

# Improving the Satisfaction and Loyalty of Online Shopping Customers Based on E-Commerce Innovation and E-Service Quality

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**Abstract:** The purpose of this study is to develop new knowledge related to innovations in e-commerce, which we call e-commerce innovation, and how this affects customers' satisfaction and loyalty, along with the e-service quality, in the context of an online shop in Indonesia. Several measurement items of e-commerce innovation were adopted and modified from the existing literature. To answer how this affected the customers' satisfaction and loyalty, partial least squares structural equation modeling was used to analyze the data from 400 respondents. Empirical test results found that e-commerce innovation and e-service quality can increase customers' satisfaction and loyalty, respectively. It is also known that in the context of online shopping customers in Indonesia, it is easier to generate customers' satisfaction than customers' loyalty. This study contributes to the novelty related to e-commerce innovation, which focuses on innovation of the application or website, not of the company as a whole.

**Keywords:** e-commerce innovation, e-service quality, customers' satisfaction, customers' loyalty, online shop.

**JEL Classification:** D11, M21, M31, O3

## Introduction

Indonesia is the country with the highest growth rate of e-commerce users, which was 78% in 2018. The high number of e-commerce users in Indonesia is the potential target market, indicated by more and more online shops popping up in Indonesia. This condition led to intense competition among them for customers. Unfortunately, the bad news is that online shopping customers in Indonesia show very little loyalty. This low level of loyalty can be seen from the significant change in the number of visitors to each online shop every quarter. For example, one of the biggest online shops in Indonesia, Lazada, had the most visitors in every quarter of 2017, with the highest number in the 4th quarter of 2017 (131,848,000 visitors). However, the number of visitors decreased by 72.39% in the third quarter of 2018, to only 36,405,200 visitors. Meanwhile, Shopee, which is a new online shop, was always in the bottom three for the number of e-commerce of visitors during 2017, but the number of visitors increased rapidly in the 3rd and 4th quarters of 2018, beating Lazada's numbers. This indicates that it is not easy to retain customers in the e-commerce industry because of the intense competition (Yun & Good, 2007).

In the literature, several factors can be identified as the antecedents of customers' loyalty, such as products (Devaraj et al., 2011; Pan et al., 2012), prices (Vinita and Sharma, 2015), service quality (Devaraj et al., 2011; Vinita and Sharma, 2015), trust (Yieh et al., 2007; Pan et al., 2012; Yap et al., 2012), innovation (Kazmacı and Ekiyor, 2015; Yeh, 2015), and customers' satisfaction (Gummerus, et al., 2004; Yieh et al., 2007; Bodet, 2008; Chiou and Pan, 2009; Santouridis & Trivellas, 2010; Pan et al., 2012; Yap et al.,

2012). From these factors, some important notes need attention. First, in general, these factors are from studies in the context of companies and traditional marketing, while studies in the context of electronic-based marketing are still scarce. Second, for the service quality factor, several studies found that the examinations of the relationship between service quality and customers' loyalty still used the dimensions of traditional service quality; these conditions do not really suit the e-commerce industry. It has been proven by Gefen (2002) that empathy had a lesser role in increasing customers' loyalty to amazon.com. The lack of human interaction in the e-commerce industry makes this aspect somewhat less important in the quality of e-commerce services. So in this study, we use e-service quality. Besides, from the few studies that have used e-service quality, we found that they had inconsistent results. Chinomona et al., (2014) found that e-service quality had no significant effect on online shopping customers' loyalty, while Sheng and Liu (2010) found the opposite. Third, for the customers' satisfaction factor, several inconsistencies were found from the existing studies. The first inconsistency encountered is related to the use of customers' satisfaction as an indicator of customers' loyalty, (Söderlund, 2006; Ogba and Tan, 2009), and vice versa. This happens because of the very close relationship between the two concepts (Jones and Sasser, 1995; Sheth and Sisodia, 1999). The second inconsistency encountered is related to the effect of customers' satisfaction on customers' loyalty. Several studies prove the direct effect of customers' satisfaction on customers' loyalty (Hallowell, 1996; Meuter et al., 2000; Kandampully and Suhartanto, 2003; Jones and Reynolds, 2006), while other studies could not prove it (Khatibi et al., 2002; Stoel et al., 2004). With such inconsistencies

in customers' satisfaction as an antecedent of customers' loyalty, it needs to be discussed again, especially in the context of online marketing. Fourth, considering that almost all online shops in Indonesia sell the same products, because they come from the same retailer, with prices that are not much different, then in addition to the quality of the services provided, competition also occurs due to the performance of the online shopping platforms (website, and/or smartphone application) and the additional services provided. This is reinforced by the results of a survey conducted by jakpat.net, which states that interface design and helpful services are factors considered by online consumers in Indonesia when choosing which e-commerce service provider to use. For that, innovating regularly is the solution. For this reason, e-commerce service providers in Indonesia often update their e-commerce platforms and ask their users to update the e-commerce platform they use. In the literature, we also found inconsistent results from a few studies. Lee (2011) found that innovation positively affected customers' loyalty. However, Dachyar & Hananto (2014) and Bersali & Guermat (2014) found the opposite results, in which innovation did not have a direct effect on customers' loyalty; these studies still used innovation measurement items in their traditional context (offline). So, in this study, we use innovation measurement dimensions that are tailored to the e-commerce context.

