The Influence of Recommendation System Quality on E-commerce Customer Loyalty with Cognition Affective Behavior Theory

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ABSTRACT

The high number of internet users and the growth of e-commerce make it important for companies or businesses that provide e-commerce services to know the quality of their services to increase customer trust and loyalty. In addition, with the proliferation of e-commerce, there is more information related to available products, sometimes it also causes problems that users feel confused and frustrated to sort out information and make purchase decisions. In some e-commerce, there is already a recommendation system that makes it easier for users to make their choice. This study aims to find out what factors affect customer loyalty to Shopee e-commerce as well as test how much influence the quality of Shopee's e-commerce recommendation system have on customer loyalty with user trust as mediation variables. This research uses a quantitative approach using cognition affective behavior theory. Data collection in this study was carried out by distributing questionnaires through Google forms with purposive sampling techniques. A total of 356 respondents have participated in the study. The obtained data were analyzed with partial least squares – structural equation model (PLS-SEM). From the results of the analysis, seven hypotheses exist. All independent variables affect dependent variables. It was found that recommendation quality (RQ) can affect directly on the LO or indirectly through the trust mediation variable (TR).

1 Introduction

Popularity of e-commerce in Indonesia will tend to increase. Salma et al. (2021) explain that e-commerce users in Indonesia have experienced a high upward trend. In 2017, e-commerce users in Indonesia reached 139 million users, then in 2018 it reached up to 154.1 million users. Meanwhile, in 2019 e-commerce users in Indonesia were recorded at 168.3 million and are expected to reach 212.2 million in 2023.

The high number of internet users and the growth of e-commerce make companies or businesses that provide e-commerce services important to improve their quality for customer loyalty. According to research in China, studies regarding the evaluation of e-commerce have become an important topic (Kang et al., 2016). This is because an evaluation of the e-commerce quality has a great impact on sales growth and generates revenue from online marketing, e-commerce has also become the preferred form of transaction (Sulova, 2019).

With the proliferation of e-commerce, it is also easier for users to find information about the product they want to buy, but the amount of information available sometimes makes users feel confused and frustrated to sort out information and determine purchase decisions for a product (Abumalloh et al., 2020). There is a problem of excess information or information overload on e-commerce platforms (Bai et al., 2020; Chen, 2020), which will make users longer in making their choice in buying a product. In some e-commerce there is already a recommendation system that can

make it easier for users to make their choice. This recommendation system is a major component in online stores and e-commerce (Ebrahimi et al., 2019). Yang et al. (2016) mentioned that as an important part of e-commerce, the recommender system serves as a supporting tool in the decision-making process by providing appropriate recommendations to users.

Abumalloh et al. (2020) has investigated related to e-commerce in Arabia, namely analyzing how the influence of website quality, recommendation quality and transparency on customer loyalty with customer satisfaction and trust as mediating variables. The research used the cognition affective behavior (CAB) theory model. Related to CAB theory, Oliver (1999) argues that customer loyalty starts cognitively based on prior knowledge or experience-based information about brand attributes. According to him, it is called cognitive loyalty. After that the customer becomes loyal in the affective sense, and then the customer eventually becomes loyal in behavior (actual commitment to buy back).

Meanwhile, other similar studies have also been conducted by Nilashi et al. (2016). In the study, measurements were specific to two products, namely books and cameras sold on Amazon and Lazada e-commerce, and geographically carried out in Malaysia. Some researchers in Indonesia, for example Ardi and Yulisetiarini (2018), Afrelia et al. (2020), Wijaya et al. (2021), and Suci et al. (2020) have conducted research related to the effect of e-commerce websites and applications quality on customer loyalty. However, the research conducted by Ardi and Yulisetiarini (2018), Afrelia et al. (2020), Wijaya et al. (2021), dan Suci et al. (2020) only researching e-commerce related to the effect of its quality in general on customer loyalty and there are not many variables related to the recommendation system quality in e-commerce that have been studied in more depth.

In view of the above, this study examined the e-commerce recommendation systems quality in Indonesia that would provide an important contribution to the theory in this context. The study is focus on trust as a mediating variable between recommendation system quality and customer loyalty. The main purpose of this study was to build a theoretical model of observation in the form of factors to predict customer loyalty to e-commerce and to test how much influence the recommendation system quality on customer loyalty with user trust as mediating variables.

