

The Path to E-Loyalty: Examining the Effects of E-Service Quality and Customer Value on E-Satisfaction Among Malaysian University Students

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Abstract. The purpose of this study was to examine factors influencing e-loyalty among university students in Malaysia's online shopping context. We investigated how e-service quality affects e-loyalty through the mediating roles of online customer value and e-satisfaction. Data were collected from 104 university students using convenience sampling. Structural equation modeling revealed that e-service quality positively influenced both online customer value ($\beta=0.615$) and e-satisfaction ($\beta=0.299$). Online customer value significantly affected e-satisfaction ($\beta=0.529$), which in turn strongly predicted e-loyalty ($\beta=0.561$). Online customer value is the mediator between e-service quality and e-satisfaction, whereas e-satisfaction is the mediator between online customer value and e-loyalty and also between e-service quality and e-loyalty. All hypothesized relationships were supported, confirming that high-quality online services generate customer value and satisfaction, ultimately fostering loyalty among university students. These findings provide practical insights for e-retailers seeking to build lasting relationships with the university student market segment. The study's limitations include its cross-sectional design and relatively small sample size, suggesting opportunities for future research using larger, more diverse samples and longitudinal approaches.

Keywords: E-Service Quality, Online Customer Values, E-Satisfaction, E-Loyalty, Online shopping

1. Introduction

The advancement of technology and COVID-19 epidemic accelerated the shift to online retail since lockdowns have driven more people to shop online in recent years. The digital transformation has brought convenience to online consumers such as time saving, cost saving shopping experience and etcetera which has become the main influence of online shopping. It is altering how consumers interact with brands and how businesses approach retail experience (Chang & Chen, 2021). With this, customers can easily and instantly compare the prices, quality, and overall information about the desired products or services by visiting multiple websites to make the rational purchase decision (Al Asheq et al., 2022). Online shopping has been providing these positive values to customers over the traditional shopping model. (Chetioui et al., 2021).

In Malaysia, online shopping has become increasingly popular, revolutionising how customers buy products and services. The online shopping trend has grown significantly in recent years, with e-commerce revenue increasing by 21.8% in 2021 compared to in 2020 (Mentek, 2022). Meanwhile, based on the survey conducted on e-commerce consumers in Malaysia in 2022 (Statista, 2023), the largest consumer group is below age of 20 years old, with 27.4%. University students who fall into this age group have become the targets of the researchers due to their growing influence on online shopping (Huterska & Huterski, 2022). Nowadays, the online marketplace is very competitive. As the competition in e-commerce is intensified, maintaining e-loyalty in online marketplaces is important for the long-term growth of businesses. However, McKinsey & Company (2021) highlights a significant shift in consumer behaviour during the pandemic and with these changes likely to have a lasting impact. One of the major consumer shifts is the groundbreaking extent of consumer switching between shopping channels and disturbances in brand loyalty which reflected that many younger consumers are searching for brands that reflect their values. Hence, it is crucial to investigate the factors that influence the university students towards e-loyalty in online shopping. Consumer loyalty is essential to the prosperity of the e-commerce market, as it is posited as a critical driver of post-purchase spectacles, such as repeated purchase, spreading Positive Word of Mouth (PWOM) and recommending or introducing to others.

Notably, past empirical research consistently identifies customer satisfaction as a precondition to customer loyalty (Okour et al., 2023; San et al., 2020; Sasono et al., 2021). Meeting or exceeding customer expectations through exceptional product and service quality drives repeat purchase behaviour and PWOM, which underpin customer loyalty formation (San et al., 2020). Additionally, research has shown that perceived online customer value significantly mediates the relationship between e-service quality and customer satisfaction (Okour et al., 2023).

In Malaysia, few studies have explicitly demonstrated the sequential impact of e-service quality, e-satisfaction and e-loyalty. For example, a study among millennials in Malaysia (Emamdin et al., 2020) examined e-satisfaction and e-loyalty as parallel outcomes of e-trust, omitting the mediation analysis. Likewise, a banking study (Okour et al., 2023) focused on perceived value as a mediator, but did not extend to customers' loyalty outcomes. This disintegration contrasts with Pakistan-based research (Ashiq & Hussain, 2024), in which confirmed e-service quality's indirect effect on loyalty via satisfaction.

The dearth of comparable studies in Malaysia warrants a localised investigation on the minimum-service quality levels required to trigger e-loyalty, via e-satisfaction based on the perceived value of consumers. The largest age group in Malaysia currently is Generation Z, which makes approximately 29% of the total population (Xing et al., 2025), with the age distribution between 18-24 years old (Chang, 2023). As an electronically-savvy and -active generation, they have higher purchasing power than other generations in online shopping (Xing et al., 2025). In particular, university students who largely represent these attributes emerge as significant and growing segment of online consumer market, with unique expectations shaped by convenience, trust and tailored experiences (Soo, 2024).