Based on the various issues we encountered in the previous studies, in this study, we want to fill in the gap caused by the lack of studies that discuss the antecedents of customers' loyalty in the context of e-commerce. We have adjusted the antecedent factors to the scope of e-commerce. The antecedent factors used in this study were e-service quality, e-commerce innovation, and customers

satisfaction. As for the product and price factors, we did not use them. As explained earlier, almost all online shops in Indonesia sell the same products, from the same retailers, with prices that are not much different, so that will not be too big an influence for the online shopping customers. This was proven by Degeratu et al., (2000) who found that online customers were not as price-sensitive as customers in general, even if they coincided with promotions. Likewise for trust, we did not use it in this study because it was already reflected in the dimensions of e-service quality. Thus, the research question of this study is: How have innovations (in the e-commerce context) and e-service quality affected customers' satisfaction and loyalty? Through this study, we aim to make several contributions to the literature. First, we want to increase the understanding about the attitudes and behavior of e-commerce customers in Indonesia, in the concept of customers' loyalty. Second, we want to enrich the innovation literature with innovation activities focusing on e-commerce, which are the novelty, and the originality of this study. Third, we would like to reiterate the contemporary relationship between customers' satisfaction and loyalty by re-examination, whether it is in terms of the statistical significance, direction, or the magnitude of the effect in the context of the e-commerce industry.

## Literature Review and Research Hypotheses

### *Customers' Satisfaction and Loyalty*

One of the things a company can do to achieve a competitive advantage is to maintain or even increase its customers' loyalty (Bharadwaj et al., 1993), because customers' loyalty can increase customer retention by

protecting them from the effects of the marketing activities of competitors (Ha and Park, 2013), which can reduce the marketing costs (Gupta and Zeithaml, 2006). In theory, there are two approaches to the concept of customers' loyalty, which are the behavioral and attitude approaches (Day, 1969; Jacoby and Kyrner, 1973). With the behavioral approach, loyal customers are willing to make repeated purchases of the same product/service or additional products/services from the same company (Ganiyu et al., 2012; Narayandas, 1996), and with the attitude approach, they are willing to provide recommendations to others, as well as refusing to buy from competitors (Akbar and Parvez, 2009; Feick, et al., 2001). In this study, we used an integrated approach (behavior and attitude) in assessing customers' loyalty. However, in the literature there is sometimes an overlap in measuring customers' loyalty and customers' satisfaction, given the close and complex relationship between the two constructs. For example, Chang et al., (2009) measured customers' satisfaction by using repurchased items, as well as Ranjbarian et al., (2002) who also used repurchased items, and a willingness to provide recommendations to others. In fact, those items should be measures of the customers' loyalty. On the other hand, some studies used items such as the service provider as a measurement item for customers' loyalty (Srinivasan et al, 2002; Chang et al., 2009 ), while Riel et al (2003) used it to measure customers' satisfaction. This is what caused Ganiyu et al., (2012) to make the allegation that customers' satisfaction could be an indicator or dimension of customers' loyalty.

In this study, we argue that customers' loyalty and satisfaction are two different concepts, where loyalty is the result of customers' satisfaction (Bei & Chiao, 2001) because ac-

ording to the definition, customers' satisfaction is the feeling felt by customers relating to the difference between their expectations and the reality of their perception of the performance of the product/service they receive (Kasiri et al., 2017). Meanwhile, according to their perceptions, when the performance of a product/service exceeds what they expected, it will cause feelings of pleasure for them. Logically, if someone feels happy with a product/service, then the product/service will be the first choice when they need it again. In other words, customers' satisfaction is a determining factor that can affect customers' loyalty. In our opinion, the previous studies that used appropriate customers' satisfaction measurement items, which proved more effective than the cognitive concepts (Udo, et al., 2010 ), are by Bayraktar et al., (2012), who used verification of satisfaction, the fulfillment of expectations, and competing with the ideal; Ha and Park (2013), who used items such as feeling satisfied, the right decision, right and wise, or vice versa; Cronin et al., (2000), who used interest, enjoyment, surprise, anger, wise choice, and doing the right thing to measure satisfaction. As for loyalty, according to some studies, we have used certain items of measurement, in accordance with the approach behavior and attitudes to the concept of loyalty. Some of them are from Deng et al., (2010), who used items of the willingness to continuously use the product, the willingness to recommend, and the willingness not to switch; while Kim et al., (2004) used the intention to continuously use the product, and the intention to recommend.

### *Innovation and E-commerce Innovation*

The study of innovation has evolved since Schumpeter (1934) stated the impor-

tance of innovation and entrepreneurship for economic growth through increased competitiveness. Since then, until now, there has not been a single global consensus on the definition of an appropriate innovation (Amara and Landry, 2005), so that a lot of the definitions of innovation arose from several experts (Popa et al, 2010). Meanwhile, for innovation activities, OECD & Eurostat (2005), in the third Oslo Manual, defined them as scientific steps, which involve technology, organization, and finance as well as commercial steps, intended to implement innovation. As for the marketing measurements, innovation measurements can use items such as the introduction of new products or services (Manu and Sriram, 1996; Karabulut, 2015). Jimenez and Valle (2011) used items to enhance the products/services that already existed and changed the process introduced to stakeholders, including customers. Rajapathirana and Hui (2018) used items such as developing a product or original service, enhancing the value of the product or service, adding a new element into the product or service, and processing online interactions.