2 Research Framework

Various studies related to measurement of e-commerce quality and how this quality affects user customer loyalty have been carried out a lot. This study conducted using formulated CAB theory by Bagozzi (1992) and has been adapted by several researchers before (Abumalloh et al., 2020; Chen & Phou, 2013; Chiou, 2004; Kowalczuk et al., 2021; Kwon & Vogt, 2010; Lin & Wang, 2006; Safa & Solms, 2016; Thaichon & Quach, 2015; Yoon et al., 2013; Zhu et al., 2019). CAB theory has been widely used to study how customer loyalty is in using a traditional product or a system (Abumalloh et al., 2020; Bagozzi, 1992). This research uses several dimensions of recommendation system quality by Abumalloh et al. (2020) and Nilashi et al. (2016) to measure the quality of the recommender system in the e-commerce. Recommendation quality variable is in the cognition factor because these quality affects a person's reaction in daily activities in using e-commerce, and indicate the formation of human behavior (Safa & Solms, 2016). Meanwhile, this study uses trust as a mediating variable between recommendation quality and customer loyalty is in the affective factor because trust is emotional responses that can further affect behavior in this case loyalty (Bagozzi, 1992).

The main prerequisite of a positive user experience with a recommendation system is the quality of the resulting recommendation system (Abumalloh et al., 2020). Previous research (Abumalloh et al., 2020; Ebrahimi et al., 2019; Nilashi et al., 2016; Roudposhti et al., 2018) using accuracy, novelty, and diversity in assessing the quality of the recommendation system perceived by users. These three dimensions can affect users' perception of the recommendation system quality. The recommendation system quality is often considered an important factor for the formation of user trust attitudes (Ebrahimi et al., 2019; Nilashi et al., 2016). Therefore, Nilashi et al. (2016) asserts the recommendation quality has an influence on consumer trust because the higher the level of personalization felt.

- **H1**: Recommendation accuracy (RA) will positively affect perceived recommendation quality of the application (RQ).
- **H2**: Recommendation novelty (RN) will positively affect perceived recommendation quality of the application (RQ).
- **H3**: Recommendation diversity (RD) will positively affect perceived recommendation quality of the application (RQ).

H4: Recommendation quality (RQ) will positively affect trust (TR).

User satisfaction is considered the key to continuing the achievement of the online market and as an antecedent or trigger for the formation of loyalty (Cyr, 2008; Gull et al., 2020; Setó-Pamies, 2012). However, despite the fact that most of the loyal customers are satisfied customers, according to Setó-Pamies (2012) satisfaction cannot be universally translated into loyalty, satisfaction is one of the main antecedents of customer loyalty although it is not the only one. It is also supported in Yoon et al. (2013), in addition to customer satisfaction, the research conducted also showed that there is another factor that significantly affects loyalty, namely the recommendation quality. Then, the positive relationship of trust and loyalty has been confirmed in previous studies (Abumalloh et al., 2020; Afrelia et al., 2020; Cyr, 2008; Nilashi et al., 2016). Users who trust recommender systems are more likely to buy products from e-commerce and to adopt in the long term (Al-Taie & Kadry, 2014).

H5: Trust (TR) positively affects loyalty (LO).

H6: Recommendation quality (RQ) has direct effect loyalty (LO).

H7: Recommendation quality (RQ) has indirect effect on loyalty (LO) through trust (TR).

3 Research Method

3.1 Sampling

Based on a deep review of the literature, in this study using one of the nonprobability sampling techniques, namely purposive sampling. Purposive sampling is a method of sampling with a strategy in which the sample is selected deliberately according to certain criteria to provide important information that cannot be obtained from other parties (Taherdoost, 2018). Data collection lasted for approximately three weeks from November 9, 2022, to November 29, 2022. In this data collection, the minimum target number of respondents was 250 samples (Hair et al., 2017), with predetermined criteria, namely Shopee e-commerce users are at least 18 years old and a maximum of 40 years old. Based on the data collection process that has been carried out, a total of 367 respondents have filled out online questionnaires. Then data screening is carried out, so that a total of 356 data will be further analyzed.

