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# Modeling the influence of e-service quality on e-satisfaction in Indonesia's digital marketplaces using a hybrid approach of SEM and fsQCA

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## Abstract

**Purpose** – Indonesia's expanding digital marketplaces make e-satisfaction a key success factor, yet traditional research often overlooks its complex, nonlinear drivers. This study aims to integrate partial least square structural equation modelling (PLS-SEM) and fuzzy-set qualitative comparative analysis (fsQCA) to reveal both linear and configurational influences – security, pricing, shipping, information availability and product quality – providing practical insights for digital platforms to enhance competitiveness.

**Design/methodology/approach** – This research uses Expectancy-Disconfirmation theory as a framework which demonstrates the mechanism through which buyers' digital marketplace experiences create their e-satisfaction. Through integrating fsQCA with PLS-SEM this research combines asymmetric and symmetric methods to analyze the determinants of e-satisfaction.

**Findings** – The structural equation modeling results show that security, pricing, shipping, information availability and quality significantly impact e-satisfaction. The fsQCA findings further reveal that high e-satisfaction depends on the presence of security, pricing, information availability and quality, whereas low e-satisfaction stems from their absence.

**Originality/value** – This study uniquely integrates PLS-SEM and fsQCA to reveal both linear effects and complex configurations that drive e-satisfaction in Indonesia's digital marketplaces. It extends the Expectancy-Disconfirmation Theory by showing how security, pricing, shipping, information and product quality interact to shape satisfaction. By focusing on an emerging economy, it delivers much-needed context-specific insights and fills a critical gap in global e-commerce research.

**Keywords** E-service quality, E-satisfaction, Asymmetric approach, Digital marketplaces, Expectancy-disconfirmation theory, Decision-making, Fuzzy, Management, Business strategy

**Paper type** Research paper

## 1. Introduction

Modern digital marketplaces have transformed business practices by reducing costs, expanding availability and providing interactive connectivity for both consumers and firms (Cano *et al.*, 2023).

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During the global COVID-19 pandemic, online sales leapt from US$2,855bn in 2020 to US $3,285bn in 2021, representing a 22% increase (ITA, 2021). This surge showcases how platforms have adapted to demand fluctuations by offering personalized online experiences that enhance engagement. Adhering to e-satisfaction theories, these digital advancements help build consumer trust, bolster customer loyalty and highlight a marketplace's potential to meet evolving consumer needs. Indonesia exemplifies this rapid growth, with digital retail increasing from US$59.6bn in 2022 to US$72.7bn in 2023 (Uzunoglu, 2024). Rising internet access, affordable smartphones and improved network infrastructure have made online shopping more convenient and accessible. Consequently, Indonesian businesses view e-satisfaction as a key driver for long-term profitability and competitive advantage in the dynamic digital market sector (Ashiq and Hussain, 2024).

As competition intensifies, digital marketplaces must retain customers by delivering high-quality e-services that align with consumer expectations (Al-Okaily, 2023; Al Amin *et al.*, 2024). Critical dimensions of these e-services – security, pricing, shipping, information availability and product quality—are known to affect customer satisfaction (Ilieva *et al.*, 2022; Loiacono *et al.*, 2007; Parasuraman *et al.*, 2005). Yet, many digital platforms struggle to pinpoint which dimension most strongly drives e-satisfaction. This uncertainty can lead to inefficient resource allocation, where efforts are concentrated on elements that may not significantly improve customer experiences. To address this gap, empirical inquiry is needed to clarify which e-service components are most crucial for boosting e-satisfaction, guiding strategic decisions for better user experiences, customer retention and sustainable market growth.

Despite the importance of understanding e-satisfaction in digital marketplaces, existing research offers conflicting results and faces methodological challenges. For example, Ilieva *et al.* (2022) found that security, information availability, quality and time significantly affect e-satisfaction, yet shipping and pricing did not. In contrast, Mofokeng (2021) concluded that product delivery, perceived security and product variety matter, while privacy does not. Similarly, Al-Dweeri *et al.* (2019) emphasized privacy, reliability, emotional benefits and customer service as pivotal factors, rendering efficiency negligible. These inconsistencies hint that the influence of each e-service quality dimension can vary widely depending on context.

From a methodological standpoint, much research has relied on structural equation modeling (SEM) alone, possibly overlooking nonlinear and more complex interactions among variables. For instance, Tzeng *et al.* (2021) observed that only information quality and product quality had significant effects on satisfaction in both online and offline settings, raising questions about broader applicability. Meanwhile, Khan *et al.* (2023) found that e-service quality strongly affects e-satisfaction and e-loyalty in online banking, suggesting that industry-specific nuances can shift the relative importance of each factor. Thus, these findings underscore the need for further research to reconcile theoretical inconsistencies and offer clearer, more practical insights for digital marketplaces striving to refine their e-service quality.

This study investigates how Indonesia's digital marketplaces can enhance e-satisfaction by examining key e-service quality dimensions – security, pricing, shipping, information availability and product quality – through both linear (SEM) and nonlinear [fuzzy-set qualitative comparative analysis (fsQCA)] analytical methods. By focusing on consumer expectations such as secure transactions, competitive pricing, timely shipping and reliable product quality, the study aims to illuminate how these dimensions work in concert to shape overall satisfaction (Ilieva *et al.*, 2022; Ashiq and Hussain, 2024; Mofokeng, 2021; Tzeng *et al.*, 2021). Using a multimethod research design is intentional: SEM provides insight into direct, linear relationships, whereas fsQCA uncovers more intricate, nonlinear configurations that may yield high or low satisfaction. This holistic approach bridges theoretical and practical gaps, ultimately

offering digital marketplaces actionable guidance to optimize service quality, foster customer loyalty, and thrive in a competitive e-commerce environment.

To address the inconsistencies in prior research, this study concentrates on how five e-service quality dimensions – security, pricing transparency, shipping reliability, information availability and product quality – collectively shape customer satisfaction in Indonesia's e-commerce sector (Ilieva *et al.*, 2022; Mofokeng, 2021; Al-dweeri *et al.*, 2019). The first research question (*RQ1*) probes:

*RQ1*. How these dimensions contribute to satisfaction?

Drawing from Tzeng *et al.* (2021) and Khan *et al.* (2023), who confirm the multidimensional and context-specific nature of e-service quality. Leveraging a mixed-method design – SEM for linear insights and fsQCA for nonlinear analyses – represents a step beyond traditional single-method models, allowing us to discern multiple "recipes" for achieving high or low e-satisfaction. Specifically, fsQCA reveals that certain bundles of security, pricing, information availability and product quality can foster elevated e-satisfaction, whereas their absence predicts dissatisfaction.

In light of these mixed outcomes in existing literature, the second research question (*RQ2*):

*RQ2*. What configurations of e-service quality dimensions most effectively lead to high e-satisfaction in Indonesia's e-commerce market?

This will reveal favorable configurations and provides insights for digital marketplaces to prioritize key e-service quality dimensions, optimize service delivery and gain a competitive edge. Finally, to address the challenges of dissatisfaction, the third question (*RQ3*):

*RQ3*. What unfavorable combinations of e-service quality dimensions contribute to low e-satisfaction levels?

This will provide a roadmap for market players to proactively mitigate service shortfalls. Overall, this dual analysis not only advances the theoretical understanding of e-satisfaction through an asymmetric modeling lens but also delivers practical strategies for e-commerce platforms to improve their offerings in Indonesia and beyond.

The remaining sections of this article are structured as follows. Section 2 provides a comprehensive literature review, discussing prior studies, gap identification, theoretical frameworks, hypotheses and proposition development. Section 3 details the research methodology, including operationalization and measurement items, sampling techniques, data collection procedures and analysis techniques. Section 4 presents the results of this work, showing the analytical findings obtained through SEM and fsQCA approaches. This work analyzes theoretical and practical implications in Section 5 followed by a discussion of implications for theory in digital marketplaces in Section 6. Section 7 summarizes the study's key findings, limitations and potential future research directions.

