



Measuring Hybrid e-Logistics Service Quality from B2C e-Commerce

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Abstract

Purpose: This study aims to test and analyze two hybrid models of logistics service quality (LSQ) and their influence on satisfaction, loyalty, and purchase intent in the future. The context of this research is business-to-consumer (B2C) e-commerce with a case study on Tokopedia. This study integrates the traditional LSQ model that adds 3 dimensions, namely order availability, order returns, and quality assurance consisting of the quality of personnel contacts, handling of order non-conformities, and the return process.

Method: The survey was conducted by distributing a questionnaire through a google form. Respondents were selected based on predetermined criteria, and data were analyzed using structural equation modelling to examine the relationship between research variables.

Result: The results of the study showed that 6 hypotheses were supported and 4 hypotheses were not supported. Order accuracy, order availability, ordering procedures, and quality assurance affect customer satisfaction. Customer satisfaction affects loyalty, and loyalty affects future purchase intention. Hypotheses 1, 2 and 5, namely the influence of timeline, order conditions and information quality on customer satisfaction are not supported. Hypothesis 9 is also unsupported, which suggests that customer satisfaction has no significant effect on future purchase intention.

INTRODUCTION

The rapid growth of e-commerce has made the retail industry undergo significant changes in recent years. Online shopping has evolved into a force that shapes the way consumers buy goods and services. E-commerce platforms offer convenience, variety, and competitive prices, making online shopping more popular and causing a shift in consumer behaviour. This poses a significant challenge for traditional retail. This transformation is not limited to one region but is a global phenomenon that affects retailers in various sectors that are not only changing the way consumers shop but also the way businesses operate. This condition forces traditional retailers to reevaluate their business models and strategies (Cedro, 2024).

Changes in people's lifestyles and increasing internet penetration in various regions make the growth of e-commerce in Indonesia projected to continue to increase, with an estimated penetration of 34.89% by 2029. This trend is expected to contribute to the government's digital economy target of Rp 4,531 trillion by 2030 (<https://www.sirclo.com>).

In Indonesia, several popular platforms such as Shopee, Lazada, and Tokopedia have encouraged digital business growth while expanding market access for business actors. Based on the eConomy SEA 2022 report released by Kominfo, the value of Indonesia's digital economy in 2022 is estimated to reach USD 77 billion with an annual growth of 22%, of which e-commerce accounts for USD 59 billion and is projected to increase to USD 95 billion by 2025. This data shows that online commerce has a strategic role in accelerating national economic growth (Lanteng, 2024). The Global eCommerce Market 2024 report released by eCBD predicts global e-commerce growth in 2024 to reach 10.4%. Indonesia occupies the highest position in the world at 30.5% or almost three times the global average. Below Indonesia, Mexico is projected to grow 26.8%, Thailand 22.9%, Iran 22.1%, and Malaysia 21.4% (Yonatan, 2024).

The rapid growth of e-commerce in Indonesia makes consumer demand for delivery accuracy, good delivery conditions, delivery accuracy, availability of delivery services, information quality, and ordering procedures for the products offered have an important role. Increased e-commerce sales make customer expectations for service levels higher. The pressure on retailers to provide convenient and flexible product delivery and easy returns is increasing. Today, retailers are in a situation where e-commerce continues to revolutionize the way customers shop and shape their expectations of retailers (Uvet et al., 2024).

This study refers to the research model of Uvet et al., (2024) which uses a hybrid e-Logistics Service Quality (LSQ) approach. The hybrid e-Logistics Service Quality (LSQ) approach is a development of the traditional logistics service quality model from Mentzer et al., (1999) that was previously focused on the business-to-business (B2B) and conventional retail contexts. The rapid growth of business-to-consumer (B2C) e-commerce has made customer expectations for logistics services change significantly in terms of product availability, information quality, ease of returns, and fast and responsive customer service (Daugherty et al., 2019; Esper et al., 2020). Previous models such as Physical Distribution Service Quality (PDSQ) which assessed the dimensions of order accuracy, condition of goods, and punctuality, no longer reflect the complexity of the customer experience in e-commerce transactions (Mentzer, et al., 1999).

The hybrid approach integrates the traditional LSQ dimensions with new elements relevant to B2C e-commerce. Such additional dimensions include order availability (Bienstock et al., 2008), order returns (Xing & Grant, 2006; Xing et al., 2010), as well as the quality assurance dimension which includes the quality of personnel contacts, handling of order non-conformities, and the return process (Parasuraman et al., 1985; Parasuraman et al., 1988). This approach is better able to adapt to the complexity of digital distribution channels and flexible logistics needs. The quality of logistics services has a direct effect on customer satisfaction, customer experience, loyalty, and company performance (Leuschner & Rogers, 2013; Prastyawan et al., 2024; Vakulenko et al., 2022b). The development of the LSQ hybrid model is crucial in responding to e-logistics challenges and building a competitive advantage in the increasingly competitive B2C e-commerce market (Jain et al., 2021a; Kilibarda et al., 2020).

PDSQ and LSQ were developed in the context of B2B and traditional industry buyer and seller (TIBS). In the e-commerce environment, the PDSQ and LSQ approaches are inadequate. Uvet (2023) develops the results of Mentzer et al.'s (1999) research on the LSQ dimension to the B2C e-commerce domain. The research conducted seeks to answer the following research questions: RQ1) What is the effect of our hybrid LSQ dimensions for traditional LSQ measures in addition to order availability and assurance quality, which also captures order IJLM returns) on customer satisfaction? RQ2) How important is assurance quality (personnel contact quality, order discrepancy handling and order returns) towards achieving customer satisfaction in an e-commerce B2C market? RQ3) In the greater context of LSQ in e-commerce B2C, does customer loyalty mediate the relationship between satisfaction and future purchase intention?