Therefore, this study proposes e-service quality, online customer value, and e-satisfaction as factors that contribute to e-loyalty of university students in Malaysia. Given Malaysia's diverse and competitive e-commerce environment, understanding the sequential impact of these value-added constructs (i.e., e-service quality, e-satisfaction, online customer values) may help retailers tailor their offerings to better meet student consumers' needs, thereby improving e-loyalty in this key market segment (Kamleitner & Mitchell, 2019; Meyers-Levy & Loken, 2015; Soo, 2024).

2. Literature Review

2.1. Theoretical Foundations

The Expectation Confirmation Theory (ECT) posits that customer satisfaction arises from the disconfirmation between pre-purchase expectations and post-purchase perceptions of service performance (Shukla et al., 2024). In the context of online shopping, ECT explains how consumers' loyalty develops when e-service quality, attributed to elements such as website functionality or delivery speed aligns with or exceeds their initial expectations (Ampadu et al., 2023). When expectations are met or exceeded, satisfaction triggers loyalty behaviours like repeat visit and brand advocacy (Ampadu et al., 2023). A significant portion of the student population in Malaysia exhibits high internet usage, with 11.9% of this group actively online (Kemp, 2025) alongside medium-high to high levels of digital literacy, encompassing knowledge of digital products, awareness of risks, and understanding of consumer rights (Nawang et al., 2023). These reflect the potential of elevated expectations for personalized recommendations, expedited shipping and seamless and safe payment systems (Shukla et al., 2024). Hence, ECT postulates how deviations from these expectations impact satisfaction and loyalty.

Additionally, the Technology Acceptance Model (TAM) emphasises perceived usefulness and ease of use as drivers of technology adoption and satisfaction (Nazari-Shirkouh et al., 2023). Extended to e-commerce, it assesses how utilitarian features, (e.g., secure payment gateways) and hedonic features (e.g., personalised interfaces) influence continued platform usage (Hu et al., 2022). A healthcare e-service study by Nazari-Shirkouh et al. (2023) validated TAM's relevance, showing that website quality and ease of use boost satisfaction by 34%.

The Electronic Service Quality (E-S-QUAL) and Electronic Service Quality Recovery (E-RecS-QUAL) measurement scales assess the quality of online services, particularly e-commerce across four primary dimensions (i.e., efficiency, fulfillment, system availability, and privacy) and three recovery dimensions (i.e., responsiveness, compensation, and contact) (Parasuraman et al., 2005; Ulkhaq et al., 2019). For example, a case study in Zalora, Indonesia shows that the online fashion shop scored 2.695 for e-service quality and 2.787 for e-service quality recovering, implying that more strategies are required to improve customer satisfaction (Ulkhaq et al., 2017).

Alternatively, SERVQUAL's five dimensions (i.e., reliability, assurance, tangibles, empathy, and responsiveness) are foundational for evaluating service quality (Parasuraman et al., 1985). In e-commerce or online shopping, these dimensions of E-SERVQUAL may translate to browsing efficiency, responsiveness to customer inquiries and issues, etc. (Mohd Salleh et al., 2024). On the other hand, the integrated e-loyalty model (eTailQ and value perception) situates e-loyalty as an outcome of trust and satisfaction, mediated by value perception and e-service quality (Li et al., 2015). The eTailQ scale integrates measures, which include website design and security, privacy, value perception, reliability and customer support (Wolfenbarger & Gilly, 2003; Li et al., 2015).

Drawing the principles from the preceding models, this study adopts an integrated theoretical base. ECT sets the baseline for expectation-performance gaps, TAM supports the evaluation of platform usability and perceived value, E-S-QUAL represents specific e-service quality dimensions, and eTailQ integrates value perception as a mediator between e-service quality and e-satisfaction.

2.2. E-loyalty

Online shopping is a form of e-commerce that involves the process of buying and selling goods or services over the internet through a broad range of digital platforms (Taheer, 2025). The global trend shows significant growth, with over 2.77 billion people engaging in online shopping and the sales are expected to surpass \$6.86 trillion (Taheer, 2025). A survey among 399 college students in China, aged 18-23, revealed that online shopping has a significant influence on their lifestyle (Tian & Zhang, 2024). In Malaysia, this demographic represents the growing segment of online consumer market (Chang, 2023; Soo, 2024), with heightened connectivity, purchasing power, digital literacy, and unique expectations (Nawang & Shukor, 2023; Xing et al., 2025; Soo, 2024).

