The Influence of E-Commerce Innovation and E-Services Qualityon *Customer loyalty* with Customer Satisfaction as Mediator in Gen-Z

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Abstract

This study investigates the influence of e-commerce innovation and e-service quality on customer satisfaction and loyalty among Gen-Z students in Surabaya. Utilizing a non-probability sampling technique and the Lameshow formula, data were gathered via a structured questionnaire from 384 active students aged 20-25 years. Multiple linear regression analysis, conducted withthe PLS program, revealed that all variables met the validity (AVE > 0.05) andreliability (Cronbach's alpha > 0.7) criteria. The hypothesis tests indicated that e-commerce innovation does not significantly affect customer loyalty (P-value 0.976 > 0.05), whereas e-service quality does (P-value 0.000 < 0.05). Both e- commerce innovation and e-service quality significantly impact customer satisfaction (P-value 0.000 < 0.05), which, in turn, significantly influences customer loyalty (P-value 0.000 < 0.05). Additionally, the study found that e-commerce innovation and e-service quality significantly affect customer loyalty when mediated by customer satisfaction (P-value 0.000 < 0.05).

Keywords: *E-commerce innovation, Customer satisfaction, E-services quality, Customer loyalty.*
JEL Classification: A11, D03, H54

INTRODUCTION

Gadgets, gen-z, and digitalization are the three main pillars of today's economic growth in all parts of the world, including Indonesia. These three pillarsare also believed to be key elements in trend transitions Conventional trading is becoming a digital-based trading trend. This assumption cannot be separated from the fact that shows that from the opening of 2017 to the close of 2023, digital usageand transactions through various *e-commerce platforms* have increased by 42.8% and are predicted to continue to increase. (Jayani, 2023). The graph of increasing *e-commerce* trends is shown as follows.
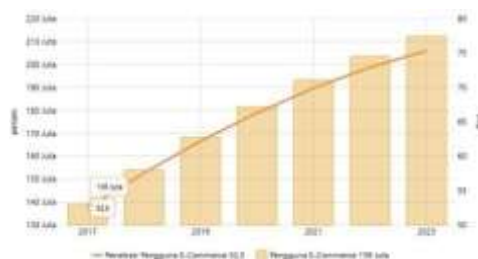
Figure 1. Increase in *E-Commerce* Users Periodization 2017 – 2023
Source: katadata.co.id

From Figure 1 it can also be seen that in 2023 e-commerce users will reach ± 210 million people, in percentage terms reaching 75% of the total population. Regarding Gen-Z, in the years when the e-commerce trend increased, it was in the 20 to 25 year age range. In this age range, Gen-Z is in the student phase which is known as the consumer age phase (Kahawandala et al., 2020) . A study also shows that in this phase students are key in the development of e-commerce due to consumer tendencies, awareness of technology, and accelerated digitalization. The close relationship between gen-z students and the development of e-commerce has become a reference for determining subjects in this research (Astuti et al., 2022) .

The increase in the number of users and transactions taking place in e- commerce is the main trigger for the increasingly widespread emergence of various online shopping platforms as well as the demands of intense digital competition. One of the important efforts for an e-commerce company to survive is to increase customer loyalty so that they do not switch platforms e-commerce competitors (Ye et al., 2023) . Loyalty is the highest level of bond between the provider of goods or services and the consumer. This loyalty can be triggered by satisfaction, trust, image, or dependability. Among these factors, the factor that is seen as having the greatest role in generating or increasing consumer loyalty is consumer satisfaction(Priansa, 2017) .

A consumer's satisfaction with e-commerce is the conclusion of various experiences gained while using e-commerce facilities in carrying out online transactions or shopping. In essence, satisfaction is a person's response to the privileges and services offered by each e-commerce platform (Arief et al., 2023) . This privilege can be achieved through the active role of e-commerce in carrying out innovation, or what is known as e-commerce innovation. Innovation is still not enough if used as the sole factor in increasing consumer satisfaction. Another factor which is also key to consumer satisfaction is the quality of digital services or what is called e-services quality, because the quality of the goods or services provider cannot be separated from the quality of the services provided (Ariyanto and Astuti, 2023) .