## 2. Literature review

### *2.1 Prior studies and gap identification*

Several studies have explored the determinants of e-satisfaction in digital marketplaces, each offering insights into various service dimensions as shown in Table 1. For instance, Ilieva *et al.* (2022), using SEM, found that security, information availability, quality and time significantly influence e-satisfaction in Bulgaria, while shipping and pricing do not. In South Africa, Mofokeng (2021) revealed that product delivery, security, information quality and product variety significantly affect e-satisfaction, but privacy does not. Similarly, Al-dweeri

**Table 1.** Previous studies and gaps

| Author (s) | Context (online vs offline shopping) | E-service quality dimensions used | Methods (SEM, fsQCA, etc.) | Main findings | Contribution of the study |
|---|---|---|---|---|---|
| Ilieva *et al.* (2022) | Online shopping (digital marketplaces) | Time, security, quality, information availability, shipping and pricing | A single method of SEM | Security, information availability, quality and time significantly affect e-satisfaction. Shipping and price do not affect e-satisfaction | Limited to a single method (SEM); does not explore causal complexity or interactions between dimensions |
| Mofokeng (2021) | Online shopping (digital marketplaces) | Information quality, privacy, security, product variety and delivery | A single method of SEM | Product delivery, perceived security, information quality and product variety significantly influence e-satisfaction and privacy does not influence e-satisfaction | Focuses on certain dimensions; lacks mixed-method approaches for a deeper understanding of e-satisfaction |
| Al-dweeri *et al.* (2019) | Online shopping (digital marketplaces) | Privacy, reliability, emotional benefit, customer services and efficiency | A single method of SEM | Privacy, reliability, emotional benefit and customer service influence e-satisfaction, but efficiency does not | Limited by SEM; efficiency dimension lacks significant impact. Does not consider complexity of interactions |
| Tzeng *et al.* (2021) | Online and offline shopping | System quality, information quality, services quality, product quality and delivery service | A single method of SEM | Only information quality and product quality affect customer satisfaction | Context is mixed (online and offline), leading to potential biases. Limited by use of a single method |
| Khan *et al.* (2023) | Online banking services | Personal needs, website organization, website efficiency and user friendliness | A single method of SEM | E-service quality significantly affect e-satisfaction and e-loyalty | Focuses on online banking, which may differ from shopping contexts. Limited to a single method |
| This study | Online shopping (digital marketplaces) | Security, pricing, shipping, information availability and quality | A combined used of SEM and fsQCA | Security, pricing, shipping, information availability and quality significantly affect e-satisfaction | Addresses methodological gaps by using SEM and fsQCA for a deeper analysis of interactions and causal complexities among dimensions. Provides a more comprehensive understanding of e-satisfaction in online shopping |

**Source(s):** Created by authors

*et al.* (2019) identified that privacy, reliability, emotional benefits and customer service significantly affect e-satisfaction in Jordan, but efficiency does not. Although these studies provide valuable insights, their reliance on a single-method SEM approach limits their ability to uncover the causal complexities and interactions among e-service quality dimensions.

Tzeng *et al.* (2021) explored online and offline shopping environments, finding that only information and product quality significantly affect customer satisfaction. However, the mixed shopping context and exclusive reliance on SEM limit a deeper understanding of e-satisfaction in purely online settings. Similarly, Khan *et al.* (2023) extended the research to online banking, identifying personal needs, website organization, efficiency and user-friendliness significantly affecting e-satisfaction and e-loyalty. Despite these insights, the unique context of online banking makes it challenging to apply these findings to online shopping experiences directly, and the exclusive use of SEM limits the ability to examine nonlinear and complex relationships.

This study seeks to overcome the methodological limitations of previous research by integrating SEM and fsQCA. By investigating key dimensions – security, pricing, shipping, information availability and quality – within Indonesia's digital marketplace, the research offers a comprehensive view of how these factors interact to influence e-satisfaction. The mixed-method approach provides a more holistic understanding of causal pathways, uncovering the complex configurations that lead to high and low e-satisfaction. These insights enhance theoretical knowledge and provide practical strategies for digital marketplaces to optimize service quality, improve customer experience and gain a competitive edge.

### *2.2 The expectancy-disconfirmation theory*

This study applies Expectancy-Disconfirmation Theory (EDT) to explain how digital marketplaces fulfill buyer expectations and shape e-satisfaction. EDT maintains that customers develop expectations about a product or service based on factors such as the platform's reputation, prior experiences and other users' reviews (Oliver, 1980; Favero *et al.*, 2024). In the context of digital marketplaces, these expectations typically revolve around essential service elements, including secure transactions, reasonable pricing, prompt delivery, readily available information and high product quality (Venkatakrishnan *et al.*, 2023). The research extends EDT by treating each of these e-service quality dimensions – security, pricing, shipping, information availability and product quality – as critical determinants of e-satisfaction. This extension is particularly relevant in digital marketplaces, where factors like security and information availability heavily influence both customer expectations and subsequent satisfaction.

EDT's core contribution to this study lies in its focus on how perceived performance compares with these initial expectations to shape e-satisfaction. Positive disconfirmation, which arises when the service surpasses customer expectations, leads to higher e-satisfaction. Negative disconfirmation, by contrast, occurs when the service falls short of expectations, thus lowering e-satisfaction. Confirmation takes place when perceived performance aligns precisely with what was anticipated, effectively maintaining existing satisfaction levels. By highlighting these different outcomes – positive disconfirmation, negative disconfirmation and confirmation – this study provides a more comprehensive view of how e-service quality dimensions interact to influence e-satisfaction, representing a notable advancement in our theoretical understanding of online consumer behavior.

### *2.3. E-satisfaction*

E-satisfaction is defined as the customer's overall experience with the product, and it indicates how well products and services meet the needs and preferences of customers (Rita *et al.*, 2019). It is the feeling of pleasure or disappointment due to contrasting a product's

performance with what one expects (Raza *et al.*, 2020). In the digital marketplace realm, Lee and Lee (2019) postulated that e-satisfaction is influenced by the product information quality presented on the website and the overall transaction process.

Recent studies have revealed various configurations influencing high and low e-satisfaction in digital marketplaces, each defined by distinct patterns (Yan *et al.*, 2023). High e-satisfaction is strongly linked to increased brand loyalty and purchase intention, which are crucial for digital marketplaces. Conversely, low e-satisfaction highlights areas where marketplaces fail to meet service quality standards. By analyzing these behaviors, digital platforms can develop optimal strategies to enhance e-satisfaction, prevent dissatisfaction and gain actionable insights to prioritize key e-service quality dimensions. Incorporating these insights enables digital marketplaces to optimize service delivery and secure a competitive edge. Understanding the drivers of high and low e-satisfaction helps platforms make informed decisions about which areas of service quality require improvement. These actions enhance e-satisfaction and contribute to long-term business sustainability by fostering customer loyalty and increasing purchase intention.

### *2.4. E-service quality*

Parasuraman *et al.* (2005) defined e-service quality as the degree to which a website simplifies an effective transaction and the provision of goods and services. Gupta *et al.* (2023) posited service quality as customers' long-term evaluation of service providers' performance. Integrating e-service quality enables researchers to understand better how these elements contribute to e-satisfaction in digital marketplaces. This study exercises the most common e-servqual dimensions of security, pricing, shipping, information availability and quality (Loiacono *et al.*, 2007; Parasuraman *et al.*, 2005). Security refers to the platform's protection level for user information (Al-dweeri *et al.*, 2019). Pricing refers to the total amount customers pay relative to their expectations of the product's value (Kotler and Armstrong, 2018). Shipping relates to delivery speed, cost and reliability (Rita *et al.*, 2019). Information availability relates to accurate and comprehensive product information (Moriuchi and Takahashi, 2023). Quality refers to the consumer's assessment of a product's overall excellence (Uzir *et al.*, 2021). These aspects collectively enhance the e-satisfaction of digital marketplaces.

### *2.5 Security*

Al-dweeri *et al*. (2019) defined security as the level of protection a platform provides for user information. Other researchers have similarly defined security as protecting customers' personal and financial information and ensuring it remains safe and confidential (Rita *et al.*, 2019). It also includes the confidence users have in a platform's ability to safeguard their property and maintain the privacy of their information (Fan *et al.*, 2018). Concerns over the misuse of personal data often discourage customers from purchasing in digital marketplaces. Customers tend to feel more satisfied when they perceive a platform as secure, using appropriate technologies to protect their personal information and ensure confidentiality during transactions. The more secure the marketplace, the greater the level of e-satisfaction is. Thus, the following hypothesis is proposed:

*H1*. Perceived security positively impacts e-satisfaction in digital marketplaces.

### *2.6 Pricing*

The perceived price is defined as the total amount customers pay relative to their expectations of the product's value (Kotler and Armstrong, 2018). Whether a consumer purchases from a

marketplace depends on the perceived value, which reflects the consumer's overall evaluation of subjective and objective factors shaping the shopping experience (Wu and Huang, 2023). Consumers who perceive high value tend to experience satisfaction, meaning that perceived value directly impacts e-satisfaction (Miao *et al.*, 2022). A lower perceived price enhances perceived value, especially when consumers feel they are getting a good deal. Before purchasing, buyers often compare prices across different online stores to find the lowest price that aligns with the expected quality. Therefore, digital marketplaces must carefully consider pricing, as higher prices can reduce perceived value and, consequently, lower e-satisfaction. Thus, the following hypothesis is proposed:

*H2*. Perceived pricing positively impacts e-satisfaction in digital marketplaces.

### *2.7 Shipping*

Hult *et al.* (2019) defined shipping as the seller's ability to deliver a product at the specified time, to the chosen location and at the lowest possible cost. Similarly, Lee and Lee (2019) noted that shipping includes all necessary services to ensure timely product delivery to the customer's address. Shipping is assessed based on delivery accuracy, timeliness of customer notifications regarding delivery status and shipping costs. Providing reliable, secure and timely shipping in digital marketplaces is crucial (Ehsani and Hosseini, 2023). Shipping is critical in determining e-satisfaction as delivery speed, cost and reliability significantly impact customer satisfaction (Rita *et al.*, 2019). Fast and timely delivery and low shipping costs cause higher e-satisfaction, as customers value speed and punctuality when receiving their orders and vice versa (Chao *et al.*, 2024). Thus, the following hypothesis is proposed:

*H3*. Shipping positively impacts e-satisfaction in digital marketplaces.