Referring to the research of Uvet et al., (2024), this study took a case study on Tokopedia e-commerce users in Indonesia. Tokopedia was chosen as the object of research because it is one of the largest B2C e-commerce platforms in Indonesia that has a complex logistics ecosystem and high transaction volumes (Hananto & Indrawan, 2024). Research by Zarfan et al., (2024) and Komara & Fathurahman (2024) shows that service aspects such as delivery speed, order accuracy,

ease of return, and information quality greatly affect Tokopedia's customer satisfaction. These dimensions align with the components in the Hybrid LSQ approach, which combines traditional and modern elements in e-commerce logistics services. Therefore, Tokopedia is a relevant and representative object to examine the influence of logistics service quality on customer satisfaction and loyalty in the context of B2C e-commerce.

The Influence of Timeliness on Customer Satisfaction

Timeliness is the time between demand and order fulfilment, and orders arrive when promised (Mentzer et al., 2001). Another definition of timeliness according to (Zailani et al., (2018) is the delivery of customer orders on time as promised. Customers do not tolerate waiting times, so they expect their orders to be realized at the promised time (Akil and Ungan, 2022; Al-Mu'ani et al., 2024).

Timeliness is an important dimension of logistics service quality that shows how quickly and accurately orders are received within the promised time. The consistency and reliability of delivery over time will shape the customer's perception of service performance. Several previous studies have shown that timeliness significantly affects customer satisfaction in the context of e-commerce (Mentzer et al., 2001; Murfield et al., 2017; Parasuraman et al., 2005). Therefore, this study proposes the following hypothesis:

H1: timeliness has a positive effect on customer satisfaction

The Effect of Order Conditions on Customer Satisfaction

According to Mentzer et al., (2001) order condition is the physical condition and feasibility of using the product at the time the order is received by the customer. These dimensions are used to assess whether the product arrives intact, undamaged, and ready for use. Companies need to ensure that customer orders are kept safe and appropriate, as products can be damaged during various moving and handling processes before they are finally delivered to customers (Akil and Ungan, 2022). Delivery of a defective or defective product to a customer will lead to customer dissatisfaction, product returns, or order cancellations (Vasić et al., 2021). In transactions using e-commerce, customers cannot evaluate the product directly before making a purchase, so the condition of the order when it arrives is the main indicator of the quality of the service provided by the provider. If the ordered product arrives in a damaged state, the customer not only loses the benefit of using the product, but the customer must make additional efforts to file a complaint or return to the service provider. This will reduce customer perception of service quality and affect the overall level of satisfaction.

According to Collier & Bienstock (2006), order conditions are one of the dimensions of outcome quality that has a significant effect on customer satisfaction in e-commerce transactions. This is in line with the findings of Forbes et al. (2005) which stated that the delivery of damaged or defective goods is ranked third out of the seven most important performance indicators for e-commerce customers which shows the importance of this aspect to the overall service experience.

This statement is reinforced by Feng et al. (2007) who stated that there is a positive relationship between order conditions and customer satisfaction. Customers who receive products in good condition tend to give a positive assessment of the overall logistics service and have higher repurchase intentions. Based on this description, the following hypotheses can be formulated:

H2: Order conditions have a positive effect on customer satisfaction

The Effect of Order Accuracy on Customer Satisfaction

Order accuracy is the degree of conformity between the order delivered and the order intended by the customer, both in terms of type, quantity, and product specifications (Mentzer et al., 2001). In e-commerce transactions, one of the main causes of customer dissatisfaction is errors in the delivery of goods such as exchanged items or mismatched quantities. Order accuracy is an important foundation for creating a positive shopping experience and the long-term sustainability of customer relationships (Tarn et al., 2003). Order accuracy is related to the accuracy of the courier service in delivering customer orders (Hendayani & Dharmawan, 2020). Accurate order

fulfilment will increase customer trust in the service provider and encourage loyalty and the possibility of making a repeat purchase.

Previous research has shown that order accuracy has a significant effect on customer satisfaction, repurchase intent, loyalty, and perception of service value (Parasuraman et al., 2005; Rafiq & Jaafar, 2007). This is also supported by Akil & Ungan (2022) and Chaisaengduean (2019) research in various sectors has found a positive relationship between order accuracy and customer satisfaction. Order accuracy played a critical role in satisfying customers (Al-Mu'ani et al., 2024; Prasetyo et al., 2021). For this reason, order accuracy is one of the main dimensions in the Logistics Service Quality (LSQ) model in the e-commerce era which prioritizes convenience and speed of service. Based on the review, the hypothesis proposed is as follows:

H3: Order accuracy has a positive effect on customer satisfaction

The Effect of Order Availability on Customer Satisfaction

Order Availability is an important component of the quality of logistics services in e-commerce (Uvet et al., 2024). Order Availability refers to the availability and readiness of products for purchase (Uvet et al., 2024; Nabiilah et al., 2025). According to (Bienstock et al., 2008), order availability in the quality of logistics services reflects whether the product desired by the customer is available and ready to be delivered at the time the order is placed. Order availability is an early indicator of the success of meeting customer needs in e-commerce. Furthermore, order availability reflects the effectiveness of demand management practices in ensuring timely product accessibility. This dimension also describes the consistency of the service provider in fulfilling orders on an ongoing basis.