The primary objective of this research is to analyze how e-commerce innovation and e-service quality impact customer loyalty, with customer satisfaction acting as a mediating factor. Specifically, the hypothesis in this research is raised through descriptions of the relationships between variables which are explained as follows. First, innovations developed by companies are actually stronger in encouraging consumer confidence in using a product, whether in the form of physical products or digital products (Nurabiah et al., 2023) . Consumer trust is closely related to customer loyalty, so consumers tend to continue using a product if they have trust in the product. Based on this description, the first

hypothesis that we want to prove through this research is, H_1 = e-commerce innovation (X_1) has a significant effect on customer loyalty (Y).

Second, e-commerce tends to offer various innovations in the form of convenience and renewal of buying and selling transactions to obtain customer satisfaction. Product creativity and product innovation have a significant effect on customer satisfaction (Ernawati and Kurniawati, 2020). The creativity and innovation offered by the company are able to provide a point of difference from other competitors, so that the company can obtain customer satisfaction as a form of feedback on this renewal strategy. Based on this description, the second hypothesis that we want to prove through this research is, H_2 = e-commerce innovation (X_1) has a significant effect on customer satisfaction (Z).

Third, service quality is the provision of services or services that consistently meet or exceed consumer expectations. In the scope of e-commerce, consumers will tend to be loyal to an e-commerce platform if the performance of the services offered is of sufficient quality. Based on this description, the third hypothesis to be proven in this research is, H_3 = e-services quality (X_2) has a significant effect on customer loyalty (Y).

Fourth, as a service provider, service quality has a significant influence on consumers. Quality service is service that is friendly and agile, so that it is able to attract consumers and can achieve consumer satisfaction in using a service product(Syauqi, 2020). The quality of service in question refers to the quality of electronicservices in providing needs for consumers and providing satisfaction for consumerswho use service products. Based on this description, the fourth hypothesis that thisresearch wants to prove is, H_4 = e-services quality (X_2) has a significant effect oncustomer satisfaction (Z).

Fifth, customer satisfaction can significantly encourage customer loyalty in consuming a product, whether in the form of goods or service products (Prasetyo, 2021). Customer loyalty to a product occurs due to the influence of consumer satisfaction and dissatisfaction which accumulates continuously. The higher the level of customer satisfaction with a product, the higher the opportunity to make a repeat purchase. Based on this description, the fifth hypothesis that this research wants to prove is, H_5 = customer satisfaction (Z) has a significant effect on customer loyalty (Y).

Sixth, there is a conception that consumers who feel satisfied will tend to put their trust in the product, so that they have the potential to make repeat purchases(Putra & Kusumadewi, 2019). Repeated purchases by consumers in this case are aform of customer loyalty towards the use of a product. It can be understood that themore intensive e-commerce innovation is carried out, the higher the company's chances of achieving customer satisfaction which can encourage consumers to continue making repeat purchases until they achieve customer loyalty. Based on this description, the sixth hypothesis that this research wants to prove is, H_6 = customer satisfaction (Z) mediates the influence of e-commerce innovation (X_1) on customer loyalty (Y).

Seventh, customer satisfaction in using e-commerce services can provide astimulus to continuously make repeat purchases (Fakhrana, 2020). Repeatedpurchases in this context refer to the use of e-commerce by consumers to carry outongoing buying and selling transactions. Therefore, the better the quality of e- services presented can potentially increase consumer satisfaction and create

customer loyalty to use e-commerce services. Based on this description, the seventh hypothesis that this research wants to prove is, H $_7$ = customer satisfaction (Z) mediates the influence of e-services quality (X $_2$) on customer loyalty (Y).
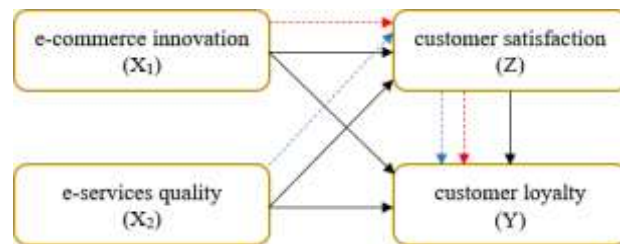
Picture 2. Flow Chart of Relationships Between Variables

METHOD

This study employs an explanatory and quantitative research approach to investigate the relationships among key variables. Specifically, it examines how e- commerce innovation and e-service quality (the independent variables) influence customer loyalty (the dependent variable), with customer satisfaction serving as the mediating variable.