### *2.8 Information availability*

Rita *et al.* (2019) defined information availability as the vendor's ability to provide sufficient information to enable customers to make informed decisions about products or services. Therefore, the availability of accurate and comprehensive product information is essential in digital marketplaces (Moriuchi and Takahashi, 2023). Yoo *et al.* (2023) defined information accuracy as the correctness of the data presented. Before purchasing, customers often seek product information and compare product quality across different marketplaces based on what is available. The availability of detailed and accurate information positively influences e-satisfaction, as it helps align consumers' expectations with the actual products they purchase (Yu *et al.*, 2017). Well-informed customers are more satisfied with their purchases, perceiving that they have made sound decisions based on the information provided. Thus, the following hypothesis is proposed:

*H4*. Information availability positively impacts e-satisfaction in digital marketplaces.

### *2.9 Quality*

Moriuchi and Takahashi (2023) stated that product quality is most strongly associated with e-satisfaction, emphasizing the need for digital marketplaces to maintain high product standards consistently. Uzir *et al.* (2021) defined product quality as the consumers' assessment of a product's overall excellence, reflecting consumers' evaluations of their prior consumption experiences, including how well their needs were met. In digital marketplaces,

product quality is a crucial determinant of e-satisfaction, as buyers cannot physically see or inspect the product before purchase (Rita *et al.*, 2019; Ashiq and Hussain, 2024). Despite being unable to examine the products firsthand, buyers still expect to receive items that match descriptions and expectations and are durable and functional, fulfilling their intended needs. When products do not meet these expectations or are easily damaged, e-satisfaction among buyers diminishes. Thus, the following hypothesis is proposed:

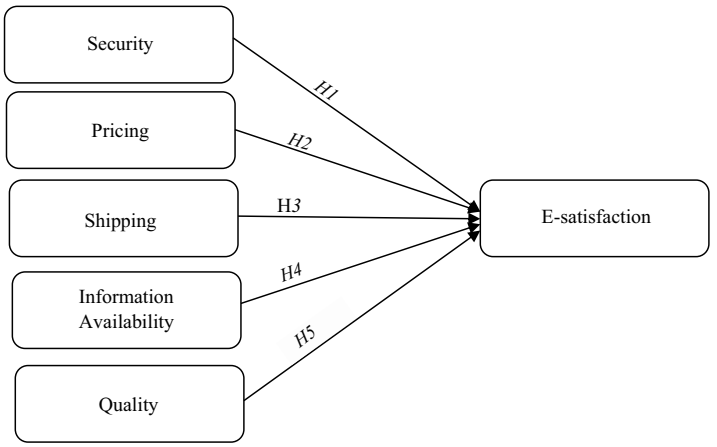
*H5*. Product quality positively impacts e-satisfaction in digital marketplaces.

All the hypotheses in this study are displayed in Figure 1.

### *2.10 Proposition development*

The rising popularity of online shopping has led to the rapid expansion of e-commerce platforms, creating challenges for these platforms to enhance e-service quality to optimize performance and meet consumer expectations. E-service quality has been recognized as a crucial driver of e-satisfaction, as demonstrated by Sharma and Lijuan, 2015 and Chao *et al.*, 2024. E-satisfaction is pivotal in fostering long-term loyalty, as satisfied consumers will continue engaging with the platform. Consequently, critical e-service quality dimensions – security, pricing, shipping, information availability and quality – are seen as primary determinants of e-satisfaction. However, previous research has revealed that the impact of these dimensions is not always linear but rather depends on the specific configuration of these elements. While these findings hold vital theoretical significance, they face limitations in their practical applicability to e-commerce business practices, as noted in the study by Rashid and Rasheed, 2024.

Previous research has examined the direct relationship between e-service quality dimensions and e-satisfaction on digital platforms (Ashiq and Hussain, 2024; Chao *et al.*, 2024). While these studies have made valuable contributions to the practical understanding of this relationship, they fall short in explaining more complex interactions from a broader practical perspective. The varying effects of specific e-service quality dimensions and




**Source(s):** Created by authors

**Figure 1.** Conceptual model

platform characteristics on e-satisfaction indicate the need for a deeper understanding of how these elements interact. To date, no study has comprehensively combined SEM and fsQCA to investigate e-service quality within the Indonesian e-commerce context. This gap underscores the need for research that integrates these approaches. This study identifies the key factors driving e-satisfaction by developing a model that maps the configurations of e-service quality dimensions. By integrating SEM and fsQCA, this model offers a more holistic understanding of how e-service quality shapes consumer e-satisfaction. As a result, this study proposes the fsQCA model as presented in Figure 2:

*P1*. The presence of a single e-service quality dimension alone is insufficient to achieve high customer e-satisfaction in e-commerce.

*P2*. The absence of a single e-service quality dimension alone is insufficient to cause a low level of customer e-satisfaction in e-commerce.

## 3. Methods

### *3.1 Operationalization and measurement items*

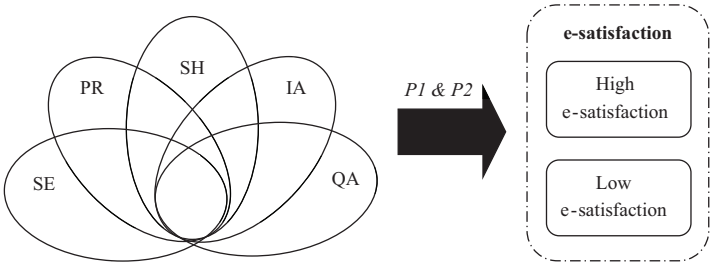
This study's measurement items were derived from prior studies and adapted to suit the study's circumstances. A five-point Likert scale, with ratings ranging from strongly disagree to strongly agree, was used to measure the items. This study exercised five independent variables of security, pricing, shipping, information availability and quality and one dependent variable of e-satisfaction, which are operationalized as follows.

*3.1.1 Security.* Security is operationalized as a digital marketplace's ability to provide consumers with information, mitigate the risk of privacy loss and prevent identity theft (Ilieva *et al.*, 2022; Vasic *et al.*, 2019). This study adapts and measures security from Ilieva *et al.* (2022) and Vasic *et al.* (2019) using three items:

(1) While purchasing online, I hesitate to provide my credit/debit card number;

(2) When purchasing online, there is a risk of privacy loss; and

(3) When purchasing online, there is a risk of identity theft.




**Note(s):** SE = security; PR = pricing; SH = shipping; IA = information availability; QU = quality; ES = e-satisfaction
**Source(s):** Created by authors

**Figure 2.** The study's configurational path

*3.1.2 Pricing.* Pricing is defined as a digital marketplace's ability to save customers money, offer lower prices and reduce transaction costs (Ilieva *et al.*, 2022; Vasic *et al.*, 2019). This study adapts and measures pricing from Ilieva *et al.* (2022) and Vasic *et al.* (2019) using three items:

(1) online shopping saves money compared to traditional shopping;

(2) online shopping is cheaper than traditional shopping; and

(3) online shopping significantly reduces expenses per transaction compared to traditional shopping.

*3.1.3 Shipping.* Shipping is defined as a digital marketplace's ability to offer free shipping, deliver the correct product in the proper size as ordered, maintain the quality and freshness of the shipped product and provide delivery on weekends (Ilieva *et al.*, 2022; Vasic *et al.*, 2019). This study adapts and measures shipping from Ilieva *et al.* (2022) and Vasic *et al.* (2019) using six items:

(1) free shipping options in online shopping increase sales;

(2) after making an online purchase, customers are concerned whether the ordered product will be delivered;

(3) online purchases make customers worry about receiving the wrong product;

(4) after making an online purchase, consumers are anxious about whether the ordered product (clothing) will be the appropriate size;

(5) after making an online purchase, consumers are concerned about the quality or freshness of the delivered product; and

(6) online shopping offers shipping options on weekends as well.

*3.1.4 Information availability.* Information availability is defined as a digital marketplace's ability to provide consistent, accurate, reliable and timely information (Ilieva *et al.*, 2022; Vasic *et al.*, 2019). This study adapts and measures information availability from Ilieva *et al.* (2022) and Vasic *et al.* (2019) using three items:

(1) the information on the product online is identical to the information in the store;

(2) the information on the product online is accurate; and

(3) the information on the product online is up to date.

*3.1.5 Quality.* Quality is defined as the customer's assessment of the overall excellence and value of the delivered product and shipping conditions (Ilieva *et al.*, 2022; Vasic *et al.*, 2019). This study adapts and measures quality from Ilieva *et al.* (2022) and Vasic *et al.* (2019) using three items:

(1) the product ordered online is of the same quality as the product purchased in a store;

(2) e-shopping offers the same purchasing conditions as traditional shopping; and

(3) the product ordered online is rarely different from the product purchased in a store.

*3.1.6 E-satisfaction.* E-satisfaction is defined as the satisfaction experienced when expectations related to digital marketplaces are met or exceeded (Ilieva *et al.*, 2022; Vasic *et al.*, 2019). This study adapts and measures e-satisfaction from Ilieva *et al.* (2022) and Vasic *et al.* (2019) using five items:

(1) I am satisfied that websites offer online purchasing options;

(2) internet shopping makes the purchasing process enjoyable;

(3) I would recommend online shopping to other consumers;
(4) I enjoy online shopping; and
(5) in my opinion, online shopping is excellent.

*3.2 Sampling technique and data collection procedure*

This study uses a survey method to examine the key factors influencing e-satisfaction in digital marketplaces. The study's objectives are twofold:

(1) to identify the determining factors of e-satisfaction in Indonesia's digital marketplaces using symmetric and asymmetric analytical approaches; and
(2) to offer actionable insights into which e-service quality dimensions most effectively improve e-satisfaction.