3.2 Research Instrument

This research instrument uses a questionnaire consisting of two parts and is written in Indonesian. The first part is the respondent's demographic profile section which consists of several questions, namely e-mail, gender, education, age, province, and one question related to application use (frequency of use). The second section contains indicator statements about recommendation quality, trust, and loyalty. In detail as shown in Appendix 1.

Meanwhile, in this study using measurements with 5 (five) points of the Likert scale. Five alternative answers to each question, ranging from strongly disagree with the value of 1 (one), disagree with the value of 2 (two), neutral with a value of 3 (three), agree with the value of 4 (four), to strongly agree with the value of 5 (five).

3.3 Data Analysis

The data analysis used in this study was partial least squares – structural equation model (PLS-SEM) because the research community for quantitative research has recognized SEM to assess the relationship between independent variables and dependent variables in research models (Abumalloh et al., 2020; Nilashi et al., 2016). SEM combines the benefits of factor analysis, path analysis, and multiple regression analysis and establishes a robust methodology for evaluating relationships between variables (Abumalloh et al., 2020; Nilashi et al., 2016). In this PLS-SEM, there are two tests, namely the outer model and the inner model.

4 Results and Discussion

4.1 Demographic Analysis

Based on data from 356 respondents who filled out the questionnaire, the number of respondents to this study who were male was 92 people or 26% of the total 356 respondents. Meanwhile, the number of respondents who are female is 264 people or 74% of the total 356 respondents. This study was dominated by respondents with female gender, because usually women are more dominant in terms of online shopping transactions through e-commerce platforms, as explained in Abumalloh et al.

(2020), that the response from men is indeed lower when compared to women in online purchases. Meanwhile, in terms of age, the age of respondents to this study was dominated by users aged 18-22 years with a total of 231 people or 65% of the total 356 respondents. Users with ages in the range are mostly students or college students. Students or college students are usually used for internet surveys on a large scale because they are computer and internet users (Ozok et al., 2010). Students are also quite representative of online consumers because they are usually more familiar with electronic media and commercial transactions (Abumalloh et al., 2020).

Most of the respondents had the last education SMA / SMK with a total of 209 people from a total of 356 respondents. The next order is in the D4/S1 education group with a total of 128 people. Then for respondents with the last D3 education, there were 9 people. The level of education is quite decisive and represents online consumers because usually online consumers are more educated than traditional consumers (Abumalloh et al., 2020). Demographic profile of respondents shown in Table 1.

Table 1. Demographic profile of respondents

Respondent profile	Total	Percentage
Gender		
Male	92	26%
Female	264	74%
Age		
18 – 22 years	231	65%
23 – 27 years	40	11%
28 – 32 years	34	10%
33 – 37 years	25	7%
38 – 40 years	26	7%
Educational stage		
High school	209	58.7%
Vocational (D3)	9	2.5%
Undergraduate (D4/S1)	128	35.9%
Graduate (S2)	5	1.4%
Postgraduate (S3)	1	0.2%
Others	4	1.1%

4.2 Outer Model

The outer model test is also called the measurement model. The first test is convergent validity. An indicator is valid if the outer loading of each indicator has a minimum threshold of 0.7 (Hair et al., 2017). Table 2 presents the results of the initial calculation for convergent validity in all indicators. The 27 indicators in this study are all valid with outer loading values above 0.7.

Table 2. Convergent validity results

Indicator	Outer Loading	Information
LO1	0.735	Valid
LO2	0.726	Valid
LO3	0.734	Valid
LO4	0.756	Valid
LO5	0.777	Valid
LO6	0.790	Valid
RA1	0.783	Valid
RA2	0.837	Valid
RA3	0.834	Valid
RA4	0.819	Valid
RD1	0.734	Valid
RD4	0.808	Valid
RD5	0.820	Valid

Indicator	Outer Loading	Information
RN1	0.775	Valid
RN2	0.858	Valid
RN3	0.803	Valid
RQ1	0.761	Valid
RQ2	0.786	Valid
RQ3	0.726	Valid
RQ4	0.821	Valid
RQ5	0.785	Valid
RQ6	0.746	Valid
TR1	0.805	Valid
TR2	0.780	Valid
TR3	0.832	Valid
TR4	0.821	Valid
TR5	0.798	Valid