The population in this study were all active students in Surabaya in the agerange of 20 to 25 years who are in the gen-z phase. Sample calculations were carriedout using the Lameshow formula with a sampling error of 5%. This formula is usedbecause the population size in the study is unknown. The Lameshow formula is carried out by calculating $n = \frac{z^2 \cdot p(1-p)}{d^2}$, with the explanation that n = number of samples, z = z score at the 95% confidence level (1.96), p = maximum estimate (0.5), d = sampling error (10% or 5%). This calculation resulted in a sample of 384students.

The type of data used in this research is primary data. The data collection technique uses a closed questionnaire technique which provides alternative answersusing a Likert scale, with references, Strongly Disagree (STS), Disagree (S), Neutral (N), Agree (S), and Strongly Agree (SS). Each answer option has a score in the range 1 – 5. The questionnaire instrument in this research was developed based on indicators for each research variable. The data obtained in this research were analyzed using SEM-PLS analysis. Structural Equation Modeling (SEM) is amultivariate statistical analysis that allows analysis of more than one independent variable and dependent variable simultaneously (Hair et al., 2010) .

RESULTS AND DISCUSSION

Validity Test Results

Validity testing is an evaluation method that aims to determine the extent towhich a measurement instrument is able to measure what it should measure. This can be seen from the loading factor value and the Average Variance Extracted (AVE) value, where the instrument is considered valid if the loading factor is > 0.50and AVE > 0.50. (Chin and Dibbern, 2010)
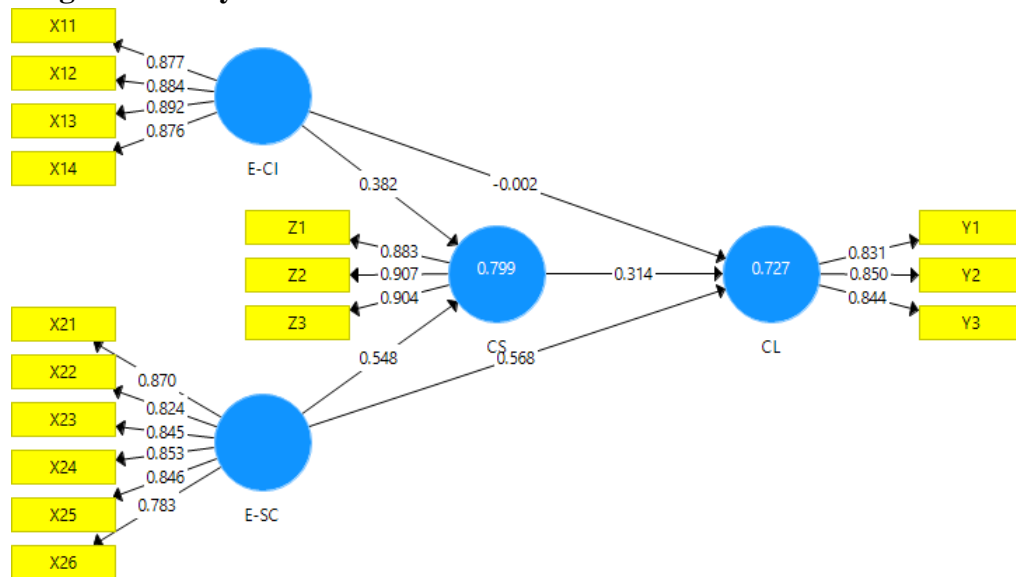
Convergent Validity

Figure 3. Outer Model Measurement Test

Based on the image above, the value of the outer loading of all indicators of the variables E-Commerce Innovation, E-Services Quality, Customer loyalty and is > 0.5 so it can be said to be valid. and thus can be relied upon to measure the variable in question.

Discriminant Validity

In this research, Discriminant Validity was evaluated using two criteria: Average Variance Extracted (AVE) and AVE Root value (or Fornell-Lacker Criterion). The analysis results show that the AVE value for each variable exceeds the threshold of 0.5, which indicates adequate validity.

	Cronbach's Alpha	Rho A	Composite Reliability	Average Variance Extracted (AVE)
CL	0.794	0.798	0.879	0.708
CS	0.880	0.880	0.926	0.807
E-CI	0.905	0.905	0.934	0.779
E-SC	0.915	0.916	0.934	0.701

Table 1. Discriminant Validity

Evaluation result use mark The AVE root (Fornell-Larcker Criterion) shows that all construct variables (CL, CS, E-CI, ESC) fulfill criteria validity discriminant. This matter be marked with mark More AVE roots tall compared to correlation between construct the with construct other in models. With So, you can concluded that variables construct This in a way effective differentiate contribution they to the variance Alone from originating variance from construct else, so fulfil criteria validity discriminant.