Previous research has shown that product availability has a positive effect on the perception of value and customer satisfaction. Rao et al., (2011) stated that the level of availability has an impact on the value that customers perceive for the service. In the research, Xing et al. (2010) stated that in the context of e-commerce, product availability ranks third highest out of fifteen variables considered important by customers. This shows how important this factor is to the online shopping experience. Based on the review, the hypotheses proposed are:

H4: Order availability has a positive effect on customer satisfaction

The Influence of Information Quality on Customer Satisfaction

Information quality is the customer's perception of the accuracy and reliability of the information provided regarding the products ordered from the service provider (Mentzer et al., 2001). These dimensions include the timeliness, accuracy, completeness, and credibility of the information communicated by the service provider to customers. The information in question includes delivery status, product availability, transportation schedule, delivery delays, prices, discounts, return procedures, and customer service details. Vasić et al., (2021), stated that information quality refers to the customer's perception of the product information offered by the retailer. Based on the available information and information of appropriate quality, the customer decides to purchase. Research by Bienstock et al., (2008a) shows that information quality has a positive relationship with the quality of logistics results, which includes aspects such as product availability, order accuracy, delivery timeliness, and condition of goods.

The results of Saura et al., (2008) research also found that information quality is positively correlated with customer satisfaction, which is reinforced by the findings of (Uvet, 2020). So, it can be concluded that the quality of information plays an important role in shaping customer perception of logistics services. Based on the literature review, the following hypothesis is proposed:

H5: Information quality has a positive effect on customer satisfaction

The Effect of Ordering Procedures on Customer Satisfaction

Ordering procedures are how well the service provider's system performs in meeting customer demands online (Mentzer et al., 2001). Ordering procedures assess the ease of use of the ordering system, how long it takes, and the effort spent by customers when making online

purchases. In e-commerce transactions, inefficient ordering procedures will be a major obstacle in creating a positive experience for customers.

Several researchers have conducted studies and found a positive relationship between the ease of ordering procedures and customer satisfaction. Rafiq & Jaafar (2007) stated that the ease of the booking system has a direct impact on customer perception of the value of services. Research by Richey et al. (2007) and Saura et al. (2008) reinforces the results of previous research that an easy and intuitive ordering system increases customer satisfaction and encourages repurchase intent. If customers have trouble navigating the service provider's website, they will switch to another, more user-friendly platform. Based on this literature, the following hypothesis is proposed:

H6: ordering procedures have a positive effect on customer satisfaction

The Effect of Quality Assurance on Customer Satisfaction

Quality assurance is a concept from Mentzer et al. (2001), especially related to order discrepancy handling and personnel contact quality. Quality Assurance (QA) is a systematic process ensuring products and services meet quality standards, satisfying customer requirements and preventing defects (Tracy, 2024). Uvet et al. (2024) define assurance using scale indicators that include customer service expertise and knowledge in solving problems, resource allocation to fulfil services, and overall efficiency in handling customer problems. Customer service aspects such as personnel experience, competence, and efforts in solving problems are important factors in rebuilding and ensuring service quality (Mentzer et al., 2001; Parasuraman et al., 1988). In addition, the unsatisfactory process of collecting and replacing orders (Xing et al., 2010), as well as refunds to customers (He et al., 2020), are also key aspects in guaranteeing customer security and certainty (Gligor, 2015).

Based on the relationship of these dimensions with the concept of assurance, three main aspects—namely personnel contact quality, order discrepancy handling (Mentzer et al., 1999), and order returns (He et al., 2020; Xing et al., 2010) combined into one more comprehensive multidimensional construct. Thus, quality assurance is defined as the ability of online retailers to build customer trust and confidence in the logistics services they provide.

This construction covers aspects of order returns such as refunds, replacement products, and timeliness of the process. In addition, it also includes the effort required by the customer to report the non-conformity and how the service provider responds, including willingness, understanding, competence, and effort in resolving the problem. These dimensions collectively become important aspects in building customer trust. Several studies have also shown that assurance is one of the main determinants in shaping customer satisfaction (Cao et al., 2018; Park et al., 2015). Based on this literature, the following hypothesis is proposed:

H7: Quality assurance has a positive effect on customer satisfaction

The Influence of Customer Satisfaction on Loyalty and Future Purchase Intention, as well as the Influence of Loyalty on Future Purchase Intention

The supply chain is a strategic function that can create a competitive advantage for companies if used appropriately (Sorkun, 2019). Logistics Service Quality (LSQ) can be used as a benchmark for whether supply chain performance is able to meet increasing customer expectations, which is measured through customer satisfaction, loyalty, and future repurchase intent. The various dimensions of LSQ are one overarching concept that contributes significantly to customer satisfaction. The main goal of companies is generally not only to pursue maximum profits, but also to provide continuous services to increase customer satisfaction, loyalty, and repurchase intent (Huma et al., 2020).

Much of the literature shows empirical evidence regarding the relationship between customer satisfaction, loyalty, and repurchase intent (Bouzaabia et al., 2013; Collier & Bienstock, 2006; Jayawardhena, 2010; Rao et al., 2011.; Saura et al., 2008). For this reason, the hypotheses proposed are as follows:

H8: Customer satisfaction has a positive effect on loyalty

H9: Customer satisfaction has a positive effect on future purchase intention

H10: Loyalty has a positive effect on future purchase intention

RESEARCH METHODS

This research is basic research, which is research made to develop science. Based on its purpose, this research is a type of causal research, which is research that shows a causal relationship between two or more variables. The sample is part of the population to be studied and usually represents the entire population. The population of this study is unknown, so this study uses nonprobability sampling. The type of nonprobability sampling used is purposive sampling. Purposive sampling is the selection of samples based on certain characteristics that have been determined (Cozby & Bates, 2015).

Data was obtained from respondents through questionnaires shared through google form to obtain responses to the questions shared. The measurement level used is the interval level. The alternative answers provided for the interval level are arranged based on the numerical scale. Statements are measured in seven scales. A score of 1 state strongly disagrees with the statement given, while a value of 5 states strongly agrees with the statement given. The measuring indicator in this study refers to the research of Uvet et al. (2024) as shown in Table 1.