The next convergent validity test for each of these variables is carried out with the AVE criteria on each variable having a minimum value of 0.5, so that a variable can be said to be valid (Hair et al., 2017). The results of the convergent validity test with the AVE value of six variables have been valid with an AVE value of more than 0.5. The next test is discriminant validity using the Fornell-Larcker criterion, i.e., the square of the AVE of each variable must be greater than its highest correlation with other variables. The results of the study in Table 3 show that all variables in each of their respective variables have a higher AVE square root value than these variables against other variables and can be said to be valid.

Table 3. Result of the Fornell-Larcker criterion

	LO	RA	RD	RN	RQ	TR
LO	**0.756**					
RA	0.507	**0.818**				
RD	0.584	0.568	**0.789**			
RN	0.489	0.657	0.584	**0.813**		
RQ	0.714	0.677	0.709	0.654	**0.771**	
TR	0.753	0.541	0.584	0.580	0.740	**0.807**

Note: The grey shaded areas show that the variables in each of their respective variables have a higher AVE square root value than these variables against other variables.

The study also tested reliability using two criteria, namely Cronbach's alpha and composite reliability, both of which must meet the minimum threshold of 0.7 (Hair et al., 2017). Based on Table 4, overall, the variables in this study are reliable or consistent because they have Cronbach's alpha and composite reliability values above 0.7.

Table 4. Reliability Test Results

Variable	Cronbach's Alpha	Composite Reliability	Information
Loyalty (LO)	0.847	0.887	Reliable
Recommendation Accuracy (RA)	0.836	0.890	Reliable
Recommendation Diversity (RD)	0.701	0.831	Reliable
Recommendation Novelty (RN)	0.742	0.853	Reliable
Recommendation Quality (RQ)	0.864	0.898	Reliable
Trust (TR)	0.866	0.903	Reliable

4.3 Inner Model

The model fit test was carried out in this study to find out how well the research model was used and to avoid model specification errors. The model of this research used has been considered good fit because it meets the four criteria, namely the SRMR value in the model has been less than 0.08 (Hu & Bentler, 1998) i.e., 0.057. As for the value RMS_{theta} on the model is 0.102 and already meets the criteria (<0.12) (Henseler et al., 2014). Then for the Euclidean and Geodesic values have also met the criteria (<95) (Dijkstra & Henseler, 2015), indicated by the d_ULS value is 4.406 and the d_G value is 1.488.

In this study also used the R^2 values to evaluate structural models. R^2 value is in the range between 0 to 1, with higher rates indicating the strength of the prediction model being higher. This research investigates customer loyalty, hence the value of R^2 by 0.2 is classified as high (Hair et al., 2017). In this study, the value of R^2 varied with a range of 0.514 to 0.660, while the value of R^2 in the loyalty variable was 0.660, and it was interpreted that the loyalty variable had a high level of predictive model strength. Meanwhile, the value of R^2 in the recommendation quality variable is 0.637 then the variable also has a high level of predictive model strength, and so on, until the trust variable has an R^2 value of 0.547 in the power level of the high prediction model. Table 5 shows the results of the calculation of values R^2.

Table 5. Result of R^2 value

Dependent Variables	*R Square*	Information
LO	0.660	High
RQ	0.637	High
TR	0.547	High

Next, there is path coefficient test which shows the strength of relationships between the variables in research model. The strength of this relationship is in the range between -1 to +1. Based on Table 5, the strongest positive relationship is between recommendation quality and trust with a value of 0.740. Meanwhile, other independent variables also have a positive relationship to the dependent variable indicated by the original sample coefficient path value in Table 6. Next, to test the significance and relevance of a coefficient, bootstrapping is applied to check the value of t and the value of p at the same time for hypothesis testing. In this study using a two-tailed test with a critical value of 1.96 (significance level = 5%). When the empirical t value is greater than the critical value, then the coefficient is statistically significant at a certain probability of error, and the hypothesis is accepted if the p value <0.05 (Hair et al., 2017). The results of the calculation of the value of t and the value of p can be seen in Table 6.