	CL	CS	E-CI	E-SC
CL	0.842			
CS	0.806	0.898		
E-CI	0.741	0.844	0.882	
E-SC	0.839	0.870	0.843	0.837

Table 2. AVE root values

Reliability of Test Results

Reliability Test aim evaluate consistency instrument measurement momentused repeatedly with the same method. Consistency This be measured through Cronbach Alpha coefficient. Instrument considered can reliable If Cronbach Alphavalue > 0.7 (Vinzi et al., 2010) . Based on Table 2, it is known that all Cronbach Alpha values are > 0.7 so that it can be concluded that That can reliable.

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Table 3. Reliability

Required composite reliability value must more big of 0.7 (Chin, 1998) . Inthis research, the composite reliability value is obtained for all constructs ranged from 0.879 to 0.934. This indicates that all these values meet the specified thresholdof each variable is more than 0.7 so it can be said that the data is reliable.

Hypothesis Test Results

The path coefficient between constructs must demonstrate statistical significance. This can be determined through a bootstrapping procedure, where P- values < 0.05 indicate a significant impact of the independent variable on the dependent variable.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
E-CI -> CL	-0.002	-0.013	0.072	0.030	0.976
E-CI -> CS	0.382	0.380	0.057	6,740	0,000
E-SC -> CL	0.568	0.567	0.065	8,715	0,000
E-SC -> CS	0.548	0.551	0.055	10,042	0,000
CS -> CL	0.314	0.323	0.069	4,568	0,000

Table 4. Direct Effect

PLS bootstrapping results reveal that results testing No support hypothesis 1 with mark coefficient -0.002. Coefficient value This very approach zero with TheP-value is 0.976 > 0.05 which means every increased E-Commerce Innovation No influential to Customer loyalty. For Hypothesis 2 The research results support thishypothesis with a path coefficient

of 0.382 with a P-value of 0.000 < 0.05. This shows that e-commerce innovation has a significant effect on customer satisfactionof Gen-Z students in Surabaya

Whereas for hypothesis 3, 4 and 5, the research results support the three hypotheses with path coefficients of 0.568, 0.548, and 0.314 be marked with p - value 0.000 < 0.05 that every increase in E-commerce innovation have an impact which is significant for customer loyalty and customer satisfaction. And customer satisfaction also has an impact significant to customer loyalty Gen-Z students in Surabaya

Indirect Effects

To test the role of customer satisfaction as a mediating variable according to hypotheses 6 and 7, the PLS bootstrap method was also used. The results can befound at Table 5 shows the Indirect Effect between EC commerce variablesInnovation and ES service quality on customer loyalty, with customer satisfaction as a mediating variable in this research.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
E-CI -> CS -> CL	0.120	0.123	0.031	3,859	**0,000**
E-SC -> CS -> CL	0.172	0.178	0.043	3,970	**0,000**

Table 5. Indirect Effect

0.120 and 0.172 respectively and P-value: 0.000 < 0.05, indicates that connection This significant in a way statistics. This indicated that both E-commerceinnovation and E-service quality have an influence on customer satisfaction. This means that Customer Satisfaction is not only own influence direct towards Customer Loyalty, but also mediate connection between E-commerce innovation and E-service quality with customer loyalty. This matter describe complexity connection between variables in the model used in study this, and shows that variable mediation (Customer Satisfaction) plays a role role important in explain connection between variables the.

DISCUSSION

Influence E-Commerce Innovation to Customer loyalty

Connection between e-commerce innovation and customer loyalty often assumed positive, with hope that development features new, improvement experience users, and integration technology advanced will increase loyalty customer. However, results study This disclose that e-commerce innovation does not own influence significant to loyalty customer Findings This No support hypothesis previously from (Rahman et al., 2022) , which states that influential e- commerce innovation significant to loyalty customer. This matter supported by (Khairawati, 2019) , that is loyalty customer more influenced by other factors such as quality products, prices and services customer compared to with innovation technology That Alone

Influence E-Service Quality on Customer Loyalty

Superior quality e-service plays a role role crucial in increasing customer loyalty in the current digital era This. E-service quality includes various elements, such as speed

service, responsiveness to complaints, convenience navigation, and system reliability (Diaw & Asare, 2018) . When customer feel quality service highelectronics, they tend feel satisfied and comfortable for Keep going interact with company the. Findings This supported by (Rahman et al., 2022) , who stated existsconnection significant between e-service quality and customer loyalty.