Purposive random sampling was used, with the following respondents' criteria:

- male or female, aged 17 years or older;
- a minimum education level of high or vocational school; and
- experience using and purchasing from Indonesia's digital marketplaces at least twice in the past three months.

This research focuses on Indonesian digital marketplace users due to the substantial growth and large user base of these platforms. However, we acknowledge certain limitations in the generalizability of the findings. Future studies should conduct cross-country surveys to address these limitations. Data was collected via an online survey using Google Forms, which was randomly distributed across various social media platforms, including Facebook, Instagram, LINE and WhatsApp. The questionnaire was divided into three sections: screening questions for eligibility, demographic information and e-satisfaction determinant details. Respondents rated items on a five-point Likert scale. A total of 220 responses were collected over a 2.5-month period, from January to April 2024. The respondent profile is presented in Table 2.

*3.3 Analysis technique*

This study uses both symmetric and asymmetric modeling approaches to examine how e-service quality influences e-satisfaction. The symmetric approach, exemplified by SEM, focuses on linear relationships in which the effects of e-service quality on e-satisfaction are assumed to be consistent across the data set (Kaya *et al.*, 2020). SEM is particularly useful for exploring complex research models because it can simultaneously estimate both direct and indirect effects (Hair *et al.*, 2017, 2019). In addition, SEM is well-suited for investigating latent constructs such as e-satisfaction, which require measurement via observable indicators – here, factors like shipping, pricing, security, information availability and quality. In contrast, the asymmetric approach – represented by fsQCA – examines nonlinear and context-specific relationships by identifying configurations of conditions that produce a specific outcome (Kaya *et al.*, 2020). Unlike SEM, which emphasizes uniform effects, fsQCA highlights multiple causal pathways that might otherwise be overlooked in linear models (Rasoolimanesh *et al.*, 2021). By considering a variety of possible configurations, fsQCA reveals how different routes can lead to high or low levels of e-satisfaction.

The first method uses SEM through Smart-PLS 4.0 for data processing. SEM is chosen due to the exploratory nature of the research, making it ideal for examining complex

**Table 2.** Sample profile

| Measure | Items | Frequency | % |
|---|---|---|---|
| Gender | Male | 104 | 45.22 |
| | Female | 126 | 54.78 |
| Age group | <17 | 0 | 0.00 |
| | 17–26 | 119 | 51.74 |
| | 27–36 | 90 | 39.13 |
| | >36 | 21 | 9.13 |
| Education level | Vocational/high school | 95 | 41.30 |
| | Diploma 3 | 0 | 0.00 |
| | Bachelor's degree | 110 | 47.83 |
| | Master's degree | 23 | 10.00 |
| | Doctoral degree | 2 | 0.87 |
| Occupation | Students | 104 | 45.22 |
| | Civil servants | 25 | 10.87 |
| | Entrepreneurs | 27 | 11.74 |
| | Private workers | 65 | 28.26 |
| | Others | 9 | 3.91 |
| Purchase frequency | 2–4 times | 119 | 51.74 |
| | 5–8 times | 96 | 41.74 |
| | >8 times | 15 | 6.52 |

**Source(s):** Created by authors

relationships between variables (Hair *et al.*, 2017). By applying SEM, researchers can simultaneously model both direct and indirect effects. This enables a deeper understanding of how latent constructs (i.e. e-satisfaction) interact and relate to observable variables (Hair *et al.*, 2019). Moreover, SEM is beneficial for assessing latent variables, which is essential when investigating abstract concepts like e-satisfaction and e-service quality. Because these constructs cannot be directly measured, they must be evaluated using observable indicators, including shipping, pricing, security, information availability and quality (Falk and Miller, 1992).

The first analytical approach began with testing for common method variance to assess the constructs' validity and reliability. Validity was confirmed by ensuring that the average variance extracted (AVE) values were ≥0.5 and that factor loadings were ≥0.7 (Baumgartner *et al.*, 2021). Reliability was validated by ensuring that Cronbach's alpha (CA) and composite reliability (CR) values met the threshold of ≥0.7 (Hair *et al.*, 2017). Next, convergence validity, including the variance inflation factor, was evaluated. Discriminant validity was then assessed using the Fornell–Larcker criterion, which requires the square root of the AVE to be greater than the interconstruct correlation values. In addition, a cross-loading matrix was used to confirm that each construct's factor loadings were higher than their correlation coefficients with other constructs (Henseler *et al.*, 2015). Finally, model fit was evaluated through metrics such as goodness of fit (GoF) and R-squared, followed by hypothesis testing to complete the analysis.

The second approach used in this study was fsQCA using version 4.1 software by Ragin (2023), which offers an asymmetric analytical method. This approach effectively handles theoretical complexity while providing theoretical and practical insights into the dependent variable (Satar *et al.*, 2024; Pappas and Woodside, 2021). The fsQCA was used to explore random data configurations, as it does not rely on identifying a single "optimal" model. This approach allows researchers to understand which configurations generate the best outcomes

for e-satisfaction. The fsQCA enables the exploration of various random combinations of conditions, making it possible to examine nonlinear and complex relationships that the SEM approach might overlook. The fsQCA process involved several stages: first, a calibration evaluation to determine data membership by transforming values between 0 and 1. Data were calibrated on a five-point Likert scale into three thresholds: "4" for full membership, "3" for the median and "2" for full nonmembership. Subsequently, a truth table was constructed to assess the validity of conclusions, identifying unique and efficient solutions based on the cause-and-effect conditions of the independent variables.

## 4. Results

The results are presented in two stages, directly addressing the study's objectives by providing insights into individual effects and a holistic understanding of how e-service quality dimensions influence e-satisfaction. The first stage highlights linear relationships, whereas the second uncovers complex configurations. The following sections detail each stage, offering a comprehensive perspective that bridges theoretical contributions and practical applications.

### *4.1 Validity and reliability assessment*

Several stages were conducted to assess the validity and reliability of the constructs. First, factor loading values were compared with a threshold of ≥0.7 (Hair *et al.*, 2017). The results confirm the constructs' validity. Second, AVE values were examined, with a minimum threshold of ≥0.5, to ensure data quality (Hair *et al.*, 2017). At the same time, it shows that all AVE values meet this requirement. Finally, the internal consistency of the constructs was evaluated by examining CA and CR values, both of which must be ≥0.7 (Hair *et al.*, 2017). Table 3 demonstrates that all criteria for internal consistency were successfully met.

After confirming validity and reliability, this study used two approaches to assess discriminant validity. The first approach used the Fornell–Larcker criterion, which requires that the square root of the AVE be greater than the interconstruct correlation value. As demonstrated in Table 4, all square root AVE values exceed the corresponding interconstruct correlation values, confirming discriminant validity.

The second approach is the cross-loading matrix, which is a measure of discriminant validity. The test results show that all constructs have factor loadings higher than the correlation coefficients of other constructs, indicating that each construct has good discriminant validity. Table 5 shows the results of the cross-loading matrix test.

### *4.2 Hypothesis testing*

Table 6 and Figure 3 present the hypothesis testing results, revealing that all proposed relationships are supported. The first three hypotheses emphasize that security, pricing and shipping each exert a positive influence on e-satisfaction. Specifically, security (*H1*) shows a path coefficient of 0.135 ($t = 2.154$), consistent with Rita *et al.* (2019), who highlight that secure payment methods, two-factor authentication (2FA) and encryption enhance customer trust and loyalty. Pricing (*H2*) records a path coefficient of 0.152 (t = 2.406), reflecting Rita *et al.* (2019) and Khanh (2020), who argue that competitive pricing, transparent cost structures, discounts and bundled offers boost customer satisfaction. Shipping (*H3*), with a path coefficient of 0.216 ($t = 3.631$), aligns with Tzeng *et al.* (2021) and Morganti *et al.* (2014), demonstrating that timely delivery and cost-effective shipping significantly elevate the overall shopping experience.

The remaining hypotheses further validate the importance of information availability (*H4*) and product quality (*H5*). Information availability, evidenced by a path coefficient of

**Table 3.** Convergent validity

| Construct | Items | OL | CA | CR | dAVE |
|---|---|---|---|---|---|
| Customer satisfaction | CS1 | 0.798 | 0.872 | 0.907 | 0.662 |
| | CS2 | 0.789 | | | |
| | CS3 | 0.836 | | | |
| | CS4 | 0.825 | | | |
| | CS5 | 0.820 | | | |
| Information availability | IA1 | 0.852 | 0.808 | 0.887 | 0.723 |
| | IA2 | 0.858 | | | |
| | IA3 | 0.841 | | | |
| Pricing | PR1 | 0.843 | 0.796 | 0.880 | 0.710 |
| | PR2 | 0.808 | | | |
| | PR3 | 0.875 | | | |
| Quality | QU1 | 0.864 | 0.791 | 0.878 | 0.706 |
| | QU2 | 0.836 | | | |
| | QU3 | 0.819 | | | |
| Security | SE1 | 0.851 | 0.819 | 0.892 | 0.734 |
| | SE2 | 0.865 | | | |
| | SE3 | 0.854 | | | |
| Shipping | SH1 | 0.800 | 0.893 | 0.918 | 0.651 |
| | SH2 | 0.799 | | | |
| | SH3 | 0.814 | | | |
| | SH4 | 0.802 | | | |
| | SH5 | 0.814 | | | |
| | SH6 | 0.813 | | | |

**Note(s):** OL = outer loading ≥ 0.7; CA = Cronbach's alpha ≥ 0.7; CR = composite reliability ≥ 0.7; AVE = average variance extracted ≥ 0.5
**Source(s):** Created by authors

0.160 ($t$ = 2.612), supports Yoo *et al.* (2023) and Moriuchi and Takahashi (2023), who find that detailed product descriptions and transparent information reduce consumer uncertainty. Finally, product quality shows the strongest effect (*H5*) with a path coefficient of 0.319 ($t$ = 3.950), corroborating the findings of Uzir *et al.* (2021) and Yusuf *et* al. (2019), which indicate that high-quality products – and by extension reliable shipping – are key drivers of both customer satisfaction and loyalty in e-commerce settings.