Table 1.
Measurement Item

Variable Name	Items	Source
Customer satisfaction (SAT)	- Overall, I am very satisfied with this online retailer's service - My online retailer gives good service	Murfield et al., (2017)
Loyalty (LYL)	- I am happy with my online retailer - I will say good things about this online retailer - I would recommend this online retailer - I would classify myself as a loyal customer of this online retailer	(Hu et al., 2022; Huang et al., 2006)
Future purchase intention (FPI)	- I am planning to use again in near future - I am planning to use again in the mid-term - I am planning to use again in the long term	(Jain et al., 2021b)
Timeliness (TI)	- Orders arrive on the date promised - Arriving time of order is consistent with the date promised - Delivery time of orders is consistent - Delivery time of orders is reliable - Time between placing and receiving order is reliable	(Mentzer et al., 2001; Mentzer, Daniel, et al., 1999)
Order condition (OC)	- Orders arrive undamaged - Order damage rarely occurs because of the transport mode - Packaging of order is sturdy - Packaging of order is undamaged	(Bienstock et al., 1997; Mentzer et al., 2001)
Order accuracy (OAC)	- Shipments rarely contain the wrong items - Shipments rarely contain incorrect number of quantities - Shipments rarely contain substituted items - Shipments rarely contain erroneous items	(Mentzer et al., 2001)
Information quality (IQ)	- The information communicated by online retailer is timely - The information communicated by online seller is accurate - The information communicated by online seller is complete - The information communicated by online seller is adequate - The information communicated by online seller is credible	(Rafiq & Jaafar, 2007)
Order availability (OAV)	- Products are available in inventory when ordered - Products consistently be available in inventory - Products seen as available in inventory is reliable	(Bienstock et al., 2008b)

Variable Name	Items	Source
Ordering procedures (OP)	• Online requisitioning procedures are easy to use • Online requisitioning procedures do not take much effort • Online requisitioning procedures do not take much time • Online requisitioning procedures are understandable	(Rafiq & Jaafar, 2007)
Order assurance quality (ξ6) (second-order construct)		
Order discrepancy handling (ODH)	• Correction of order discrepancies is satisfactory • Response to order discrepancies is satisfactory • The process of reporting of order discrepancies is adequate	(Mentzer et al., 2001)
Personal contact quality (PCQ)	• Customer services have sufficient knowledge to resolve problems • Customer service has sufficient experience to resolve problems • Customer services make an effort to understand my situation • Customer service is willing to understand my problems • Customer service is willing to find a solution to any problem • Customer services provide great effort to understand my problems • Customer services provide great effort to find a solution to any problem	(Bienstock et al., 2008; Mentzer et al., 2001)
Order return (OR)	• Collection of unsatisfied orders is prompt • Replacement of shipping product is prompt • Refund of unsatisfied orders is available after return	(He et al., 2020; Xing et al., 2010; Xing & Grant, 2006)

Source: Uvet, et al. (2024)

The target population in this study is everyone who has purchased products on the Tokopedia platform. The characteristics set are men or women with at least high school/vocational/equivalent, have made purchases on the Tokopedia platform in the last 6 months, have received an order that is not suitable and made a return. The reason for choosing respondents with these characteristics is so that respondents can provide accurate and reliable information in accordance with the existing reality. The number of respondents in this study was 542. Respondents in this study consisted of 363 (66.97%) males and 179 (33.03%) females. Based on age, respondents were dominated by 527 (97.22%) between the ages of 18–40 years. Respondents' education was more dominant in high school/vocational/equivalent as many as 122 (22.5%) and S1 as many as 324 (59.77%). The respondents' jobs were dominated by 126 students/university students (23.24%), civil servants as many as 112 (20.67%), and private employees as many as 236 (43.54%). Based on purchase frequency, as many as 423 (78.04%) respondents made purchases 6-20 times in the last 6 months.

The initial data processing in this study was carried out by testing validity and reliability using SPSS software. The validity test aims to identify factors that have precise accuracy to be used as a measuring tool that provides accurate measurement results on existing research models. A variable is declared valid if the significant correlation value is less than alpha (α) 0.05. Reliability tests measure the consistency and stability of the indicator. Reliability is measured by the Cronbach Alpha method through SPSS software. A variable is considered reliable if the Cronbach Alpha value is more than 0.6. The AMOS program is used to process SEM data, namely conducting structural and measurement model tests as well as hypothesis tests.

RESULTS & DISCUSSION

The initial stage in this study is to conduct a validity and reliability test. The validity test was used to test the feasibility of the indicators by distributing the initial 30 questionnaires online via Google Forms. Data from 30 initial respondents were tested to calculate Pearson correlations using the SPSS program. The indicator is declared valid if the significance value ≤ 0.05 and has a Pearson correlation value of ≥ 0.5 . A valid questionnaire shows that the indicators used in the questionnaire can measure every variable and are understood by respondents. In addition, the indicator is said to be reliable if Cronbach's alpha value ≥ 0.6 .

The results of the validity test showed that the indicators of all research variables, namely customer satisfaction, loyalty, future purchase intention, timeliness, order condition, order accuracy, information quality, order availability, order procedure, and order assurance quality consisting of 3 dimensions, namely the handling of order differences, the quality of personal contact, and order returns, had a significance value of < 0.05 and had a Pearson correlation value of > 0.5 , so that declared valid. All variables also have an alpha Cronbach value ≥ 0.6 . Thus, it can be concluded that all the indicators used to measure the variables in this questionnaire are consistent and reliable so that they can be used.