As such, driving e-loyalty initiatives towards online shopping platforms, targeting the university students seems crucial for retailers. According to Anderson and Srinivasan (2003), loyalty can be defined as the willingness of a customer to engage in future purchases, regardless of external influences and competitive marketing tactics to create long-term customer relationships. More specifically, e-loyalty refers to the customers' favourable attitude towards online products or services, resulting in repeat purchases, willingness to pay for premier products or services, PWOM, and resistance to switching to competitors. (Al Amin et al., 2023; Ashiq & Hussain, 2024; Emamdin et al., 2020; Ting et al., 2016).

Studies have consistently identified e-service quality as a significant predictor of e-loyalty (Asgari et al., 2014; Ting et al., 2016). However, some authors argue that e-satisfaction directly impacts the e-loyalty of consumers (Anderson & Srinivasan, 2003; Evanschitzky et al., 2004; Utami et al., 2023), whereas others claim that improvements in service quality may enhance satisfaction without necessarily translating into loyalty, or vice versa (Khan et al., 2019). Despite these conflicting insights, few recent studies suggest integrating both e-service quality and e-satisfaction when attempting to measure the e-loyalty of consumers, underscoring the mediating effect of e-satisfaction between e-service quality and e-loyalty (Ashiq & Hussain, 2024; Avania & Widodo, 2022; Khan et al., 2023; Mofokeng, 2021). Moreover, examining the sequential impact of e-service quality, e-satisfaction and e-loyalty seems important for marketers and retailers because these constructs represent different aspects of consumer behaviour (Khan et al., 2019; Sağlam & Jarrar, 2021), contributing distinct acumens for strategy development, such as loyalty programme or personalised marketing efforts (Khan et al., 2019).

Furthermore, past empirical findings imply that online customers' perceived value, such as fulfilment and customer support service, show a direct or mediated influence on e-loyalty (Al-Adwan & Al-Horani, 2019; Jameel et al., 2023), highlighting another potential construct for retailers to leverage resources to enhance e-loyalty. Hence, the following section discusses past literature pertaining to the factors (i.e., e-quality service, e-satisfaction, online customer value) that influence e-loyalty, resulting in the development of research hypotheses and conceptual framework for this study.

2.3. E-service quality

Service quality denotes comparing perceived performance against customer expectations, which determines customer satisfaction, loyalty, and overall business success through face-to-face or physical interactions (Vun, 2021; Zygiaris et al., 2022). E-service quality refers to the extent to which online services delivered through websites, apps and digital platforms facilitate efficient, secure, and user-friendly interactions during pre-purchase, transaction, and post-purchase (Blut et al., 2015; Eryiğit & Fan, 2021; Santos, 2003). In other words, it focuses on comparing the perceived performance of electronic services against customer expectations in a virtual environment. Service quality is commonly measured using the SERVQUAL scale, whereas e-service quality is measured with E-SERVQUAL, which include reliability, security, fulfillment, ease of use, and responsiveness dimensions (Eryiğit & Fan, 2021; Guo et al., 2012; Rita et al., 2019).

Numerous studies agree that high e-service quality can significantly improve customer satisfaction (Al Amin et al., 2023; Bashar & Wasiq, 2013; Ilham, 2018). However, subsequent research found that improved e-service quality leads to increased customer satisfaction, which ultimately improves

customers' loyalty (Blut et al., 2015; Olaleye et al., 2021). Gounaris et al. (2010) discovered a positive association between e-service quality and key consumer behavioural intentions, such as intent to make a purchase, return to the website, and participate in word-of-mouth marketing. In Malaysia, common dimensions of e-service quality examined include efficiency (e.g., ease of use), fulfillment (e.g., order accuracy), system availability (e.g., technical reliability), privacy (e.g., data protection) and responsiveness (e.g., customer support) (San et al., 2020; Okour et al., 2023). Research evidence also highlights that e-service quality dimensions such as, website organisation, service friendliness, and efficiency are critical for fostering loyalty among Malaysian bank customers, indicating that a well-structured e-service environment improves customer retention (Khan et al., 2023).

Prior literature consistently demonstrates various dimensions of e-service quality that influence customers' e-loyalty, primarily through the mediating effects of e-satisfaction. As e-commerce platforms continue to evolve, understanding the dynamic interplay between these constructs is important to enhance customer loyalty in the digital marketplace, particularly among university students who hold promising customer base for e-businesses in Malaysia.

2.4. E-satisfaction

Customer satisfaction is mostly influenced by tangible service performance and face-to-face interactions (Forero & Gómez, 2017). E-satisfaction focuses on the online environments, influenced by website usability, security, information quality, and interactivity (Al-Amin et al., 2023; Taherdoost & Madanchian, 2021). Measurement models for satisfaction often include ECT and SERVQUAL, whereas for e-satisfaction common models include TAM, E- SERVQUAL, and ECT (Nazari-Shirkouh et al., 2023; Mohd Salleh et al., 2024; Parasuraman et al., 1985).