The e-commerce industry is different from traditional industries. Several factors distinguish it, as stated by Danaher et al., (2003); these factors are related to product information, risks, and the ability of the customers to buy the same product through the use of a personal shopping list. Katawetawaraks and Wang (2011) listed several of the factors that caused internet shopping to have been widely accepted, including customers getting more information, more choice, and making it easier to find what is needed. This is what has caused competition in the e-commerce industry to become tighter, because customers have the flexibility to compare offers from many e-commerce services in a short amount of time so that the

slightest difference encountered and felt by the customers will have a big effect. Instead of making radical innovations that can cost a lot and require other resources, e-commerce businesses can make simple innovations on their websites or smartphone applications. Some of the simple innovations in question can be related to the website or application, the methods used, and the services provided. For example, a simple innovation that can be done on a website or application is a change in its appearance, making it more attractive, informative, and more pleasing to the eye, even if only by the changing the color or layout. Innovations to the methods used, such as the registration and login methods, can be integrated with email and social media accounts. A more precise search method, according to the keywords used by the customers, also helps. While for services, the innovations that can be made include cash on delivery, paying after trying, free shipping, customer service and retailers more interactive, or by adding features to minimize the customers' risk, as well as changes and other improvements that can make the e-commerce web or application, as well as its services, better and more interesting.

In this study, the changes we meant earlier are for e-commerce innovation. The e-commerce innovation that we mean in this study is part of the scope of e-innovation in general. If the e-innovation only applies to all e-business, then e-commerce innovation is only focused on industrial commerce. The reason why we use the term e-commerce innovation is that we want to focus on innovation that is only done on one e-commerce website/application and its services, with a domain name that will be used forever. If there is an online-based company that innovates by creating new e-commerce services with different domain names, then we shall



not categorize them as e-commerce innovations. By adopting the opinion of Lan & Du (2002) which defined e-innovation as an activity that introduces new information technology (IT) based products to the e-business environment, we define e-commerce innovation as an activity that introduces new features, new methods, a new look, and new services, or the improvement of all these things on a website or e-commerce application based on information technology.

### *Service Quality and E-Service Quality*

Many studies stated that service quality is an antecedent of customers' satisfaction and customers' loyalty (Anderson et al., 1994; Gummerus et al., 2004; Rust et al., 1995; Zeithaml et al., 1996). Initially, service quality is intended to accommodate the service industry in the midst of a business era focusing on quality, also known as the era of quality (Peeler, 1996), whose measurement instrument (SERVQUAL) was developed by Parasuraman et al., (1985; 1988). The definition of service quality in this study refers to Asubonteng et al., (1996), who defined service quality as the difference, from the customers' perspective, between the expectations of the service they will receive and their perceptions after the service has been received.

In its development, SERVQUAL has been following the development of the service industry, especially in terms of measurement. Asubonteng et al., (1996), in their study, have summarized several different SERVQUAL dimensions used for service industries within different sectors, such as finance, education, health, trade, public utilities, and transportation sectors. Ladhari (2008) added several other service industry sectors, such as consulting, logistics, tourism, and internet retail. To measure the service quality, the dimen-

sions used must be in accordance with the characteristics of the industrial sector, as well as in the retail or e-commerce internet sector. When the dimensions of SERVQUAL are adjusted to the characteristics of the e-commerce industry, the term will be changed to e-service quality, which was first introduced by Zeithaml et al., (2001). Santos (2003) defined e-service quality as an overall evaluation carried out by customers, as well as the assessment provided in relation to the services offered on the virtual market. Gummerus et al., (2004) defined e-service quality as an evaluation by customers related to the process and quality of the results of their interactions with electronic service providers.

### *The Effect of E-commerce Innovation on Customers' Satisfaction and Loyalty*

Nowadays, customer needs are changing rapidly, which is indicated by the shorter life cycle of a product/service. For that, innovation can be the solution. By continuing to innovate, a company can be improving its products or services to meet its customers' needs. When the customers feel their needs are being met, this can increase their satisfaction. Furthermore, when each of these customer changes is always able to be fulfilled by a service provider through innovation, their loyalty to continue using the service will have been created or increased. In the literature, the effect of innovation in general on customers' satisfaction has been investigated by Nemati (2010), who reported that innovation affects customer satisfaction positively in the cell phone industry. Kurniawan et al., (2019) also reported that innovation affects customer satisfaction positively in the internet service provider industry, likewise in the retail

industry (Nanda et al., 2013). Unfortunately, in the literature, the effect of e-innovation on customers' satisfaction and loyalty is still rarely encountered. However, by referring to some of the studies above, it is reasonable to suspect that e-commerce innovation affects customer satisfaction positively.

Hypothesis 1: E-commerce innovation has a positive effect on online shopping customers' satisfaction.

Meanwhile, it is also known that only few pieces of literature have discussed the things related to the effect of innovation in general on customers' loyalty. Among the few studies that can be found, there is one by Lee (2011) who found that innovation has a positive effect on customers' loyalty in the mobile communications providers and smartphones service industry. However, the opposite results were obtained by Bersali and Guermat (2014), Dachyar and Hananto (2014), who found that innovation does not have a direct effect on customers' loyalty, but indirectly affects it if it is mediated by other customer variables, one of them being customer satisfaction. In other words, innovation creates greater satisfaction, and it also leads to increased customer loyalty. For this reason, this study re-examines the effect of e-commerce innovation on customers' loyalty, both the direct and indirect effects as mediated by customers' satisfaction.

Hypothesis 2: E-commerce innovation has a positive effect on online shopping customers' loyalty.

### *The Effect of E-Service Quality on Customers' Satisfaction and Loyalty*

The characteristics of online customers are different from traditional service customers. Online customers have the convenience

of comparing several online service providers at the same time, which causes online customers to be more sensitive to the service system offered. If there is a process failure in a service they are using, they become dissatisfied, causing them to immediately switch to another online service provider. Several studies have tried to see what the relationship is between e-service quality and customers' satisfaction and loyalty. The relationship of e-service quality with customers' satisfaction has been investigated by Carlson and O'Cass (2010), Chang et al., (2009), Lee and Lin (2005), who all found that e-service quality had a positive effect on customers' satisfaction.