The next stage is data processing using the Structural Equation Model (SEM). The SEM approach is a measurement model that serves to describe the relationship between latent constructs and other indicators that represent them. The goal is to ensure that the measuring tools used in the study have met the standards of validity and reliability. To evaluate the measurement model, the Confirmatory Factor Analysis (CFA) technique was used on all indicators of each variable studied. Before the model can proceed to the structural analysis stage, the model must first be ensured to meet the Goodness of Fit (GoF) criteria.

The test results of the measurement model are shown in Table 2. The Goodness of Fit value in the structural model shows that the CMIN/DF value is 2.715 which means that the model has a good fit, because it is below the value of 3.00. RMSEA obtained a score of 0.056 included in the good fit category. The GFI value of 0.844 is included in the marginal fit category because it is between the range of 0.8 - 0.9. The CFI and TLI indices received values of 0.913 and 0.906, respectively, which means that both are included in the good fit, because they exceed the minimum limit of 0.9. Thus, the results of the structural model test have met the requirements for adequate compatibility and are worthy of further analysis.

Table 2.
The Goodness of fit Structural Model SEM

Goodness of fit	Criteria	Test Results	Description
CMIN/DF	$\leq 3,00$	2,715	Good Fit
RMSEA	$\leq 0,08$	0,056	Good Fit
GFI	$\geq 0,90$	0,844	Marginal fit
CFI	$\geq 0,90$	0,913	Good Fit
TLI	$\geq 0,90$	0,906	Good Fit

The next stage is standard loading analysis to determine the accuracy of each indicator. This stage is carried out using AVE and CR values. Table 3 shows the results of the validity and reliability tests using standard loads by calculating the extracted mean variance (AVE) and reliability construct (CR). The indicator will be used when the standard loading value is ≥ 0.5 or has an AVE value of ≥ 0.5 and a CR value ≥ 0.7 with a minimum value of 0.6. Table 3 shows that all variables meet the requirements as they have a CR value of ≥ 0.7 and an AVE value of ≥ 0.5 . Based on the results of the standardized load calculation test, all variables met the standard load requirements ≥ 0.5 . The measurement results can be declared to meet the criteria of validity and reliability in the measurement model, so that they can be continued to the next stage.

Table 3.
Standardized Loading, AVE, and CR Values on each Variable

Variable	Indicator	Std Loading (λ)	AVE	CR	Description
TI	TI1	0,909	0,777	0,946	Valid and Reliable
	TI2	0,886			Valid and Reliable
	TI3	0,859			Valid and Reliable
	TI4	0,877			Valid and Reliable
	TI5	0,877			Valid and Reliable
OC	OC1	0,787	0,598	0,856	Valid and Reliable
	OC2	0,813			Valid and Reliable
	OC3	0,773			Valid and Reliable
	OC4	0,716			Valid and Reliable
OAC	OAC1	0,936	0,808	0,944	Valid and Reliable
	OAC2	0,909			Valid and Reliable
	OAC3	0,874			Valid and Reliable
	OAC4	0,875			Valid and Reliable
OAV	OAV1	0,888	0,699	0,873	Valid and Reliable
	OAV2	0,691			Valid and Reliable
	OAV3	0,912			Valid and Reliable
IQ	IQ1	0,767	0,721	0,928	Valid and Reliable
	IQ2	0,865			Valid and Reliable
	IQ3	0,864			Valid and Reliable
	IQ4	0,892			Valid and Reliable
	IQ5	0,851			Valid and Reliable
OP	OP1	0,870	0,624	0,869	Valid and Reliable
	OP2	0,724			Valid and Reliable
	OP3	0,750			Valid and Reliable
	OP4	0,808			Valid and Reliable
ODH	ODH1	0,810	0,551	0,785	Valid and Reliable
	ODH2	0,720			Valid and Reliable
	ODH3	0,691			Valid and Reliable
PCQ	PCQ1	0,702	0,742	0,952	Valid and Reliable
	PCQ2	0,919			Valid and Reliable
	PCQ3	0,931			Valid and Reliable
	PCQ4	0,906			Valid and Reliable
	PCQ5	0,907			Valid and Reliable
	PCQ6	0,684			Valid and Reliable
	PCQ7	0,939			Valid and Reliable
SAT	SAT1	0,780	0,586	0,809	Valid and Reliable
	SAT2	0,728			Valid and Reliable
	SAT3	0,787			Valid and Reliable
LYL	LYL1	0,862	0,736	0,893	Valid and Reliable
	LYL2	0,846			Valid and Reliable
	LYL3	0,866			Valid and Reliable
FPI	FPI1	0,910	0,834	0,938	Valid and Reliable
	FPI2	0,903			Valid and Reliable
	FPI3	0,927			Valid and Reliable
OR	OR1	0,720	0,535	0,775	Valid and Reliable
	OR2	0,691			Valid and Reliable
	OR3	0,780			Valid and Reliable

Once the measurement model is declared feasible, the next process is to test the structural model to test the hypothesis and answer the research questions. The variables used in this structural model are variables that have gone through the process of validity and reliability in the second stage of the measurement model. The initial process of testing the structural model is carried out by evaluating the Goodness of Fit value to assess the suitability between the theoretical model and the empirical data obtained.

Table 4 presents the results of the Goodness of Fit on the structural model. The results of the CMIN/DF test were 2.715, below the maximum limit of ≤ 3.00 (Good fit). The RMSEA Index value is 0.056 (Good fit) because the value is ≤ 0.08 . The GFI value is 0.844 (marginal fit), because the value is in the range of 0.8 - 0.9. The results of the CFI and TLI tests received values of 0.913 and 0.906 (good fit), respectively. The results of the structural model test show that the model has a high level of conformity.