Previous research has confirmed that elevated satisfaction levels directly correlate to an enhanced tendency for loyalty, underscoring this relationship (Rane et al., 2023; Toufaily et al., 2013). The fundamentals of consumer happiness, as outlined by Zeithaml et al. (1996) and Oliver (1980), remain steadfast in the context of modern commerce. E-satisfaction is a predictor of customer loyalty (Evanschitzky et al., 2004; Utami et al., 2023). According to Prahiawan and Purba (2021), the intention to repurchase the product or services from the same website is positively influenced by e-satisfaction. E-satisfaction also plays a critical mediating role between e-service quality and e-loyalty. Mofokeng's (2021) research indicates that higher e-satisfaction leads to increased loyalty, suggesting that satisfied customers are less likely to switch to competitors. Indeed, this mediation effect is supported by various studies, including one that found full mediation of customer satisfaction in the relationship between service quality and loyalty (e.g., Khan et al., 2023), contrasting with other scholarly works that reported partial mediation (e.g., Vun et al., 2013). Another study on e-commerce platform, Shopee emphasised that responsiveness, personalisation, and reliability are significant predictors of customer satisfaction, which in turn influences loyalty (Avania & Widodo, 2022). While e-satisfaction's role in fostering loyalty is well-documented globally, Malaysian research reveals mixed results. A study on millennials in Kuala Lumpur found that e-satisfaction strongly predicted online buying frequency, however, e-trust showed no significant effect (Emamdin et al., 2020). In contrast, a 2017 e-retailing study reported that e-satisfaction solely accounted for only 29% of loyalty variance, implying the need for more research and integration of other factors. Preceding findings, therefore, underline the importance of examining the mediating effect of customers' e-satisfaction in the relationship between e-quality service and e-loyalty outcomes, along with the integration of other potential constructs.

2.5. Online Customer Value

Customer value is the perception on the intangible and tangible benefits of a product or service received by a customer (Wang & Prompanyo, 2020). Customer value on a service is based on the perception of what they accepted and what is delivered (Sastry & Rao, 2017). Sastry and Rao (2017) stated that online sellers should always examine customers' perceived value, which can improve customers' e-satisfaction

and e-loyalty. Perceived value is considered a crucial factor in marketing and a stable factor to predict customers' purchasing behaviour (Uzir et al., 2020).

Tsao et al. (2016) found that system and electronic service quality had a substantial influence on customers' perceived value, which in turn had a significant influence on online loyalty. A study in Malaysia shows that when customers experience high-quality online services (e.g., fast load times, accurate information), they tend to evaluate the service as more valuable. This perceived value may include emotional (e.g., enjoyment), functional (e.g., efficiency), and monetary (e.g., cost-savings) benefits (Okour et al., 2023). Furthermore, customers who perceive high value from online services tend to be more satisfied with their overall experience, as a result from comparing what they receive (value) against what they expected (Okour et al., 2023). Empirical findings also confirm that perceived value partially or fully mediates the relationship between e-service quality and e-satisfaction. That said, even if e-service quality is high, its effect on e-satisfaction will be stronger when perceived online customer value is also high (Candra & Juliani, 2018; Okour et al., 2023).

Therefore, companies may nurture customer happiness and generate value for young generations by providing perceivable benefits and a superior overall experience through great e-service quality (Agarwal & Teas, 2002; Parasuraman et al., 2005). According to Keeney (1999), this view fundamentally involves striking a balance between the perceived benefits and quality of a provider's offering and the trade-offs necessary to achieve it. Research also indicates that e-trust significantly impacts on customer loyalty, with e-service quality serving as a foundational element in building that trust. The study revealed that while e-service quality and e-trust positively influenced e-loyalty, they did not significantly affect e-satisfaction, suggesting that other factors may contribute to customer satisfaction in online environments (Ashiq & Hussain, 2024).