### *4.3 Fuzzy-set qualitative comparative analysis findings*

In this study, fsQCA analysis is used to identify configurations that result in high and low e-satisfaction, drawing on the constructs of security, pricing, shipping, information availability and quality. The findings show that high e-satisfaction arises from various combinations of these dimensions – such as having security, pricing, information availability and quality in place – while low e-satisfaction tends to occur when one or more of these factors are absent. This insight underscores the value of a configurational perspective in understanding e-satisfaction, especially in Indonesian digital marketplaces where such an approach has not been extensively explored.

The analysis further addresses the complex interplay among these constructs within the research model. Following the method described by Pappas and Woodside (2021), the original five-point Likert scale data are calibrated into three groups: "4" (full membership), "3" (intersection or median) and "2" (full nonmembership). These calibrated scores are then converted into fuzzy values ranging from 0 (low) to 1 (high). The resulting truth table

**Table 4.** Discriminant validity

| Construct | CS | IA | PR | QU | SE | SH |
|---|---|---|---|---|---|---|
| Customer satisfaction (CS) | 0.814 | | | | | |
| Information availability (IA) | 0.838 (0.997) | 0.850 | | | | |
| Pricing (PR) | 0.841 (1.007) | 0.817 (1.016) | 0.843 | | | |
| Quality (QU) | 0.848 (1.019) | 0.820 (1.024) | 0.812 (1.021) | 0.840 | | |
| Security (SE) | 0.837 (0.990) | 0.813 (0.999) | 0.822 (1.017) | 0.796 (0.987) | 0.857 | |
| Shipping (SH) | 0.884 (1.000) | 0.856 (1.007) | 0.857 (1.019) | 0.852 (1.012) | 0.852 (0.995) | 0.807 |

**Note(s):** a. The diagonal and italic values are the square roots of AVE. b. Threshold for HTMT: ≤0.85, strong; ≤0.90, weak: ≤0.95
**Source(s):** Created by authors

**Table 5.** Cross-loadings matrix

| Construct | CS | IA | PR | QU | SE | SH |
|---|---|---|---|---|---|---|
| CS1 | 0.798 | 0.677 | 0.704 | 0.697 | 0.654 | 0.709 |
| CS2 | 0.789 | 0.656 | 0.663 | 0.618 | 0.662 | 0.679 |
| CS3 | 0.836 | 0.642 | 0.688 | 0.695 | 0.684 | 0.751 |
| CS4 | 0.825 | 0.700 | 0.714 | 0.711 | 0.720 | 0.720 |
| CS5 | 0.820 | 0.734 | 0.654 | 0.724 | 0.684 | 0.735 |
| IA1 | 0.739 | 0.852 | 0.745 | 0.724 | 0.699 | 0.774 |
| IA2 | 0.705 | 0.858 | 0.696 | 0.669 | 0.695 | 0.713 |
| IA3 | 0.692 | 0.841 | 0.639 | 0.697 | 0.680 | 0.694 |
| PR1 | 0.711 | 0.675 | 0.843 | 0.696 | 0.681 | 0.721 |
| PR2 | 0.641 | 0.665 | 0.808 | 0.641 | 0.655 | 0.715 |
| PR3 | 0.767 | 0.723 | 0.875 | 0.713 | 0.738 | 0.734 |
| QU1 | 0.743 | 0.721 | 0.709 | 0.864 | 0.707 | 0.752 |
| QU2 | 0.701 | 0.690 | 0.706 | 0.836 | 0.680 | 0.720 |
| QU3 | 0.691 | 0.654 | 0.630 | 0.819 | 0.617 | 0.673 |
| SE1 | 0.702 | 0.670 | 0.677 | 0.633 | 0.851 | 0.700 |
| SE2 | 0.712 | 0.714 | 0.721 | 0.705 | 0.865 | 0.744 |
| SE3 | 0.736 | 0.706 | 0.713 | 0.705 | 0.854 | 0.744 |
| SH1 | 0.687 | 0.670 | 0.704 | 0.665 | 0.657 | 0.800 |
| SH2 | 0.704 | 0.691 | 0.711 | 0.691 | 0.667 | 0.799 |
| SH3 | 0.729 | 0.702 | 0.662 | 0.705 | 0.708 | 0.814 |
| SH4 | 0.720 | 0.683 | 0.685 | 0.666 | 0.687 | 0.802 |
| SH5 | 0.696 | 0.710 | 0.702 | 0.692 | 0.685 | 0.814 |
| SH6 | 0.741 | 0.691 | 0.690 | 0.703 | 0.717 | 0.813 |

**Source(s):** Created by authors

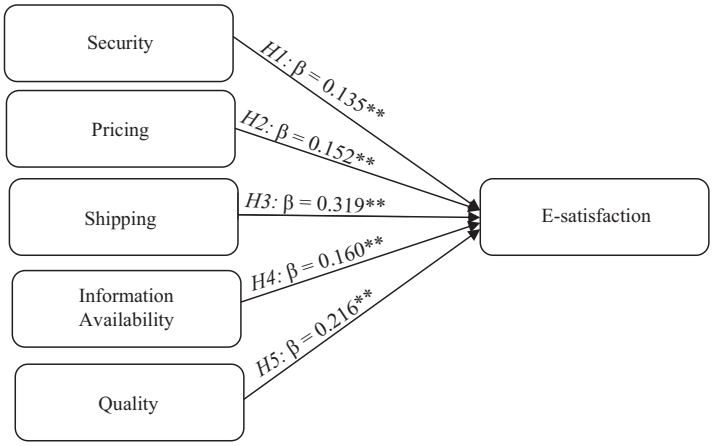
**Table 6.** Summary of hypothesis testing

| | | | Bootstrapping CI 97.5% | | |
|---|---|---|---|---|---|
| Hypothesis | Path coefficient | T-value | Lower | Upper | Decision |
| *H1* Security → e-satisfaction | 0.135** | 2.154 | 0.011 | 0.251 | Supported |
| *H2* Pricing → e-satisfaction | 0.152** | 2.406 | 0.030 | 0.276 | Supported |
| *H3* Shipping → e-Customer satisfaction | 0.216*** | 3.631 | 0.099 | 0.332 | Supported |
| *H4* Information availability → E-satisfaction | 0.160** | 2.612 | 0.038 | 0.281 | Supported |
| *H5* Quality → E-satisfaction | 0.319*** | 3.950 | 0.160 | 0.477 | Supported |

**Note(s):** Significance level of ***$p < 0.001$; **$p < 0.01$
**Source(s):** Created by authors

presents all possible combinations of conditions leading to either "high" or "low" e-satisfaction, with the calibration outcomes detailed in Tables 7 and 8.

The truth table analysis reveals that 13 composite indicators, with scores of "1" (yes), correspond to high e-satisfaction. Specifically, 18 cases fall into the second composite and 129 cases into the 13th composite, with fewer than three cases in the remaining composites. Conversely, 13 cases are associated with low e-satisfaction, indicated by a score of "0" (no). Of these, 129 cases are in the first composite and 18 in the 13th, with the remaining cases numbering fewer than three. These findings demonstrate that the fuzzy-set analysis for high and low e-satisfaction is both unique and varied.




**Source(s):** Created by authors

**Figure 3.** Summary of hypothesis testing

**Table 7.** Truth table for high e-satisfaction

| Antecedents for high e-satisfaction | | | | | | Outcome for high | Raw |
|---|---|---|---|---|---|---|---|
| SE | PR | SH | IA | QU | Cases | e-satisfaction | consistency |
| 1 | 1 | 0 | 1 | 1 | 1 | Yes | 0.975 |
| 1 | 1 | 1 | 1 | 1 | 18 | Yes | 0.969 |
| 1 | 1 | 1 | 0 | 0 | 1 | Yes | 0.967 |
| 0 | 0 | 1 | 1 | 1 | 1 | Yes | 0.964 |
| 1 | 0 | 1 | 1 | 1 | 2 | Yes | 0.962 |
| 1 | 0 | 1 | 0 | 0 | 1 | Yes | 0.952 |
| 0 | 0 | 1 | 0 | 1 | 1 | Yes | 0.949 |
| 1 | 1 | 0 | 0 | 0 | 2 | Yes | 0.941 |
| 0 | 1 | 0 | 0 | 1 | 2 | Yes | 0.937 |
| 0 | 1 | 0 | 1 | 0 | 1 | Yes | 0.932 |
| 0 | 0 | 1 | 0 | 0 | 3 | Yes | 0.912 |
| 1 | 0 | 0 | 0 | 0 | 1 | Yes | 0.88 |
| 0 | 0 | 0 | 0 | 0 | 129 | No | 0.343 |

**Note(s):** SE = security; PR = pricing; SH = shipping; IA = information availability; QU = quality
**Source(s):** Created by authors

Table 9 presents the fsQCA analysis of intermediate solutions, including core and peripheral factors influencing high and low e-satisfaction. The findings reveal two configurations that define "high" and "low" degrees of e-satisfaction. Based on Ragin's (2006) criteria, the consistency value for "high" e-satisfaction outcomes exceeds 0.75, indicating that the combination of causal conditions is relevant and valid. For high e-satisfaction, the overall solution coverage is 0.873, with a solution consistency of 0.838. Similarly, for low e-satisfaction, the overall solution coverage is 0.873 and the solution consistency is 0.912. These scores demonstrate predictive solid accuracy for both high and low e-satisfaction outcomes.