Hypothesis 3: E-service quality has a positive effect on online shopping customers' satisfaction.

While many studies have found that traditional service quality has an effect on customers' loyalty (Dean, 2002; Ganiyu, 2016; Osman and Sentosa, 2013), several other studies have found that e-service quality had no effect on customers' loyalty (Chang and Wang, 2007; Chinomona et al., 2014; Sheng and Liu, 2010). Therefore, this study investigates whether customers' satisfaction can act as a variable mediating the relationship between e-service quality and customers' loyalty, as this role has been proven by several researchers, such as Santouridis and Trivellas, (2009) and Vunet al., (2013).

Hypothesis 4: E-service quality has a positive effect on online shopping customers' loyalty.

### *The Effect of Customers' Satisfaction on Loyalty*

Customers' satisfaction is trusted and widely recognized as one of the important

antecedent factors that can predict consumer loyalty. For consumers to be willing to continue to use the services or purchase repetition, they must first be satisfied. Moreover, if we expect the customers to be willing to give recommendations to others, their satisfaction has to be ensured. In the literature, the effect of customers' satisfaction on customers' loyalty has been proven by Deng et al., (2010), Hallowell (1996), Kandampully, and Suhartanto (2003) who found that customers' satisfaction was an important factor affecting their loyalty in a positive direction. Most of the previous studies have proven this. However, to re-examine this relationship in the context of e-commerce in Indonesia, we then developed the fifth hypothesis of this study as follows:

Hypothesis 5: Customers'satisfaction has a positive effect on the loyalty of online shopping customers.

*The Mediated Effect of Customers' Satisfaction*

As explained before, customer satisfaction and loyalty are two constructs that have a close and complex relationship. Therefore,

sometimes the two constructs are considered as one entity and cannot be separated. To make consumers loyal, they must first be satisfied, and with this satisfaction, the chances of consumers being loyal will also be higher (Hong and Goo, 2004). In other words, to create loyal customers, one has to satisfy them. Based on this thought, many studies have proposed customer satisfaction as a variable that can mediate the antecedent factors of loyalty that they examined, including service quality and innovation. Several studies reported that customer satisfaction is a mediating variable between service quality and customer retention/loyalty (Asnawi et al., 2020; Osman and Sentosa, 2013; Rizan et al., 2020). Other studies report that customer satisfaction is a mediating variable between innovation and customer loyalty (Kiumarsi et al., 2020).

Hypothesis 6: E-commerce innovation has an indirect effect on online shopping customers' loyalty, which is mediated by customers' satisfaction.

Hypothesis 7: E-service quality has an indirect effect on online shopping customers' loyalty, which is mediated by customers' satisfaction.

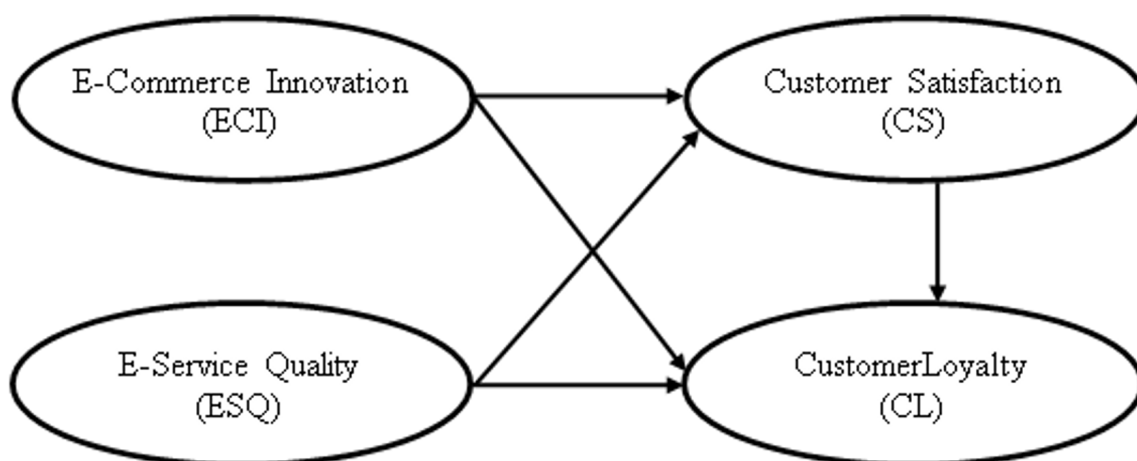


Figure 1. Conceptual Framework



## Method

### *Analysis Techniques*

The analysis was carried out using partial least squares structural equation modeling (PLS-SEM) with the help of SmartPLS 3.2.8 software. The structural equation modeling (SEM) method is a combination of factor analysis and regression or path analysis (Hox and Bechger, 1999). PLS-SEM is the most suitable technique for causal-predictive research (Garson, 2016), and evaluates how much the value of this research model affects other models' values (Han and Kim, 2019).

### *Construct Operationalization*

This research had four constructs, which were e-commerce innovation, e-service quality, customers' satisfaction, and customers' loyalty. Each construct was measured using a questionnaire consisting of several statement items, and each statement item used a 5-point Likert scale. For the e-commerce innovation construct, we focused on website/application changes/improvements, we chose several measurement items to be adopted for this study. These items were improvements to the methods used and faster operational process improvements, adopted from Karabulut (2015). In addition, we also modified new products items, as proposed by Jiménez and Valle (2011), and Manu and Sriram (1996) to introduce new things on the e-commerce website/application. We added the item proposed by Leelakulthanit and Hongcharu (2011) to measure the uniqueness of the e-commerce website, making it different from other e-commerce websites as the last indicator in the construct for e-commerce innovation.