Drawing from the analysis of past literature, limited studies have examined the relationship between e-service quality, e-satisfaction, online customer value and e-loyalty. For example, using the SERVQUAL model, Bashir et al. (2020) explored the mediating role of customer perceived value between customer satisfaction and service quality in the e-banking sector of Bangladesh, but did not extend to loyalty outcomes. The study found that customer perceived value partially mediates the relationship between service quality and customer satisfaction. Alnaim et al. (2022) examined the mediating effect of e-trust and e-satisfaction in the relationship between e-service and e-loyalty, using the E-S-QUAL framework among hotel customers who use online travel agencies in Saudi Arabia's Eastern Province. The findings show that e-satisfaction significantly mediates the relationship between e-service quality and e-loyalty; however, it did not measure the mediating effects of perceived value between e-service quality and e-satisfaction. Similarly, in Malaysia, Okour et al. (2023) examined the mediating effect of customers' perceived value between e-service quality and customer satisfaction in online banking sector based on the disconfirmation theory, but did not explore further on the loyalty outcomes. The findings demonstrate that e-service quality has significant and positive impact on customer satisfaction and customer perceived value significantly mediates the relationship. Nevertheless, a recent study by Ashiq and Hussain (2024) revealed the importance of e-service quality, e-trust, and customer satisfaction and their role in fostering customer loyalty within the context of online shopping in Pakistan.

While research in Malaysia has made significant strides in understanding individual links between e-service quality, e-satisfaction, online customer value and e-loyalty, comprehensive research examining the full causal pathway remains scarce. Furthermore, the existing literature, although rigorous, is fragmented across industries, demographics and theoretical lenses, calling for more nationally representative samples, such as university students who comprise larger online population in Malaysia and integrated models.

2.6. Research Hypotheses

The discussion above led to the formation of the following research framework as shown in Fig. 1 and hypothesis statements.

- H1: E-service quality positively influences e-satisfaction.
H2: E-service quality positively influences online customer value.
H3: Online customer value positively influences e-satisfaction.
H4: E-satisfaction positively influences e-loyalty.
H5: Online customer value mediates the relationship between e-service quality and e-satisfaction.
H6: E-satisfaction mediates the relationship between e-service quality and e-loyalty.
H7: E-satisfaction mediates the relationship between online customer value and e-loyalty.

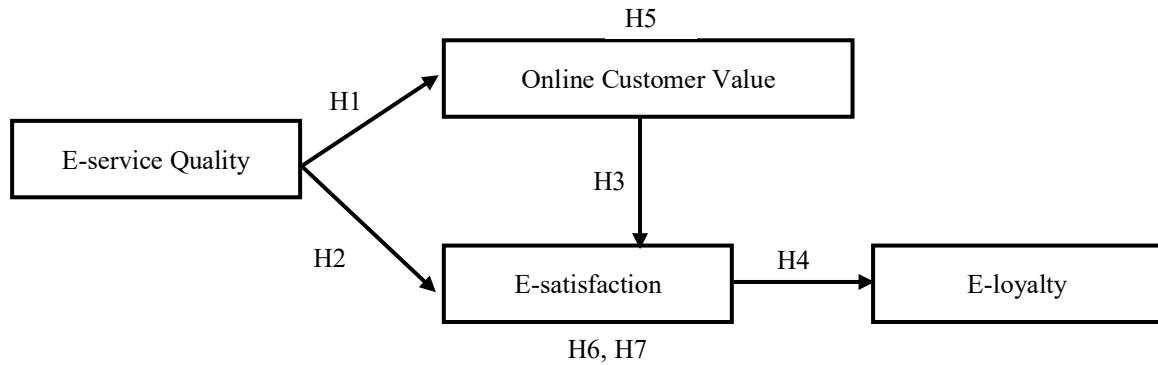


Fig. 1: Structural model

3. Research Methodology

The target population of this study are university students who have experienced online shopping. G*Power analysis with effect size of 0.15, alpha value of 0.05 and statistical power value of 0.8 indicates the required minimum sample size is 68. Therefore, a total of 104 university students were selected for the study. Due to practical constraints, convenience sampling was adopted in this study. The selection of participants was based on their accessibility within the limited data collection period of two months. Given the exploratory nature of the research, the primary objective was to obtain preliminary insights rather than to produce generalizable results applicable to the wider population. A set of self-administered questionnaires in the Microsoft Form was used to collect the data. The reason to use electronic surveys was based on two main reasons: (i) to reduce time, effort and costs, and (ii) to reach a larger pool of respondents compared to traditional self-administered surveys. The questionnaire includes an informed consent form outline the confidentiality of collected data, anonymity of participants, and the use of data solely for academic purposes. The questionnaire was distributed via Facebook Messenger, a WhatsApp group, a LinkedIn group, and also Microsoft Teams with a request for participants to complete it. Additionally, some questionnaires were sent out through email addresses. In today's technological era, most individuals are connected to mobile phones or computers, which facilitated the researchers' ability to engage with the targeted respondents for this study. The items for each of the factors were extracted based on the literature review and were adapted from the previous studies which are setyoe-service quality (Candra & Julian, 2018), online customer value (Alnaim et al., 2022), e-satisfaction (Mofokong, 2021) and e-loyalty (Mofokong, 2021). All items were validated and aligned with the purpose of this study. The Likert scale with 5-point ranging from (1) strongly disagree to (5) strongly agree was used for e-satisfaction, e-service quality, and online customer service. Meanwhile, e-loyalty was measured using 7-point Likert scale ranging from (1) strongly disagree to (7) strongly agree. This study adopted different Likert scales to reduce the risk of Common Method Bias (CMB) which may compromise the validity of the findings and lead to inaccurate interpretation of the