**Table 8.** Truth table for low e-satisfaction

| Antecedents for low e-satisfaction | | | | | | Outcome for low | |
|---|---|---|---|---|---|---|---|
| SE | PR | SH | IA | QU | Cases | e-satisfaction | Raw consistency |
| 0 | 0 | 0 | 0 | 0 | 129 | No | 0.98 |
| 0 | 1 | 0 | 1 | 0 | 1 | No | 0.976 |
| 0 | 0 | 1 | 1 | 1 | 1 | No | 0.966 |
| 0 | 1 | 0 | 0 | 1 | 2 | No | 0.965 |
| 1 | 0 | 0 | 0 | 0 | 1 | No | 0.964 |
| 1 | 0 | 1 | 0 | 0 | 1 | No | 0.96 |
| 1 | 1 | 1 | 0 | 0 | 1 | No | 0.959 |
| 0 | 0 | 1 | 0 | 0 | 3 | No | 0.959 |
| 0 | 0 | 1 | 0 | 1 | 1 | No | 0.958 |
| 1 | 1 | 0 | 0 | 0 | 2 | No | 0.958 |
| 1 | 0 | 1 | 1 | 1 | 2 | No | 0.954 |
| 1 | 1 | 0 | 1 | 1 | 1 | No | 0.951 |
| 1 | 1 | 1 | 1 | 1 | 18 | No | 0.84 |

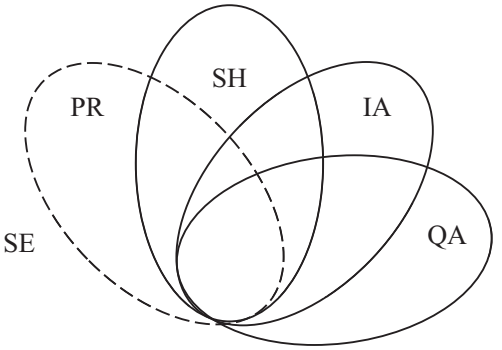
**Note(s):** SE = security; PR = pricing; SH = shipping; IA = information availability; QU = quality
**Source(s):** Created by authors

**Table 9.** Configuration for "high" and "low" e-satisfaction

| | High e-satisfaction | | | Low e-satisfaction | | |
|---|---|---|---|---|---|---|
| Configuration | P3 | P4 | P6 | P1 | P6 | P7 |
| Security (SE) | | ● | ⊗ | | ⊗ | ⊗ |
| Pricing (PR) | ⊗ | ● | ● | ⊗ | ● | ● |
| Shipping (SH) | ● | | ⊗ | | ⊗ | ⊗ |
| Information availability (IA) | ● | ● | ⊗ | ⊗ | ● | ⊗ |
| Quality (QU) | ● | ● | ● | ⊗ | ⊗ | ● |
| Raw coverage | 0.564 | 0.634 | 0.541 | 0.867 | 0.257 | 0.242 |
| Unit coverage | 0.008 | 0.095 | 0.08 | 0.551 | 0.005 | 0.001 |
| Consistency | 0.956 | 0.961 | 0.937 | 0.966 | 0.976 | 0.965 |
| Overall solution coverage | | 0.873 | | | 0.916 | |
| Overall solution consistency | | 0.838 | | | 0.912 | |

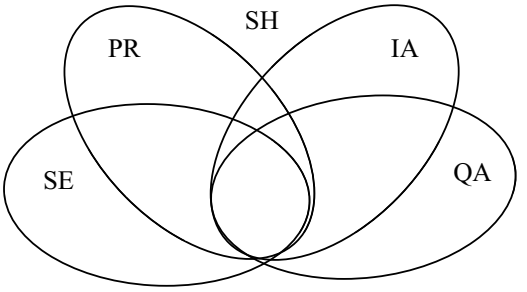
**Note(s):** black circle (●) depicts the presence of condition; a circle with a cross (⊗) depicts the absence of condition; blank column show "do not care" condition
**Source(s):** Created by authors

Figures 4–6 present the fsQCA configuration results, which show high consistency and relevance in forming high e-satisfaction. All configurations point to "presence" (∗) conditions and are unique, thereby supporting Proposition 1. Specifically, the third path (P3) for high e-satisfaction is shaped by the combination of "presence" conditions ∗SH, ∗IA and ∗QU, along with the absence of PR and a "do not care" condition for SE (consistency = 0.956, coverage = 0.564). This path highlights the importance of SH, IA and QU for achieving high e-satisfaction. The fourth configuration (P4), which includes "presence" conditions ∗SE, ∗PR, ∗IA and ∗QU, with a "do not care" condition for SH, also leads to high e-satisfaction (consistency = 0.961, coverage = 0.634). This path emphasizes the significance of SE, PR, IA and QU as key predictors of high e-satisfaction. Finally, the sixth configuration (P6), involving "presence" conditions ∗PR and ∗QU, along with the absence of SE, SH and




**Note(s):** Consistency = 0.956, Coverage = 0.564. The solid ellipse indicates "presence," the dotted ellipse indicates "absence" and no ellipse represents the "do not care" condition
**Source(s):** Created by authors

**Figure 4.** Path 3 drives high e-satisfaction

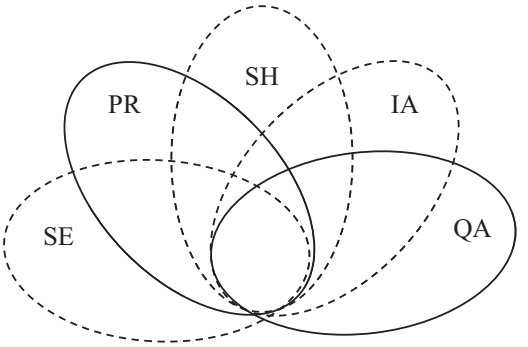



**Note(s):** Consistency = 0.961, Coverage = 0.634. The solid ellipse indicates "presence," the dotted ellipse indicates "absence" and no ellipse represents the "do not care" condition
**Source(s):** Created by authors

**Figure 5.** Path 4 drives high e-satisfaction

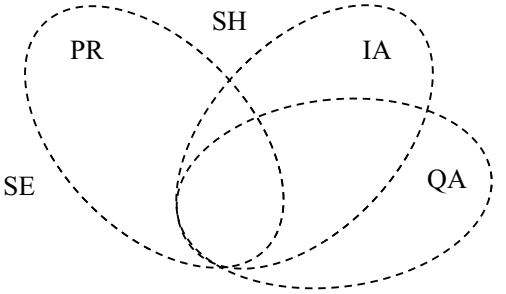
IA, also results in high e-satisfaction (consistency = 0.937, coverage = 0.541). This highlights the critical role of PR and QU in predicting high e-satisfaction.

Figures 7–9 illustrate the fsQCA configuration results, demonstrating high consistency and relevance for achieving low e-satisfaction. The analysis reveals a solution consistency of 0.912 and an overall solution coverage of 0.916, aligning with Ragin's (2006) recommendations. The study findings suggest that a configurational path leading to "low" e-satisfaction can be identified through the "absence" of pricing, information availability and




**Note(s):** Consistency = 0.937, Coverage = 0.541. The solid ellipse indicates "presence," the dotted ellipse indicates "absence" and no ellipse represents the "do not care" condition
**Source(s):** Created by authors

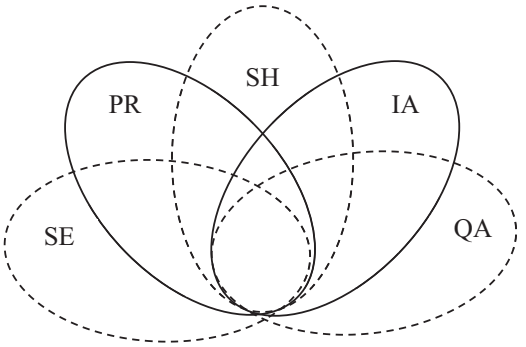
**Figure 6.** Path 6 drives high e-satisfaction




**Note(s):** Consistency = 0.966, Coverage = 0.867. The solid ellipse indicates "presence," the dotted ellipse indicates "absence" and no ellipse represents the "do not care" condition.
**Source(s):** Created by authors