Table 4.
Goodness of Fit Structural Model Test

Goodness of fit	Criteria	Test Results	Description
CMIN/DF	$\leq 3,00$	2,715	Good Fit
RMSEA	$\leq 0,08$	0,056	Good Fit
GFI	$\geq 0,90$	0,844	Marginal fit
CFI	$\geq 0,90$	0,913	Good Fit
TLI	$\geq 0,90$	0,906	Good Fit

The research continued by conducting hypothesis testing. Hypothesis testing is done to analyze the influence between variables through existing hypotheses. Table 5 and Figure 1 show the results of hypothesis testing. The results of the hypothesis testing show that of the 10 hypotheses in this study, 6 hypotheses are supported, and 4 hypothesis is not supported.

Based on the data presented in table 5, it was found that not all hypotheses received Supported results. Hypothesis 1 is not supported, this is contrary to the results of research by Uvet et al. (2024) who say that timeliness has a positive effect on customer satisfaction. The results of hypothesis test 2 are not supported. These results are not in accordance with the research of Uvet et al. (2024) which said that order conditions have a positive effect on customer satisfaction. Other hypotheses that are not supported are hypotheses 5 and 9 where the results are not in line with the research conducted by Uvet et al. (2024) which states that information quality has a positive effect on customer satisfaction and customer satisfaction has a positive effect on future purchase intention.

Table 5.
Hypothesis Testing Results

Variable paths	Std Estimate(β)	Critical Ratio (C.R.)	p-value	Remarks
H1 TI $\rightarrow$ SAT	-0.179	-3,594	0.00	Not Supported
H2 OC $\rightarrow$ SAT	-0.133	-2,888	0.00	Not Supported
H3 OAC $\rightarrow$ SAT	0.188	3,291	0.00	Supported
H4 OAV $\rightarrow$ SAT	0.113	3,208	0.00	Supported
H5 IQ $\rightarrow$ SAT	-0.414	-7,523	0.00	Not Supported
H6 OP $\rightarrow$ SAT	0.281	5,118	0.00	Supported
H7 AQ $\rightarrow$ SAT	0.785	2,715	0.01	Supported
H8 SAT $\rightarrow$ LYL	0.612	8,533	0.00	Supported
H9 SAT $\rightarrow$ FPI	-0.581	-7,279	0.00	Not Supported
H10 LYL $\rightarrow$ FPI	0.871	14,733	0.00	Supported

Timeliness (TI) has a negative and significant influence on Customer Satisfaction (SAT), with a standardized estimate value of -0.179, critical ratio (C.R.) of -3.594, and p-value of 0.00. In this study, timeliness had no significant effect on customer satisfaction. This suggests that consumer expectations are relatively flexible towards delivery estimates, as many users are already familiar with the time span of regular courier services. Tokopedia also provides a variety of delivery options (economical, regular, instant) so that customer satisfaction is more determined by suitability with the specified service choice, not solely with the speed of delivery. Customer satisfaction tends to be influenced by other factors that are more dominant, such as order accuracy, product quality, seller service quality, and ease of the return process. Delays are often considered the responsibility of the courier service provider, not Tokopedia as a platform, so the impact on

satisfaction is reduced. The order tracking feature also provides transparency that reduces customers' negative perception of delivery delays.

The results of the analysis showed that Order Condition (OC) had a negative and significant effect on Customer Satisfaction (SAT), with a standardized estimate value of -0.133, C.R. -2.888, and p-value of 0.00. In Tokopedia e-commerce, the order condition does not have a significant effect on customer satisfaction because this factor has become the minimum standard for customers when shopping on e-commerce platforms. Consumers consider that the products received are in good condition, protected, and suitable for use, so that the existence of good order conditions no longer significantly increases satisfaction, but is seen as a basic expectation. If the order does not suffer severe damage, customer satisfaction is more determined by other factors that are considered to provide added value, such as order accuracy, product quality as described, competitive price, speed of seller service, and ease of return process. In the event of damage, Tokopedia consumers still have a solution through a buyer protection system that allows the return or replacement of goods, so that the negative impact of order conditions on satisfaction is reduced. Thus, order conditions no longer function as the main determinant of customer satisfaction, because their role is more of a basic condition that must be met in e-commerce transactions.

The Order Accuracy (OAC) variable had a positive and significant effect on Customer Satisfaction (SAT), with a standardized estimate value of 0.188, C.R. 3.291, and a p-value of 0.00. In the context of Tokopedia e-commerce, the level of order accuracy has a positive and significant effect on customer satisfaction. This is because the accuracy of orders, which includes the suitability of product types, quantities, sizes, colors, and conditions of goods, reflects the fulfillment of customer expectations for the transactions made. Accurate ordering not only minimizes the risk of complaints and additional costs due to returns, but increases consumer trust in both sellers and platforms, creating an efficient, safe, and enjoyable shopping experience. The higher the order accuracy level felt by customers, the greater the level of satisfaction obtained, which ultimately contributes to consumer loyalty and the sustainability of the e-commerce business.

The Order Availability (OAV) variable has a positive and significant effect on Customer Satisfaction (SAT), with a standardized estimate value of 0.113, C.R. 3.208, and p-value of 0.00. Order availability has a positive and significant effect on customer satisfaction because product availability is the main factor that determines the smooth purchase process. Consistent availability of goods indicates that sellers can meet consumer demand in a timely manner, reducing the risk of disappointment due to out-of-stock or order cancellations. This directly improves the efficiency of the shopping experience, as customers do not need to allocate additional time to search for similar products from other sellers. Order availability also strengthens the perception of seller and platform reliability, thereby increasing consumer confidence in e-commerce services. By meeting consumer needs without product availability barriers, customer satisfaction will increase, which further encourages the formation of loyalty and repurchases behavior. Order availability is a fundamental factor that determines consumer satisfaction at Tokopedia.