results (Podsakoff et al., 2003). According to Altuna (2016), employing varied Likert scales does not introduce statistically significant differences, thus reinforcing the suitability of this method within the present research framework. The data was then processed and analysed. Structural Equation Modeling with SmartPLS was performed.

4. Findings

Out of the 104 university students in this study, 58.7% of the respondents are female and 41.3% are males. 95.2% of them fall within the 18 to 25-years age range while the remaining are between 26 to 30 years old. Chinese students consist of 78.8% shows majority, followed by Malay students (11.5%) and Indian (5.8%). In terms of the number of times they shop online in a month, 47.1% shop online once or twice, 37.5% is 3 to 5 times, 10.6% of them shop more than 10 times online in a month and 4.8% shop 6 to 10 times a month.

4.1. Measurement Model

Table 1 displays the factor loading, composite reliability (CR) and average variance extracted (AVE) for all the constructs. As shown in Table 1, the factor loading is between 0.79 to 0.925, CR is between 0.893 to 0.936 and AVE is between 0.767 to 0.83.

As suggested by Hair et al. (2022), the value of factor loadings for all constructs exceeds the recommended level of 0.70 indicating for a strong representation of the construct. For CR which is above 0.70 is generally acceptable for research purposes. As far as the convergent validity is concerned, AVE value should be more than 0.50, which in this case is 0.83, 0.813, 0.676 and 0.733 for e-loyalty, e-satisfaction, e-service quality and online customer value, respectively. In summary, this indicates that the convergent validity of the constructs passes the acceptable level.

The discriminant validity was examined using Heterotrait-Monotrait ratio of correlations (HTMT) (Henseler et al., 2015). Table 2 shows the HTMT values which range from 0.605 to 0.804. All the HTMT values obtained are below the threshold value of HTMT0.85 as suggested by Kline (2011) shows that the discriminant validity is deemed satisfactory. Thus, the measurement model exhibited evidence of adequate discriminant validity. (Fig. 2)

Table 1: Convergent Validity

Construct	Item	Factor Loading	CR	AVE
E-Loyalty	ELOY1	0.88	0.936	0.83
	ELOY2	0.924		
	ELOY3	0.929		
E-Satisfaction	ESAT1	0.879	0.929	0.813
	ESAT2	0.925		
	ESAT3	0.9		
E-Service Quality	ESQ1	0.861	0.893	0.676
	ESQ2	0.837		
	ESQ3	0.79		
	ESQ4	0.798		
Online Customer Value	OCV1	0.818	0.916	0.733
	OCV2	0.905		
	OCV3	0.834		
	OCV4	0.864		

Note: CR: Composite Reliability, AVE: Average Variance Extracted

Table 2: Discriminant Validity using HTMT Criterion

	1	2	3	4
1. E-Loyalty				
2. E-Satisfaction	0.628			
3. E-Service Quality	0.605	0.709		
4. Online Customer Value	0.653	0.804	0.694	