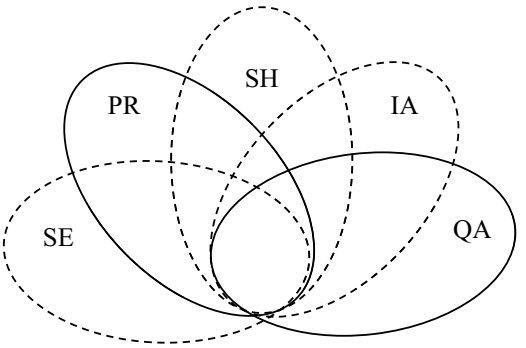
**Figure 7.** Path 1 drives low e-satisfaction

quality, supporting Proposition 2. Specifically, configurations P1, P6 and P7 present a mix of "presence," "absence" and "do not care" conditions. Configuration path 1 (P1) shows the "absence" (∼) of PR, IA and QU, combined with "do not care" conditions for SE and SH, with a higher relevance value than other configurations (consistency = 0.966, coverage = 0.867). This indicates that the absence of PR, IA and QU and indifferent SE and SH




**Note(s):** Consistency = 0.976, Coverage = 0.257. The solid ellipse indicates "presence," the dotted ellipse indicates "absence" and no ellipse represents the "do not care" condition
**Source(s):** Created by authors

**Figure 8.** Path 6 drives low e-satisfaction




**Note(s):** Consistency = 0.965, Coverage = 0.242. The solid ellipse indicates "presence," the dotted ellipse indicates "absence" and no ellipse represents the "do not care" condition
**Source(s):** Created by authors

**Figure 9.** Path 7 drives low e-satisfaction

conditions contribute to low e-satisfaction. Similarly, the sixth configuration (P6) reveals the "presence" of PR and IA, alongside the absence of SE, SH and QU, with high relevance (consistency = 0.976, coverage = 0.257). This shows that the presence of PR and IA, combined with the absence of SE, SH and QU, contributes to low e-satisfaction. Finally, the seventh configuration (P7) indicates the "presence" of PR and QU and the absence of SE, SH and IA, with a high relevance value (consistency = 0.965, coverage = 0.242), demonstrating that this combination leads to low e-satisfaction.

*4.4 Model robustness testing*

This study uses partial least square structural equation modelling (PLS-SEM) with the help of SmartPLS 4.0 software. The structural model is evaluated through several steps. The first step is determining each endogenous construct's R-squared ($R^2$) value. A structural model is viable when the $R^2$ value is more significant than 0.1 or close to 1 (Falk and Miller, 1992). The structural model results indicate that e-satisfaction has a*n* $R^2$ value of 0.839, which is explained by the path coefficients of information availability, pricing, quality, security and shipping. Therefore, the research model is considered viable, as the $R^2$ value of the endogenous construct >0.1.

The second step involves assessing the model fit criteria, where a model is considered satisfactory if the standardized root mean square residual (SRMR) is <0.05 or <0.08. The SRMR value obtained is 0.048, indicating a satisfactory model fit, as it meets the <0.05 or <0.08 threshold. In addition, other fit indices, such as d_ULS = 0.633, d_G = 0.533 and NFI = 0.841, further support the model's fit.

To assess the reliability of the developed research model, this study also calculates the GoF. The GoF is determined by taking the square root of the average of $R^2$ and AVE, as demonstrated in the following formula (Huang *et al.*, 2024):

$$\text{GoF} = \sqrt{\overline{AVE}} \times \sqrt{\overline{R^2}} = \sqrt{0.839x0.698} = 0.77$$

Based on the criteria from Tenenhaus *et al.* (2005) and Wetzels *et al.* (2009), a GoF value below 0.10 indicates no fit, values between 0.10 and 0.25 represent a small fit, values between 0.25 and 0.36 reflect a moderate fit and values above 0.36 indicate a high fit. The calculated GoF value for this study is 0.77, which falls within the high fit category. Therefore, the research model demonstrates a strong GoF with excellent criteria.

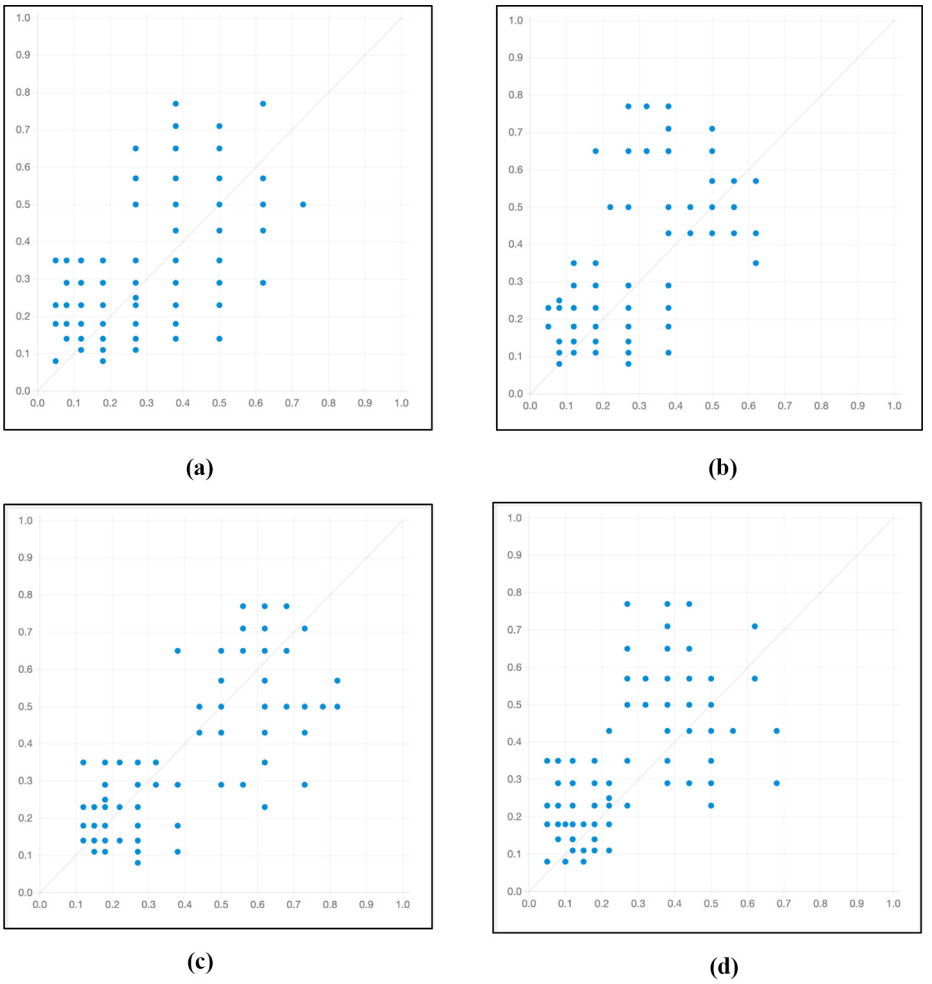
To assess the robustness of our fsQCA solution models, we follow the predictive validity guidelines recommended by Pappas and Woodside (2021). Specifically, the data are randomly split into two equal groups ($N$ =100 subsample and $N$ = 100 hold sample). We conduct fsQCA on the $N$ = 100 subsample, generating the four sufficient configurations (S1, S2, S3 and S4) for customer satisfaction shown in Table 10, which yield an overall solution coverage of 0.801 and overall solution consistency of 0.900 – values that indicate strong explanatory power.

Next, we apply the hold sample ($N$ = 100) to confirm these configurations' predictive strength using the fsQCA software's XY Plot approach. As illustrated in Figure 10(a)–(d), each solution (S1 to S4) maintains high consistency when tested on the hold sample; for instance, S1 achieves a consistency of 0.862 and S4 yields 0.918, aligning closely with the subsample results. These findings confirm that the solution models remain highly stable and predictive, even with different data splits, thereby validating their robustness in explaining customer satisfaction.

**Table 10.** Sufficient condition of customer satisfaction subsample ($N$ = 100)

| Solutions | Raw coverage | Unique coverage | Consistency |
|---|---|---|---|
| S1: SE*~QUL | 0.663 | 0.013 | 0.862 |
| S2: PR*~SH | 0.678 | 0.028 | 0.871 |
| S3: ~ PR*SH | 0.687 | 0.043 | 0.899 |
| S4: SE*IA | 0.727 | 0.082 | 0.918 |

**Note(s):** Overall solution coverage: 0.801; Overall solution consistency 0.900
**Source(s):** Created by authors




**Note(s):** (a) S1: Consistency 0.856, Coverage 0.718. (b) S2: Consistency 0.884, Coverage 0.734. (c) S3: Consistency 0.805, Coverage 0.899. (d) S4: Consistency 0.913, Coverage 0.781

**Source(s):** Created by authors

**Figure 10.** (a)–(d). The XY plots for sufficient configurations of s1 to s4 to predict customer satisfaction based on hold samples ($N = 100$)

## 5. Discussion

This study explores the factors influencing e-satisfaction through e-service quality: quality, security, delivery, pricing and information availability. It examines the direct impact of these five dimensions on e-satisfaction in Indonesian digital marketplaces. The data analysis reveals various findings, successfully addressing the research objective of testing the determinants of e-satisfaction through these e-service quality dimensions. The results show

that all dimensions significantly affect e-satisfaction. For instance, the hypothesis testing demonstrates that security (*H1*) significantly impacts e-satisfaction. This indicates that when consumers can securely complete transactions due to a robust payment system, such as digital marketplaces implementing 2FA with a pin and one-time password (OTP), they tend to experience e-satisfaction. This conclusion aligns with the findings of Li *et al.*, 2021; Jameel *et al.*, 2021; and Rita *et al.*, 2019. In addition, consumers are more satisfied when digital marketplaces offer cost savings through competitive pricing and lower transaction fees. The study confirms that pricing (*H2*) significantly impacts e-satisfaction, supporting the notion that consumers appreciate marketplaces that provide transparent costs, discounts and bundling offers, as also highlighted by Rita *et al.* (2019) and Anh *et al.* (2022).