Table 6. Results of path coefficients, t statistics, and p values

Hypothesis	Relationship	Original Sample (O)	t Statistics	p Values	Information
H1	RA → RQ	0.302	5.802	0.000**	Accepted
H2	RN → RQ	0.216	3.510	0.000**	Accepted
H3	RD → RQ	0.411	8.555	0.000**	Accepted
H4	RQ → TR	0.740	26.877	0.000**	Accepted
H5	TR → LO	0.390	6.782	0.000**	Accepted
H6	RQ → LO	0.243	4.622	0.000**	Accepted
H7	RQ → TR → LO	0.288	6.470	0.000**	Accepted

Note: Significant at p** <0.01, p*<0.05.

Regarding the quality of recommendations, the results showed that recommendation accuracy would positively affect the perceived quality of the recommendation system and the relationship was statistically significant (**H1 accepted**). These result is consistent with previous research that the accuracy of items generated from the recommendation system will affect the quality of the recommendation system perceived by users (Abumalloh et al., 2020; Nilashi et al., 2016). Users would feel the quality of the recommendation system is getting better if the products recommended on an e-commerce application are more accurate. From the results of the study, users feel that the

products recommended in the e-commerce application are accurate if the product items match and match their interests. When the recommendation system can accurately predict user preferences, the better the level of personalization felt by the user, so that it will have an impact on a feeling of satisfaction with the perceived quality of the recommendation system.

Based on the findings of this study, it can be interpreted that recommendation novelty will positively affect the quality of the recommendation system or recommendation quality that is perceived, and the relationship is statistically significant (**H2 accepted**). The result of this study is the same as those found in the study conducted by Ebrahimi et al. (2019). The better the novelty or novelty level of product item suggestions generated from the recommender system, it will trigger users to feel the good quality of the recommender system in an e-commerce application. Product item suggestions generated from a recommender system must be new, interesting, and beyond user expectations, but the suggested product items remain familiar according to their interests. This is because if the resulting recommendations have a low level of novelty, these items may not be appropriate to help users understand the choice and find new types of products.

Next, the results of the recommendation diversity study will positively affect the quality of the recommendation system or recommendation quality felt by users and the relationship is statistically significant (**H3 accepted**). The result of this study is in line with the research conducted by Roudposhti et al. (2018) that the diversity resulting from the recommender system affects the quality of the recommendation system perceived by users. If the product items recommended by the recommender system have similarities or similarities with each other, then they may not be appropriate to help make it easier for users to make their choice or may be considered too monotonous. The results of this study show that users feel that they agree to get suggestions for diverse, assorted, and varied product items. Therefore, it can be concluded that diversity, variety, and variety of product items are needed in the recommendation system because the more diverse the recommendations produced, the better the quality of the recommendation system felt by users of e-commerce applications.

Recommendation quality will also positively affect user trust and the relationship is statistically significant (**H4 accepted**). The result of this study is supported by previous research (Ebrahimi et al., 2019; Nilashi et al., 2016) that the quality of the recommendation system perceived by users affects the user's trust in using e-commerce applications. A recommender system that can help users, provide relevant recommendations, and suggest the type of goods preferred by users will make users have confidence in e-commerce applications because the recommender system provides suggestions according to user interests and preferences. If the quality and performance of this recommendation system is getting better, then users will feel confident that the recommendation system in this application is credible so that users can rely on the recommender system to successfully complete their online shopping transactions. So, it can be concluded that the trust of users depends on the quality of the resulting recommendations.

Trust also positively affects loyalty, and the relationship is statistically significant (**H5 accepted**). The result of this study is in line with previous studies (Afrelia et al., 2020; Ebrahimi et al., 2019; Nilashi et al., 2016), that a user's trust affects his loyalty in using e-commerce applications. Users who trust a product will tend to use and adopt the product sustainably in the long run. Just like satisfaction, it is also caused because trust is an emotional response that can further influence user behavior. From the results of the study, it shows that users feel confident in the performance and quality of an application is good, then the user will reuse the application with high intentions in the future and have the intention to recommend the application to others.