The Information Quality (IQ) variable showed a negative and significant influence on Customer Satisfaction (SAT), with a standard estimated value of -0.414, CR -7.523, and a p value of 0.00. In the context of Tokopedia's e-commerce, information quality does not have a positive and significant effect on customer satisfaction because consumers emphasize the real experience aspect of the transaction, such as the accuracy of orders, delivery speed, and the quality of the products received, compared to the information available on the platform. Although Tokopedia provides product descriptions, reviews, and detailed specifications, consumers are often aware of potential discrepancies between the information displayed and the reality of the goods received. This raises the perception that information quality is not always a determining factor for satisfaction but only serves as a basic prerequisite that is considered reasonable in online shopping. In addition, digital consumer behavior that tends to compare various sources of information (for example, through social media, forums, or personal recommendations) can also reduce the dominance of information quality in forming satisfaction. Thus, the unclear relationship between the quality of information and customer satisfaction reflects that other more concrete factor, such

as the speed of logistics services, seller reliability, and order accuracy, are more significant in influencing the level of Tokopedia's consumer satisfaction.

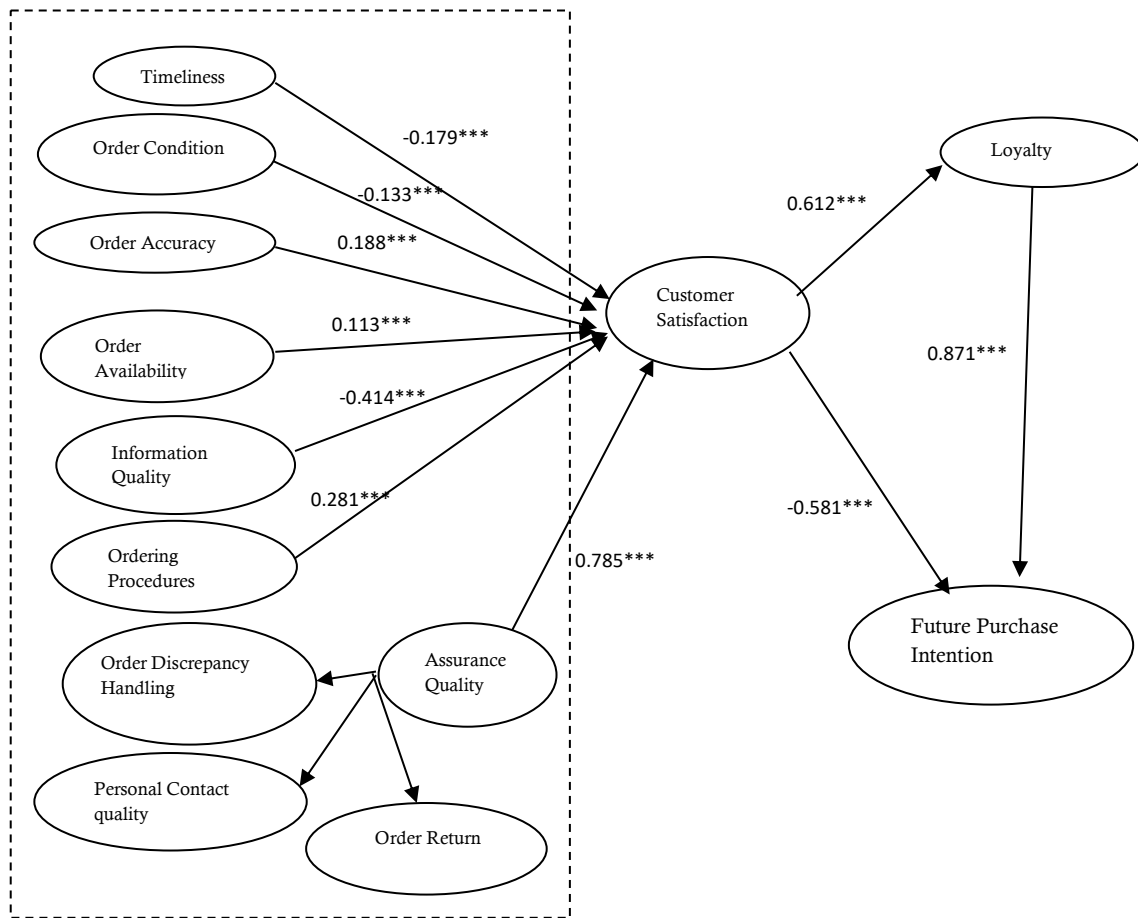


Figure 1.
Hypothesis Testing

The results of the analysis showed that the Order Procedures (OP) variable had a positive and significant effect on Customer Satisfaction (SAT), with a standardized estimate value of 0.281, C.R. 5.118, and p-value of 0.00. In the context of Tokopedia's e-commerce, order procedures have a positive and significant effect on customer satisfaction because structured and efficient operational procedures are the foundation of consistent service quality. Order procedures that include order processing, payment verification, stock management, packaging, and delivery play an important role in ensuring that transactions run smoothly according to customer expectations. If this procedure is carried out systematically and transparently, the risk of errors such as delivery delays, order cancellations, and product non-conformity can be minimized. This creates a more reliable and predictable shopping experience, which in turn increases consumer trust in both platforms and sellers. Furthermore, effective operational procedures also strengthen the perception of seller professionalism in the eyes of consumers, thus not only influencing short-term satisfaction but also driving long-term loyalty. Thus, the better the quality of operational procedures implemented at Tokopedia, the greater its contribution to increasing customer satisfaction.