Furthermore, shipping (*H3*) significantly affects e-satisfaction. Consumers are more satisfied when marketplaces offer free shipping, timely delivery, correct product orders and reliable shipping conditions, as supported by Tzeng *et al.* (2021). In addition, information availability (*H4*) significantly affects e-satisfaction, reinforcing the importance of accurate, reliable and timely information in shaping consumer satisfaction. Marketplaces that offer prominent product details and accurate order information can enhance e-satisfaction, consistent with findings from Tzeng *et al.* (2021). Finally, quality (*H5*) significantly influences e-satisfaction, as consumers like digital marketplaces with high-quality products and superior shipping conditions. This conclusion is supported by Ilieva *et al.* (2022), further underscoring the role of product excellence and shipping standards in achieving higher consumer satisfaction.

Based on shipping, security, information availability, pricing and quality, the fsQCA analysis identified the optimal solution configurations for both high and low e-satisfaction. The results reveal three causal configurations that produce high e-satisfaction and three that produce low satisfaction. Each configuration producing high satisfaction demonstrates a high consistency value, indicating that all solutions are feasible for implementation. Among these, the fourth configuration (P4) is highlighted as the best solution for achieving high e-satisfaction, emphasizing the critical roles of security, pricing, information availability and quality while considering shipping to be nonessential. This finding suggests that digital marketplaces must provide secure payment systems, such as 2FA with pins and OTP, offering competitive pricing; minimizing transaction costs; ensuring accurate, reliable and timely information; and maintaining high-quality products and shipping conditions. These insights align with Rita *et al.*'s (2019) findings, emphasizing the importance of security, pricing, information availability and quality in driving e-satisfaction.

Besides identifying configurations producing high e-satisfaction, this study also examines those producing low e-satisfaction. The findings suggest that specific configurations produce low e-satisfaction, mainly when there is indifference toward security and shipping, combined with the absence of competitive pricing, information availability and product quality. To prevent low e-satisfaction, digital marketplaces must offer transparent and competitive pricing, provide thorough and accurate product information and maintain high-quality standards. These insights align with the findings of Rita *et al.* (2019), which emphasized the importance of pricing, information availability and quality as key factors in determining e-satisfaction.

## 6. Implications

### *6.1 Implications for theory*

This study elevates the understanding of e-satisfaction in digital marketplaces by incorporating and extending e-service quality dimensions through a hybrid SEM and fsQCA approach. While earlier research often focused on security, pricing, shipping, information

availability and product quality either separately or via purely linear models (Ilieva *et al.*, 2022; Mofokeng, 2021; Al-dweeri *et al.*, 2019; Tzeng *et al.*, 2021), this work integrates these dimensions and examines their combined effects in both linear and nonlinear contexts. The SEM findings confirm that security, pricing, shipping, information availability and quality all significantly influence e-satisfaction, thereby broadening the EDT. Specifically, the results highlight how security fosters a stronger transactional experience and enduring consumer–platform relationships, showing that platforms prioritizing security are more likely to surpass consumer expectations (Rita *et al.*, 2019). Moreover, the study expands EDT by revealing that fair, transparent pricing leads to positive disconfirmation, reinforcing pricing as a critical determinant of e-satisfaction (Vasic *et al.*, 2019).

Reliable shipping – particularly on-time delivery – further underscores the importance of efficient logistics from a supply chain and distribution perspective, as it profoundly affects consumer experiences (Rita *et al.*, 2019). The role of accurate information also deepens insights into information processing theory, illustrating that detailed and precise content helps reduce uncertainty and enhances satisfaction (Vasic *et al.*, 2019). Meanwhile, maintaining consistently high product quality reinforces quality management theories, as it significantly boosts customer satisfaction (Moriuchi and Takahashi, 2023). By integrating these dimensions, the study provides a robust theoretical framework for future research and lays the groundwork for a comprehensive service quality model in digital marketplaces.

From an fsQCA standpoint, the results add theoretical depth by identifying configurations of causal conditions associated with both high and low e-satisfaction. A notable configuration for high e-satisfaction highlights the combined importance of security, pricing, information availability and quality, suggesting that digital marketplaces focused on safeguarding transactions, offering competitive pricing, delivering transparent product information and ensuring product quality are best positioned to elevate e-satisfaction.

Conversely, low e-satisfaction stems from the absence of three elements – pricing, information availability and quality – aligning with EDT's premise that unmet price expectations spark dissatisfaction. Inadequate product information also contributes to dissatisfaction, emphasizing the need for clear, detailed descriptions, whereas a lack of consistent quality further erodes consumer trust. By merging the key e-service quality factors into a unified hybrid framework, this research substantially enriches the theoretical landscape of e-satisfaction. Employing SEM to analyze linear relationships and fsQCA to uncover intricate configurational patterns, the study clarifies how these interdependent dimensions collectively shape consumer satisfaction. In doing so, it reinforces established theories in supply chain, information processing and quality management, spotlighting security and pricing as pivotal drivers of favorable postpurchase experiences. These insights pave the way for future investigations into e-satisfaction across diverse consumer segments and market contexts.

### *6.2 Implication for digital marketplaces*

This study offers several practical insights into how e-service quality dimensions influence e-satisfaction. First, the direct effects identified by SEM underscore the need for digital marketplaces to enhance pricing, security, shipping, information availability and product quality. Because security significantly impacts e-satisfaction, platforms should adopt robust security measures – such as SSL encryption and secure payment gateways – and communicate these protections clearly to bolster customer confidence. Pricing must also be transparent, disclosing all related fees (e.g. insurance, service charges, taxes and shipping) upfront. Offering discounts, cashback and promotions – particularly during live promotional events – can further elevate satisfaction. Shipping remains critical, providing multiple delivery options (same-day, expedited, standard) and real-time tracking mitigates uncertainty

and strengthens customer trust. Finally, detailed product information – including images, specifications and reviews – can reduce uncertainty and increase satisfaction, especially when paired with reliable product quality supported by regular supplier assessments and compliance checks.

Second, the fsQCA findings highlight four dimensions – security, pricing, information availability and product quality – as crucial for achieving high e-satisfaction. Implementing strong security protocols (e.g. two-factor authentication), adopting competitive pricing strategies (removing hidden costs, offering discounts, cashback and bundled deals), standardizing product information (with comprehensive specifications, high-quality visuals and usage instructions) and maintaining consistent product quality (through regular checks and clear standards) form a winning combination. In line with Rita *et al.* (2019), the absence of fair pricing, adequate information and product quality is strongly associated with low e-satisfaction. Consequently, digital marketplaces must address these gaps by ensuring transparent costs, thorough and accurate product details and adherence to quality standards. Verifying seller legitimacy and reputation is also key to upholding product quality on the platform.

Finally, these findings bridge the gap between theory and practice by offering clear guidelines for digital marketplaces, teaching, policy-making and society at large. Investments in stringent security measures, transparent pricing, efficient logistics and quality control foster both operational efficiency and heightened customer satisfaction. Educators can draw on these insights to illustrate real-world challenges in the digital economy, specifically the interplay of e-service quality and consumer behavior. From a policy perspective, the results underscore the need for robust cybersecurity regulations, price transparency and product quality benchmarks. Societally, more reliable and consumer-centric marketplaces enhance overall quality of life by improving access to trustworthy products and services. These recommendations provide immediate value for businesses, policymakers and educators seeking to cultivate a safer and more satisfying digital marketplace environment.

## 7. Conclusion and limitations

This study investigated how security, pricing, shipping, information availability and product quality shape e-satisfaction in Indonesia's digital marketplaces, leveraging data from 220 respondents and a PLS-SEM/fsQCA hybrid approach. The results confirm that all five dimensions significantly influence e-satisfaction: security instills consumer confidence by ensuring robust data protection, pricing underscores transparency and competitive costs, shipping reliability delivers timely orders at reasonable rates, information availability bridges expectation and reality via up-to-date details and product quality cements overall satisfaction in online environments. Notably, fsQCA reveals that high e-satisfaction arises when security, competitive pricing, extensive information and top-quality products act in unison, whereas omitting these factors predisposes platforms to lower satisfaction.

Despite these strong findings, the research faces several limitations. First, its geographical scope is limited to Indonesia, calling for cross-country comparisons that could unearth universal versus context-specific drivers of e-satisfaction. Second, the study centers on five e-service quality dimensions without examining whether different product categories (e.g. groceries, electronics or fashion) emphasize distinct service priorities. Third, it does not address niche or emerging segments such as eco-friendly or highly customized goods, where customer expectations might diverge further. Future studies that incorporate broader samples, varied product categories and diverse market contexts will deepen understanding of how e-service quality contributes to e-satisfaction on a global scale.

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