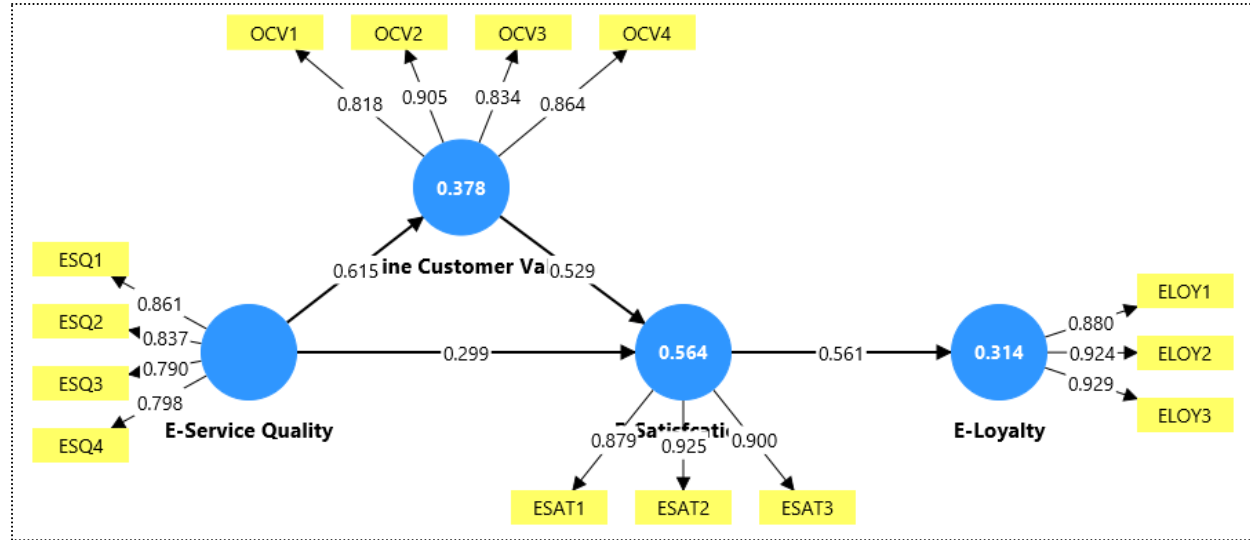


Fig. 2: Structural model

4.2. Structural Model

Table 3 presents the results from structural model that examine the relationships among variables in the research model. The variance inflation factor (VIF) values which ranged from 1 to 1.607 indicate the absence of collinearity issues among constructs (Hair et al., 2022). The R^2 are 0.378 (online customer service), 0.564 (e-satisfaction) and 0.314 (e-loyalty). This means the research model explains 37.8% of the variance in online customer service, 56.4% in e-satisfaction, and 31.4% in e-loyalty. The remaining percentages are due to other factors not included in the research model. According to Cohen (1988), f^2 is a measure of effect size that indicates the proportion of variance explained by a predictor. A higher f^2 value signifies a stronger effect, with common benchmarks being 0.02 (small), 0.15 (medium) and 0.35 (large). Referring to table 3, the value for f^2 for e-service quality has small effect size which is 0.127 and the remaining are large effect sizes which is 0.607, 0.458 and 0.4 respectively. The t-values for all the paths evaluated in the structural model are above the critical value of 2.3263 (α value of 0.01). This means all the paths are significant and all the hypothesis from H1 to H4 are supported by the findings of this study.

Table 3: Results of Structural Model

Hypothesis	Relationship	Std Beta	Std Error	t-Value	R^2	f^2	VIF	Decision
H1	E-Service Quality -> Online Customer Value	0.615	0.071	8.674*	0.378	0.607	1	Supported
H2	E-Service Quality -> E-Satisfaction	0.299	0.107	2.79*	0.564	0.127	1.607	Supported
H3	Online Customer Value -> E-Satisfaction	0.529	0.109	4.841*		0.4	1.607	Supported
H4	E-Satisfaction -> E-Loyalty	0.561	0.064	8.727*	0.314	0.458	1	Supported

Note: **p-value < 0.01, *p-value < 0.05

As presented in Table 4, a t-value of 4.45 indicates that online customer value significantly mediates the relationship between e-service quality and e-satisfaction. A t-value of 2.895 suggests that e-satisfaction significantly mediates the relationship between e-service quality and e-loyalty, while a t-value of 3.665 indicates that e-satisfaction mediates the relationship between online customer value and e-loyalty. These results demonstrate significant mediating effects along all three paths from H4 to H6, as each t-value exceeds the critical threshold of 1.96 at the 5% significance level.

Table 4: Results of Mediation Analysis

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	Confidence Interval Bias Corrected		Decision
					LL	UL	
H5	E-Service Quality -> Online Customer Value -> E-Satisfaction	0.325	0.073	4.45	0.192	0.476	Supported
H6	E-Service Quality -> E-Satisfaction -> E-Loyalty	0.167	0.058	2.895	0.058	0.29	Supported
H7	Online Customer Value -> E-Satisfaction -> E-Loyalty	0.297	0.081	3.665	0.15	0.461	Supported

Note: *p-value < 0.05, UL = Upper Level, LL = Lower Level

5. Discussion

From the findings of this study, e-service quality has significant and positive influence on the online customer value with the standardised beta of 0.615. This result is supported by Kuo et al. (2009) which stated that service quality positively influences customers' perceived value and their satisfaction. In sum, this indicates that the better the e-service quality, the higher the value customer will perceive when they purchase online. The result was similar to those of other study (e.g., Pratama et al., 2023).

Other than that, e-service quality also has positive influences on e-satisfaction. The result is in favour to the finding by Lengkong et al. (2023). This implies that e-service quality not only affects online customer value but also acts as an important factor in terms of customer satisfaction. Taken together, these findings indicate that the e-service quality provided such as the availability of the website and the data protection as well as secure payment transactions that contribute to the university students' sense of security which in turn positively influences their customer value and overall satisfaction. This is also supported by Efdison et al. (2024) that the better the quality of service provided by online shopping platforms, university students are more likely to feel satisfied.