E-service quality was measured by seven items (efficiency, reliability, fulfillment, privacy, responsiveness, compensation, and contact) taken from O'Neill et al., (2001), Parasurman et al., (2005), and Zeithaml et al., (2001). Customers' satisfaction was measured using overall satisfaction, fulfillment or confirmation of expectations, and complaints, taken from Gocłowska et al., (2019), Kristensen et al., (2000) and Yüksel and Rimmington (1998). Whereas the measurement of customers' loyalty used four items taken from Anderson and Srinivasan (2003), Bayraktaret al., (2010), Cowart et al., (2008), Kim et al., (2016), Lewis and Soureli (2006), which were willingness to repurchase, willingness to make purchases outside the product line, willingness to recommend products or services to others and customers' resistance to competitors' services.

### *Data Collection Method and Demographic Profile of Respondents*

Due to the unknown population size, Roscoe (1975) argued that a sample size of between 30 and 500 is appropriate for most studies. Furthermore, Siddiqui (2013) stated that in general, the sample size for structural equation models should be in the range of 200 to 400 samples. Thus in this study, it was determined that the sample size to be used would be 400. While for the sampling technique, this study used a non-probability sampling data collection method. The non-probability sampling method is a solution used in research where the population is not fully known (Bryman and Bell, 2012), as was the case in this study. Some non-probability sampling methods that can be used include quota, purposive, snowball, and convenience sampling (Saunders et al., 2012). In this study, we used the convenience/accidental sampling tech-

nique. Convenience sampling is a sampling technique for members of a population that can be easily found and reached by the researchers (Etikan et al., 2016).

We distributed questionnaires in collaboration with expeditionary couriers who deliver goods to customers who shop at online shops, and in total, we managed to collect 400 questionnaires that were completely and correctly filled in and were fit to be used. Table 1 summarizes the demographic profile of the respondents. Of the respondents 43% were men, and 57% were women. In terms of their age, most of the respondents were 21 to 30 years old (69% of respondents), and 22% of them were under 20 years old. Furthermore, 60% of the respondents were office workers or private employees, while 27% were students. For their monthly income 60% of the respondents had between US\$200 to

US\$400, and 28% have a monthly income under US\$200. Special note was made of the respondents who were still students, their monthly income generally came from their parents as a monthly expenditure.

## Results

### *Measurement Model Analysis*

Checking the fit of the measurement model was done by looking at the values for the convergent validity, discriminant validity, and construct reliability. The results can be seen in Table 2.

Construct reliability in PLS was measured from the value of the composite reliability in order to measure the reliability of the internal consistency. The use of composite reliability

**Table 1.** Demographic profiles of respondents.

Demographic variables	Category	Frequency	%
Gender	Male	174	43%
	Female	226	57%
	<b>Total</b>	<b>400</b>	<b>100%</b>
Age	Under 20	88	22%
	21-30	276	69%
	31-40	29	7%
	Over 40	7	2%
	<b>Total</b>	<b>400</b>	<b>100%</b>
Occupation	Entrepreneur	35	9%
	Government employees	2	1%
	Private employees	241	60%
	Student	106	27%
	Other	16	3 %
<b>Total</b>	<b>400</b>	<b>100%</b>	
Monthly household income	Under US\$200	113	28%
	US\$200 - \$400	240	60%
	Over US\$400	47	12%
	<b>Total</b>	<b>400</b>	<b>100%</b>

Source: Estimated Result

was more appropriate than Cronbach's alpha because composite reliability considers the differential weight of the indicator (Dijkstra and Henseler, 2015) while Cronbach's alpha

while any outer loading value of less than 0.5 must be removed from the research model (Hair et al, 2014). From Table 2, it can be seen that the outer loading value of all the

**Table 2.** Result of validity and reliability test.

Latent variables	Number of Indicators*	Composite Reliability	Convergent Validity (AVE)	Factor loadings
e-Commerce Innovation	4	0.800	0.501	0.654 to 0.753
e-Service Quality	4	0.789	0.556	0.697 to 0.753
Customers' Satisfaction	3	0.815	0.525	0.715 to 0.773
Customers' Loyalty	3	0.781	0.543	0.725 to 0.757

\*Final output (after removing several measurement items that have outer loading < 0.05)

Source: Estimated Result

does not. The required composite reliability value must be greater than 0.7 (Chin, 1998); in this study the composite reliability values obtained for all the constructs ranged from 0.781 to 0.815. This meant that all the values met the threshold. Meanwhile, the outer loading illustrated the absolute contribution of each item to its construct. An outer loading value of 0.7 or more is considered to be very satisfying, an outer loading value equal to 0.5 or more is considered acceptable,

indicator items for each construct was higher than 0.5, which meant that they met the criteria. For the convergent validity, shown by the average variance extracted (AVE) value, the values were required to be greater than 0.5 (Hamid et al., 2017). From Table 2, it can also be seen that all the constructs have AVE values greater than 0.5, so they met the requirements. Furthermore, from Table 3, it can be seen that the cross-loading value of each construct showed a greater variance

