

Table 2. Discriminant Validity

	Information Systems Effectiveness	Payment System Security	Service Quality	Product Quality
Information Systems Effectiveness	0.876			
Payment System Security	0.777	0.836		
Service Quality	0.825	0.851	0.840	
Product Quality	0.629	0.634	0.730	0.892

Source : SEM

Based on the table above, the loading factor value for each latent variable indicator is greater than the cross-loading factor value so that all indicators meet the discriminant validity requirements. This shows that these indicators can be differentiated from other constructs and ensures that each construct can truly measure something unique.

Reliability Test
Construct Reliability and Validity

Table 3. Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Information Systems Effectiveness	0.924	0.928	0.943	0.768
Payment System Security	0.913	0.918	0.933	0.699
Service Quality	0.895	0.898	0.923	0.706
Product Quality	0.872	0.889	0.921	0.796

Source : SEM

Referring to the table above, it can be observed that all latent variables have achieved a composite reliability value that exceeds 0.7, which indicates that all latent variables have good internal consistency. In addition, each latent variable has an AVE value that exceeds 0.5, which indicates an adequate AVE value. All variables used were proven to have Cronbach's alpha values exceeding 0.6, validating the reliability of all these variables.

Hypothesis testing
Coefficient of Determination

Table 4. Coefficient of Determination

	R-square	R-square adjusted
Information Systems Effectiveness	0.702	0.693

Source : SEM

From the information in the table, it is noted that this model has an R-square value of 0.702. This means that around 70.2% of the variation in Information System Effectiveness can be explained by the Payment System Security, Service Quality, and Product Quality variables included in this model. The remaining 29.8% may be influenced by other factors not included in the model.

Table 5. Path Coeffient

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Payment System Security -> Information System Effectiveness	0.270	0.247	0.141	1.916	0.055
Service Quality -> Information System Effectiveness	**0.559**	**0.551**	**0.138**	**4.043**	**0.000**
Product Quality -> Information System Effectiveness	0.050	0.083	0.172	0.291	0.771

Source : SEM

There is a positive relationship between payment system security and the effectiveness of e-commerce. Testing this hypothesis showed that the T-statistic value reached 1.916, and the P-value was 0.055. Because the P-value exceeds the significance level $\alpha=0.05$, the null hypothesis (H0) cannot be ignored. Therefore, we cannot conclude that there is a significant influence of Payment System Security on Information System Effectiveness.

There exists a positive correlation between service quality and the effectiveness of e-commerce. From testing this hypothesis, the T-statistic reached 4.043, and the P-value was 0.000. Considering that the P-value is smaller than the significance level α=0.05, we can reject the null hypothesis (H0). Thus, we can conclude that there is a significant influence of Service Quality on Information System Effectiveness.

There is a positive association between product quality and the effectiveness of e-commerce. Based on testing this hypothesis, the T-statistic reached 0.291, and the P-value was 0.711. Because the P-value exceeds the significance level α=0.05, the null hypothesis (H0) cannot be ignored. Therefore, it is impossible to conclude that there is a significant influence of Product Quality on Information System Effectiveness.

Conclusion

This research has been done to investigate deeply related pattern behavior purchase customers on Tokopedia based on the framework Work Information Systems Success Theory. Findings from this research provide a deeper understanding of influencing factors of the effectiveness of e-commerce from corner look behavior purchase customers. From the analysis of the results, it concluded that the effectiveness of e-commerce is influenced in a way directly by security system payment, quality service, and quality product to effectiveness system information with approach theory Information Systems Success Theory become a solid basis for explanation How factors the interact and provide impact on experience shop at Tokopedia. The significant importance of harmony between objective business and the hope of customers is reflected through findings that e-commerce effectiveness does not only focus on technology but also on satisfaction and experience customers have in shopping online. Factors like comfort, convenience usage, and quality services and information are vital influences on the level of e-commerce effectiveness. This research provides valuable insight for the perpetrator's business and e-commerce developers to increase their platform's effectiveness. With a more profound understanding of the behavior of customers and influencing factors of the effectiveness of e-commerce, the company can direct the business strategy to fulfill the hopes and needs of consumers. Apart from that, this research is also encouraging further investigation into the role of technology and interaction with customers in the context of continued commerce growth.

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