This study also shows that online customer value is correlated with e-satisfaction of customer positively. Li et al. (2015) opined that establishing a strong perceived value associated with their offerings is imperative for online retailers to satisfy customers. The result was also supported by other studies (such as Candra and Juliani, 2018; Khan et al., 2019; Meitria & Harmen, 2024). The study found that customer value significantly impacts customer satisfaction, suggesting that when customers perceive higher value in their purchases, their satisfaction levels will increase correspondingly. University students appreciate the options available to them such as a hassle-free return policy and the varies payment methods available which are the added value for them to decide whether to make a purchase from an online store. This concludes that effective online customer value ensures a higher level of customer satisfaction.

E-satisfaction is positively associated with e-loyalty as suggested by the finding for this study. This is in agreement with the empirical results by Trana et al. (2022) and Mofokeng (2021) which they have found that customer satisfaction is explaining customer loyalty. The study anticipates that higher levels

of satisfaction derived from online shopping experiences will lead to increased loyalty among university students. In sum, university students who are satisfied with their online shopping experience tend to be confident in the online shopping platform and more likely to recommend it to family and friends. This in return may help the online retailer not only have loyal customers who repeat the orders but also expand its market reach.

For mediating analysis, the result showed that online customer value has the mediating effect between e-service quality and e-satisfaction. The result is also in agreement with the research conducted by Meitria et al. (2024). This result concludes that the higher the e-quality service provided to university students enhances the perceived value among them which in turn significantly contributes to boosting online customer loyalty towards e-commerce platforms.

Besides, this study also found that e-satisfaction is a mediator between e-service quality and e-loyalty. Similarly, a comparable mediating effect involving online shopper in Pakistan been identified by Ashiq & Hussain (2024) and online shoppers in Indonesia (Muharam et al., 2021). This implies that university students who receive good e-service quality through the online shopping experience will be loyal to the online shopping platform if they are satisfied.

Furthermore, the mediating analysis implies that e-satisfaction mediates between online customer value and e-loyalty. This means that university students with positive online customer value are loyal to the online shops with higher e-satisfaction. This will make them revisit and purchase products or services with the online store.

6. Conclusion

Online shopping has fundamentally transformed retail experiences for young consumers, particularly university students, with the COVID-19 pandemic accelerating this digital shift. This study advances our understanding of e-loyalty formation among university students by empirically validating a sequential model linking e-service quality, online customer value, e-satisfaction, and e-loyalty. Our findings reveal that e-service quality serves as the foundation for building customer loyalty in online environments, operating through two complementary pathways: a direct effect on e-satisfaction and an indirect effect mediated by online customer value.

The significant relationship between e-service quality and online customer value ($\beta=0.615$) highlights that reliable, responsive, and secure online shopping experiences substantially enhance students' value perceptions. Similarly, the strong influence of online customer value on e-satisfaction ($\beta=0.529$) demonstrates that value perceptions are critical intermediaries in satisfaction formation. Ultimately, the robust relationship between e-satisfaction and e-loyalty ($\beta=0.561$) confirms the central role of satisfaction in building long-term customer relationships in digital environments.

These findings offer important theoretical contributions to e-commerce and consumer behavior literature. First, they validate the extension of traditional service quality models to online contexts specifically for university students. Second, they demonstrate the sequential nature of loyalty formation, confirming that service quality must translate into value and satisfaction before culminating in loyalty. Third, they highlight the particular significance of these relationships in the university student demographic, who combine digital nativity with emerging purchasing power.

For e-commerce practitioners targeting university students, our results suggest several strategic priorities. First, investing in service quality elements that specifically enhance perceived value—such as website usability, transaction efficiency, and information quality—should be prioritized. Second, marketing communications should emphasize value propositions aligned with student priorities, including convenience, time-saving, and cost-effectiveness. Third, implementing systematic measurement of e-satisfaction can provide early warning signs of potential loyalty issues, allowing for proactive intervention.

Despite these contributions, several limitations warrant acknowledgment. Our convenience sampling approach potentially introduced selection bias, particularly given the predominance of

Chinese students (78.8%) in our sample. The modest sample size (n=104) limits statistical power and potentially restricts the generalizability of findings. Additionally, the cross-sectional nature of our study precludes causal inferences about the relationships observed.

Future research should address these limitations through probability sampling techniques and larger, more representative samples across multiple universities. Longitudinal designs would help establish causality and track how loyalty evolves over time. Comparative studies across different demographic segments would clarify whether the relationships identified here are unique to university students or generalizable to other consumer groups.

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