**Table 3.** Loadings and cross-loadings.

Item*	E-Commerce Innovation	Customers' Satisfaction	E-Service Quality	Customers' Loyalty
ECI1	<b>0.654</b>	0.308	0.282	0.306
ECI2	<b>0.722</b>	0.330	0.309	0.290
ECI3	<b>0.753</b>	0.393	0.285	0.276
ECI4	<b>0.700</b>	0.297	0.275	0.327
CS1	0.338	<b>0.715</b>	0.388	0.314
CS2	0.348	<b>0.773</b>	0.435	0.400
CS3	0.370	<b>0.748</b>	0.338	0.319
ESQ1	0.283	0.388	<b>0.753</b>	0.335
ESQ 2	0.312	0.378	<b>0.721</b>	0.382
ESQ3	0.336	0.360	<b>0.726</b>	0.451
ESQ4	0.239	0.389	<b>0.697</b>	0.320
CL1	0.296	0.307	0.382	<b>0.725</b>
CL2	0.257	0.379	0.411	<b>0.757</b>
CL3	0.382	0.340	0.350	<b>0.728</b>

\*Final output (after removing several measurement items that have outer loading < 0.05)

Source: Estimated Result

**Table 4.** Fornell – Larcker criterion analysis.

	<b>e-Commerce Innovation</b>	<b>Customers' Satisfaction</b>	<b>Customers' Loyalty</b>	<b>Quality e-Service</b>
e-Commerce Innovation	0708			
Customers' Satisfaction	0.471	<b>0.746</b>		
Customers' Loyalty	0.406	0.522	<b>0.724</b>	
E-Service Quality	0.423	0.465	0.517	<b>0737</b>

Source: Estimated Result

with its own size than with the size of other constructs (Gefen et al., 2003).

However, it should be noted that all the values in tables 2 and 3 were obtained after removing a number of indicators from the e-service quality construct, and customers' loyalty from the research model. This was because those items had outer loading values that did

er than the value of the correlation with the other variables. The results of the evaluation of the Fornell and Larcker criteria for this study can be seen in Table 4, which shows that each construct had a square root value of AVE that met the criteria. Meanwhile, the heterotrait-monotrait (HTMT) correlation ratio was proposed by Henseler et al., (2015) as a new approach to assess the discriminant

**Table 5.** Heterotrait-Monotrait Ratio (HTMT)

	<b>e-Commerce Innovation</b>	<b>Customers' Satisfaction</b>	<b>E-ServiceQuality</b>
Customers' Satisfaction	0.743		
E-Service Quality	0.592	0.802	
Customers' Loyalty	0.683	0.781	0.808

Source: Estimated Result

not meet the requirements, resulting in a low AVE value for both constructs. The items in question were efficiency, reliability, and privacy for the e-service quality construct, and customer resistance for the customers' loyalty construct.

Discriminant validity was used to measure the uniqueness of a construct and find what made it different from the other constructs, so that there would be no overlap between the constructs used. Discriminant validity can be evaluated using cross-loading indicators, namely using the Fornell and Larcker criteria as well as the heterotrait-monotrait (HTMT) correlation ratio. Fornell and Larcker (1981) proposed a criterion for evaluating discriminant validity which states that for each construct, the square root of AVE must be great-

er than the value of the correlation with the other variables. The value required must be below 0.9. Table 5 shows the HTMT scores for this study met the requirements.

### *Structural model analysis*

The structural model analysis was performed to evaluate the overall capability of each construct in explaining the endogenous variables. The evaluation of the structural model used was through the coefficients of determination (R<sup>2</sup>), effect size (f<sup>2</sup>), and predictive relevance (Q<sup>2</sup>); the results are summarized in Table 6. Meanwhile, a significant evaluation of the path is described in the next section.

From Table 6, it is seen that the R-Square value was 0.350 for the endogenous vari-

ables of customers' satisfaction and 0.343 for the endogenous variables of customers' loyalty. This shows that e-commerce innovation and e-service quality can affect customers' satisfaction by 35%. Customers' loyalty can be affected by e-commerce innovation, e-service quality, and customers' satisfaction by 34.3%. So, it can be concluded that the research model is in the moderate category.

cated the predictive ability of the model for the two endogenous latent variables (Garson, 2016). Q-Square indicates a predictive accuracy, which is means the structural model has a good ability to predict the endogenous construct (Hair et al., 2018) . If the R-Square and f-Square values were obtained from the PLS algorithm, then the Q-Square values were obtained using the PLS blindfolding approach.

**Table 6.** R Square, f Square and Q Square

	R Square	f Square			Q Square
		e-Commerce Innovation	E-Service-Quality	Customers' Satisfaction	
Customers' Satisfaction	0.353	0.124	0.203	-	0.185
Customers' Loyalty	0.347	0.042	0.119	0.039	0.175

Source: Estimated Result

Meanwhile, the value of the effect size or f-Square was found by following the criteria proposed by Cohen (1988); it is known that the e-commerce innovation variable has a medium effect on customers' satisfaction and customers' loyalty with values above 0.02 and below 0.15, as well as the e-service quality on customers' loyalty. Meanwhile, the effect of e-service quality variables on customers' satisfaction was high because the value was above 0.15 and below 0.35. From the results of the Q-Square test , it can be seen that all the Q-Square values are above 0, which indi-

### Hypotheses Testing

By using the bootstrap technique, the results of testing the research hypotheses are summarized in Table 7.

The PLS bootstrapping results showed that all the path coefficients were significant. The test results supported hypotheses 1 and 2 with path coefficients of 0.310 and 0.193 and p-values <0.01. This showed that e-commerce innovation had a positive effect on Indonesia's online shopping customers' satisfaction

**Table 7.** Result of hypotheses test

Hypothesis	Path	Coefficient	P value	T Statistics	Decision
Hypotheses 1	ECI → CS	0.310	0.000 ***	6.822	Supported
Hypotheses 2	ECI → CL	0.193	0.000 ***	3.792	Supported
Hypotheses 3	ESQ → CS	0.193	0.000 ***	8.706	Supported
Hypotheses 4	ESQ → CL	0.396	0.000 ***	6.232	Supported
Hypotheses 5	CS → CL	0.396	0.000 ***	3.583	Supported
Hypotheses 6	ECI → CS → CL	0.062	0.001 ***	3.230	Supported
Hypotheses 7	ESQ → CS → CL	0.079	0.001 ***	3.169	Supported

\*\*\* p <0.01 (all one-tailed).