Influence E-Commerce Innovation to Customer Satisfaction

Ecommerce Innovation own potency significant for increase customer satisfaction with repair efficiency, improve experience users, and provides features new more in accordance with need customer. Application technology the latest innovative ones, such as personalization experience shop or social media integration in e-commerce platforms, can in a way substantial increasing customersatisfaction (Khairawati, 2019) . With provide more solutions good and more efficient for fulfil need shopping, e-commerce innovation is not only repair experience users, but also strengthen loyalty customer. (Zygiaris, 2022)

Influence E-Services Quality Against Customer Satisfaction

High quality e-service role important in increase customer satisfaction in digital environment. Customer tend feel satisfied when they get easy service usable,responsive, and safe by online. Factors like speed transactions, easy navigation, andeffective communication between companies and customers is key in ensure customer satisfaction. With provide high service in quality, company can build trust, fulfill hope customers, and strengthen connection period long with they. (Ritaet al., 2019) .

Influence Customer Satisfaction To Customer Loyalty

Customer satisfaction is element crucial influence customer loyalty in various context business. When customer feel satisfied with product or theirservices thank them tend For stay loyal and do it purchase repetitive. High level ofcustomer satisfaction often increasing their emotional connection with the brand that and more Possible recommend it to other people. Studies empirical (Khairawati, 2019) , shows that there is connection significant between customer satisfaction and customer loyalty. Where satisfied customers with experience they tend become loyal customers

The Influence of E -Commerce Innovation on Customer Loyalty Through Customer Satisfaction Mediation

Innovation in e-commerce plays role important in increase satisfaction customers, who in turn impact positive on loyalty customer. Although e-commerceinnovation does not directly affect customer loyalty significantly, role mediation from proven customer satisfaction crucial. Research result show that innovation ine-commerce, it can increase experience customer online shopping. Mediation by satisfaction customer explain that loyalty No only results from innovation technology, but also how innovation the fulfil hopes and needs customer. When customer feel satisfied with innovation this, them tend more loyal to brand the. Thismatter seal with study (Rahman et al., 2022) .

The Influence of E-Service Quality on Customer Loyalty Through Customer Satisfaction Mediation

E-service quality own significant impact to customer loyalty, especially when

mediated by Customer Satisfaction. Study This show that responsive, reliable and safe service No only direct increase satisfaction customer but also strengthening loyalty they to company. When customer feel satisfied with services provided, they more tend For return use service and recommend it to other people. Mediation by satisfaction customer strengthen connection between quality service electronics and loyalty customer. This in accordance with study (Rahman et al., 2022) , that For increase loyalty customer company must ensure that service electronic they no only fulfil but also beyond hope customer. With give service quality high, company can increase satisfaction customers, who in turn will increase loyalty they

CONCLUSION

Based on the study results, the following conclusions can be drawn:

1. E-Commerce Innovation (E-CI) does not directly impact Customer Loyalty (CL), indicated by a coefficient of -0.002 and a P-value of 0.976, which is not statistically significant ($P > 0.05$).
2. E-Service Quality (E-SQ) has a significant direct effect on Customer Loyalty, with a coefficient of 0.568 and a P-value of 0.000 ($P < 0.05$).
3. E-Commerce Innovation significantly enhances Customer Satisfaction (CS), as shown by a coefficient of 0.382 and a P-value of 0.000 ($P < 0.05$).
4. E-Service Quality also significantly improves Customer Satisfaction, with a coefficient of 0.548 and a P-value of 0.000 ($P < 0.05$).
5. Customer Satisfaction significantly influences Customer Loyalty, demonstrated by a coefficient of 0.314 and a P-value of 0.000 ($P < 0.05$).
6. E-Commerce Innovation significantly boosts Customer Loyalty through Customer Satisfaction mediation, with a coefficient of 0.120 and a P-value of 0.000 ($P < 0.05$).
7. E-Service Quality significantly enhances Customer Loyalty via Customer Satisfaction mediation, with a coefficient of 0.172 and a P-value of 0.000 ($P < 0.05$).

These findings underscore the importance of both E-Commerce Innovation and E-Service Quality in fostering Customer Loyalty, particularly through their positive effects on Customer Satisfaction.

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