The Assurance Quality (AQ) variable has a positive and significant influence on customer satisfaction (SAT), with a standardized estimate value of 0.785, C.R. 2.715, and p-value of 0.01. In the context of Tokopedia e-commerce, quality assurance has a positive and significant effect on customer satisfaction because quality assurance is an important mechanism that ensures that the products and services received by consumers are in accordance with the promised standards. The implementation of quality assurance for sellers on Tokopedia, whether through store verification, product assessments, review systems, or consumer protection policies, can increase customer trust

in transaction reliability. This process reduces the risk of mismatches between the description and quality of the products received, while minimizing the potential for consumer complaints, returns, and disappointment. The existence of quality assurance also strengthens the perception of professionalism and credibility of sellers and platforms, which directly increases customer satisfaction as they feel safe, valued, and protected in every transaction. Thus, the stronger the implementation of quality assurance at Tokopedia, the higher the level of customer satisfaction created, which ultimately contributes to loyalty and the sustainability of the long-term relationship between consumers, sellers, and platforms.

The Customer Satisfaction (SAT) variable has a positive and significant influence on Loyalty (LYL), with a standardized estimate value of 0.612, C.R. 5.833, and p-value of 0.00. Customer satisfaction has a positive and significant effect on customer loyalty because a high level of satisfaction forms an emotional and rational foundation that encourages consumers to make repeat purchases and maintain long-term relationships with platforms and sellers. The satisfaction that arises from a shopping experience that meets expectations such as order accuracy, delivery speed, reliability of product information, and transaction security—creates a positive perception of Tokopedia as a reliable platform. When consumers feel their needs and preferences are consistently met, they will be more reluctant to switch to competitors even though there are other alternatives with similar offers. Satisfaction also contributes to the creation of affective loyalty, which is an emotional attachment that encourages consumers to recommend Tokopedia to others through positive reviews or word of mouth. The higher the customer satisfaction level, the stronger the consumer loyalty, which ultimately supports Tokopedia's sustainable growth and competitive advantage in the e-commerce ecosystem.

The results of the analysis showed that Customer Satisfaction (SAT) had a negative and significant effect on Future Purchase Intention (FPI), with a standardized estimate value of -0.581, C.R. -7.279, and p-value of 0.00. In the context of Tokopedia as a marketplace with multi-seller characteristics and high price competition, customer satisfaction does not always have positive implications for repurchase intentions. Even though consumers feel satisfied with the shopping experience, this satisfaction can trigger exploratory behavior due to the availability of various alternatives to products and other sellers that are easily accessible on the platform. In addition, consumers' sensitivity to promotions, discounts, and product variations encourages them to switch choices even though previous experiences are satisfactory. Other factors such as the nature of the product that is rarely repurchased and the tendency to variety-seeking further strengthen this phenomenon, so that in the context of Tokopedia, customer satisfaction can show a negative influence on future purchase intention, in contrast to the relationship pattern commonly found in traditional marketing literature.

Loyalty (LYL) has a positive and significant influence on Future Purchase Intention (FPI), with a standardized estimate value of 0.871, C.R. 14.733, and p-value of 0.00. Customer loyalty has a positive and significant effect on future purchase intention because customer loyalty reflects long-term attachment formed through a combination of a satisfying shopping experience, trust in the platform, and a consistent perception of value. Loyal customers not only show repeated preference for Tokopedia but also have a commitment to continue to choose the platform even though there are competitor alternatives with similar offers. This loyalty that has been formed strengthens future purchase intentions because consumers feel confident that Tokopedia is able to provide a safe, efficient, and expected transaction experience. In addition, loyalty also encourages other positive behaviours, such as word of mouth and recommendations to others, which further strengthens consumers' tendency to continue making purchases on the same platform. Thus, the higher the level of customer loyalty that Tokopedia users have, the greater the influence on future purchase intention.

CONCLUSION

The results of the study show that not all dimensions of Tokopedia's services have a significant effect on consumer satisfaction. Timeliness, order conditions, and information quality are perceived as only the minimum standards, while consumers rely more on tracking features, protection systems, and user reviews. Thus, satisfaction is more determined by the dimensions that provide real added value than the basic service attributes.

Order accuracy, product availability, ordering procedures, and quality assurance have been proven to have a significant effect on satisfaction. The accuracy and availability of orders ensure that consumer needs are met according to expectations, while efficient ordering procedures increase convenience and perception of ease of transactions. Quality assurance realized through store verification, official labels, and warranty policies reinforces consumers' sense of security and trust in the platform. These four dimensions are important determinants in shaping perceived service quality that will substantially increase consumer satisfaction.

This study confirms that satisfaction is a strategic determinant of loyalty that drives future purchase intention. Satisfied consumers tend to develop long-term preferences, reduce the tendency to move, and ensure the sustainability of transactions, so satisfaction and loyalty play a key role as key variables that connect service quality with Tokopedia's long-term consumer relationships.

This research is limited to the realm of business-to-consumer (B2C) e-commerce with a focus on case studies that are specifically conducted on the Tokopedia platform. These limits are set to ensure the depth of analysis of the dynamics of consumer behavior in the context of marketplaces that have multi-seller characteristics and intense price competition. Thus, the findings of this study are expected to provide a more comprehensive understanding of the relationship between customer satisfaction and repurchase intent in the e-commerce ecosystem in Indonesia.

The findings of this study confirm that the dimensions of Logistics Service Quality (LSQ) play a crucial role in increasing satisfaction while encouraging customer retention in the context of the online shopping experience. In particular, the results of the analysis show that effectiveness and efficiency at the initial order handling stage, accompanied by the ability to resolve order issues optimally, have a significant influence on customer satisfaction, which in turn results in long-term benefits in the form of increased customer retention. The theoretical implications of these findings are the strengthening of the literature on the relationship between logistics service quality and consumer behavior in e-commerce, as well as contributing to the development of a conceptual model that emphasizes the importance of the LSQ dimension as a strategic determinant in the formation of customer satisfaction and loyalty, as well as the desire to make purchases in the future.

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