Source: Estimated Result



and loyalty, which means every increase in the value of e-commerce innovation will increase the value of customers' satisfaction and loyalty. Likewise, for hypotheses 3,4 and 5, the results of the study supported these three hypotheses with path coefficients of 0.193, 0.396, and 0.396, with  $p < 0.01$ .

Meanwhile, to test the role of customers' satisfaction as a mediating variable, as stated in hypotheses 6 and 7, PLS bootstrap was also used. The results of which can be seen in the specific indirect effects section on the PLS bootstrap output. The mediation test results also supported hypotheses 6 and 7 with path coefficients of 0.062 and 0.079 and  $p$ -values  $< 0.01$ . Referring to Baron and Kenny (1986), it was known that the variable of customers' satisfaction partially mediates both hypotheses, because both the variable of e-commerce innovation, and e-service quality, have a direct effect on customers' loyalty.

## Discussion

Some important findings obtained from this study are explained in this section. The results show that the innovations on the e-commerce website/application are the factors that can be predictors of customers' satisfaction and loyalty. This is evidenced by the acceptance of H1 and H2, which state that e-commerce innovation affects customer satisfaction and loyalty. These results show that the reasons for users choosing the e-commerce brand in Indonesia include the interface's design and the helpful services offered. For this reason, the e-commerce industry players need to constantly innovate their websites/applications, such as by adding new services that can help the users. Some examples of these new services include adding features such as cash on delivery payment options, paying after trying, free shipping, or the free return of de-

fective goods. Furthermore, one of the goals of e-commerce innovation is to make it easier for the customers to use online shopping websites/applications, such as the ease of finding products, ease of purchase, and ease of transactions. In theory, the results of this study reinforce the idea that innovation is an antecedent factor of customers' satisfaction and loyalty, both in the e-commerce and conventional industries (Bersali and Guermat, 2014; Victorino et al., 2005; Diaw and Asare, 2018).

These results also support H3 and H4 and prove that e-service quality is the antecedent of customers' satisfaction and loyalty in the context of an online shop. The results of this study reinforce the notion that measuring service quality in the e-commerce industry cannot be done using conventional service quality indicators, but it should be done using e-service quality indicators (Herington and Weaven, 2009). Nevertheless, from the seven items of e-service quality indicators tested in this study, the results of the study found that only fulfillment, responsiveness, compensation, and contacts can measure e-service quality. A surprising result was that efficiency, reliability, and privacy were not given much attention by the online shopping customers in Indonesia. This could be due to the perception by online shopping customers in Indonesia that all the online shops have provided certainty for these three things, so they do not see a significant difference between the online shops they have used. These results are in line with the study of Rita et al., (2019) who stated that fulfillment is the most effective determining factor for improving the quality of web-based services. On the other hand, the results of this study contradict the study by Wolfinbarger and Gilly (2003) which stated that customer service is only slightly related to service quality.

Another important finding by this study is that customer satisfaction is an antecedent of customer loyalty, which supports H5. This study has proven that customer satisfaction also has an important role in creating customer e-commerce loyalty in Indonesia. In addition to having a direct effect on customer loyalty, the results of this study also found that customer satisfaction can mediate the effect of e-commerce innovation and e-service quality on loyalty (supporting H6 and H7), although there is only a partial mediation effect. It is also known that the predictions about e-commerce innovation and e-service quality for customers' satisfaction are more accurate (35.3%) than for customers' loyalty (34.7%). Other interesting findings are related to the construct of customers' loyalty. Among the four measurement items used to measure this construct, it is known that the customers' resistance to the attractiveness of the competitors is not suitable for use in measuring this construct. These results support the phenomenon of the low levels of loyalty shown by online shopping customers in Indonesia. This is certainly a challenge for the practitioners and online shopping managers in Indonesia.

## Implications

This result has implications for the practitioners and online shopping managers, as they need to be able to improve the quality and performance of their application/website. The website/application is a major asset for e-commerce industry players (Udo et al., 2010). Besides, the website/application for e-commerce is a conveyor of information for their users, as an initial impression of the services they offer (Than and Grandon, 2002). These reasons are why managers or online shopping industry players need to improve the performance and quality of their web-

sites/applications by continuing to innovate, because these factors will determine whether their customers will continue to search on their websites/applications now and in the future (Yang et al., 2005). Another reason why online shopping managers need to continue to innovate is that business competition will lead to a perfect market, indicated by intense price competition, which results in lower profit margins (Peterson, 1997). To be successful in this industry, managers are required to maintain their customers' loyalty.

The next thing that an online shopping manager can do is to provide clear information on their website, such as clear product information, clear price information, clear shipping information, clear seller information, and other information for consideration by customers undertaking transactions. In addition, the online shopping managers need to ensure that their retailers respond quickly if potential customers ask them something, as proof of their commitment to provide the best service for customers, because the results of this study show that online shopping customers in Indonesia are more concerned with the speed of response from direct sellers, as well as customer service that is always available when needed.

## Conclusion

The research question of this study was how have innovation and e-service quality affected customers' satisfaction and loyalty? The results of this study found that each innovation activity and service quality upgrade can improve it. The study's results show a significant positive effect of both constructs on customers' satisfaction; as well as on customer loyalty, both directly and through the mediation of customer satisfaction. The innovation activities refer to innovation activities that focus

on one e-commerce website and found that improvements to the methods used, improvements to make the operating process faster, new things being introduced, and creativity are items that construct e-commerce innovation. Meanwhile, for the service quality, this study uses measurement dimensions adjusted to the e-business environment, known as e-service quality. From the seven measurement items used, fulfillment, responsiveness, compensation, and contact are all feasible to be used to measure the construct of e-service quality. Likewise, for customers' loyalty, the results of this study found that measurement items including the willingness to repurchase, willingness to purchase outside of the product line, and willingness to recommend products or services to others are feasible to be used to measure the construct of online shopping customers' loyalty in Indonesia.

From the results, it is known that in the context of online shopping customers in Indonesia, it is actually easier to create customers' satisfaction than customers' loyalty. Although it has been mediated by customers' satisfaction, the effect of e-commerce innovation and e-service quality on customers' loyalty is still relatively small, characterized by the value of the path coefficient and p value both being small. This is due to the low level of respondents' approval of the question items in the construct of the customers' loyalty, especially the statement items related to the willingness to make purchases outside the product line and to recommend products or services to others. It is known that out of the 400 respondents who make purchases outside the product line, only 216 (54%) stated their agreement. Likewise, for the willingness to recommend products or services to others, 68% of the respondents stated their agreement to recommend products or services. Special attention needs to be given to the

statement items about customer resistance, to which only 41.25% of the respondents gave their consent, making this item unfit to be used for measuring customers' loyalty by this study. The results of this study reinforce the statement that satisfied customers do not guarantee they will be loyal (Singh, 2006), while the study of Storbacka & Lentinen (2001) found that 75% of customers who turned to new service providers said that they were very satisfied, with their previous service providers.

Thus the contribution of this study is related to e-commerce innovation, which is focused on an application or website. This is because the customers are more familiar with e-commerce applications/websites than they are with the providing company. So what happens is that consumers compare the e-commerce applications/websites, not the actual companies.

## Limitation

This study has several limitations which can also be used as input for further research. First, this study uses a sample that is limited to online shopping customers in Indonesia. Therefore, the research results may not be generalized to all online shopping customers in the world. For this reason, it is necessary for further research using a larger number of samples spread throughout the world to capture how the culture of each ethnic group could affect customer' perceptions of e-service quality (Brusch et al., 2019) and customers' loyalty (Hoare and Butcher, 2008). Second, this study uses, as the object of the research, online shopping retailers in Indonesia. So, to generalize the findings that we got, further studies need to be carried out to compare different countries, different genders, or different types of industries.

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**Appendix 1: Measurement indicators**

Variables (abbreviations)	Indicators (abbreviations)	References
E-commerce innovation (ECI)	Changing the method (ECI1)	Adopted and modified from: Manu and Sriram (1996); Jiménez and Valle (2011); Leelakulthanit and Hongcharu (2011); Karabulut (2015).
	Improving the operation's process (ECI2)	
	Creative (ECI3)	
	Introducing new things (ECI4)	
E-service quality (ESQ)	Efficiency (ESQ1)	Parasurmanet al. (2005); Zeithamlet al. (2001); O'Nielllet al. (2001).
	Reliability (ESQ2)	
	Fulfillment (ESQ3)	
	Privacy (ESQ4)	
	Responsiveness (ESQ5)	
	Compensation (ESQ6)	
	Contact (ESQ7)	
Customers' Satisfaction (CS)	Overall satisfaction (CS1)	Yüksel and Rimmington (1998); Kristensenet al. (2000); Bayraktaret al. (2010); Santouridis and Trivellas (2010); Gocłowska et al. (2019).
	Fulfillment of expectations (CS2)	
	Complaint (CS3)	
Customers' Loyalty (CL)	Repurchase (CL1)	Andreassen and Lindestad (1998); Anderson and Srinivasan (2003); Lewis and Soureli (2006); Cowartet al. (2008); Bayraktaret al. (2010); Denget al. (2010); Griffin (2010); Santouridis and Trivellas (2010); Wang (2010); Kimet al. (2016).
	Purchases outside the product line (CL2)	
	Recommendation to others (CL3)	
	Customer resistance (CL4)	

**Appendix 2: Questionnaire**

Construct	Wording	Mean	Std. Dev.
E-commerce innovation (ECI)	The online shop website/application I use has searching/ordering/payment methods which are better than the previous ones.	3.948	0.475
	Is better in every maintenance/update system.	3.825	0.569
	Is more creative than the previous one.	3.723	0.634
	Always introduces new things not presented before.	3.875	0.496
E-service quality (ESQ)	From the online shop I use, I can find what I need easily/quickly.	3.888	0.538
	From the online shop I use, I get what I order.	3.790	0.559
	The online shop I use provides services which match the information stated on the website/application.	3.400	0.601
	The online shop I use protects my personal information.	3.883	0.532
	In the online shop I use I get a good and fast responses from retail sellers when I chat or contact them.	3.550	0.564
	The online shop I use provides guarantees for problematic transactions.	3.625	0.574
Customers' Satisfaction (CS)	In the online shop I use, customer service is always available when I contact them.	3.428	0.584
	Overall I am very satisfied with the online shop I use.	3.788	0.498
	The online shop I use meets my expectations.	3.643	0.562
Customers' Loyalty (CL)	I do not have any complaints about the online shop I use.	3.770	0.507
	I will surely repurchase from the current online shop I use.	3.658	0.576
	If the online shop I use provides other services (ie. airplane tickets, payments services, or other), I will also purchase them from it when I need.	3.558	0.541
	I will recommend the online shop I use to others.	3.728	0.543
	I will not be affected by other online shops' promotions.	3.783	0.516