Research that has been conducted shows that the quality of the recommendation system has a direct positive effect on loyalty and the relationship is statistically significant (**H6 is accepted**). The result of this study is in line with previous research that the quality of recommendations can directly affect loyalty (Yoon et al., 2013). If the quality of the recommendation system in this e-commerce application is getting better, then customer loyalty will also increase. The quality of this recommendation system is felt well by users because it generates recommendations suggestions for relevant product items and can help users to complete transactions, that way users will have the intention to reuse e-commerce applications to shop continuously because they have been recommended a product by the recommender system. The quality of this personalized recommendation system increases customer loyalty by reducing product evaluation and search costs.

In addition to having a direct effect on loyalty, this study also shows that the recommendation system quality has an indirect effect on loyalty through the trust mediation variable and the relationship is statistically significant (**H7 accepted**). Trust mediation variables play a partial

mediation role in supporting the relationship between recommendation system quality variables and loyalty. The result of this study is in line with several researchers who found that trust acts as a mediating variable between the quality of the recommendation system and loyalty (Abumalloh et al., 2020; Ebrahimi et al., 2019; Roudposhti et al., 2018). High recommendation quality will increase user trust, while user trust will grow loyalty. From the results of the study, users who have trust triggered by the quality of a good recommendation system, will tend to reuse an application to support their online shopping activities because they feel helped by the recommendation system. Users love a recommendation system that provides items that are new, diverse, and accurate to their interests.

The existence of mediating variables in this study is in line with CAB theory (Bagozzi, 1992) that recommendation system quality which is an aspect of cognition shows the factors of the formation of human behavior and can affect a person's emotional reaction in daily transaction activities or also called affective in this case user trust, it will also affect the behavior of sustainable users or behavior in this case shown by the loyalty of customers who do repurchase and continue to use e-commerce apps for shopping.

5 Conclusion

Of the seven hypotheses, so it can be concluded that the factors that affect customer loyalty to Shopee e-commerce are recommendation quality which consists of recommendation accuracy, recommendation novelty, and recommendation diversity. Then, trust also affects loyalty. Recommendation quality affects loyalty directly while also indirectly affecting loyalty through trust mediation variables.

The results of this study show that there are variables that mediate between the relationship between recommendation quality to loyalty, namely trust. Trust affects loyalty with a slightly greater influence. Trust plays a partial mediation role in supporting the recommendation quality and loyalty relationship. The existence of this mediation relationship can occur because a user will feel first in the cognitive aspect how the quality of application services and recommendation systems in e-commerce which then has an impact on affective reactions, namely trust so that loyalty arises as their behavior. Companies can consider the recommendations of the factors raised in this study in increasing customer loyalty. The company can provide product item suggestions from a more accurate, new, and assortment recommendation system while still according to user preferences and interests. This can make users feel helped in choosing products so that they can complete their purchase transactions easily. The convenience felt by users will make users more trusting, thus affecting the loyalty of use to this online shopping application.

6 Appendices

Appendix 1. Research instrument

Variable		Statements	Reference
Recommendation Accuracy (RA)	1.	The items recommended to me match my interests. (RA1)	(Abumalloh et al., 2020; Nilashi et al., 2016)
	2.	The recommender system gave me good advice. (RA2)	(Abumalloh et al., 2020)
	3.	I found a lot of interesting items recommended by the system to me. (RA3)	(Nilashi et al., 2016)
	4.	I am interested in the items recommended to me. (RA4)	(Abumalloh et al., 2020)
Recommendation Novelty (RN)	5.	The items recommended to me are new and interesting. (RN1)	(Abumalloh et al., 2020)
	6.	This recommender system helped me find new items. (RN2)	
	7.	I can find familiar items through the recommender system. (RN3)	(Abumalloh et al., 2020; Nilashi et al., 2016)

Variable	Statements	Reference
	8. This recommender system recommends items to me that are beyond my expectations. (RN4)	(Nilashi et al., 2016)
Recommendation Diversity (RD)	9. The items recommended to me are diverse. (RD1)	(Abumalloh et al., 2020; Nilashi et al., 2016)
	10. The items recommended to me are not similar to each other. (RD2)	
	11. The items recommended to me are similar to each other. (RD3)	(Nilashi et al., 2016)
	12. The items recommended to me are assorted and varied. (RD4)	(Abumalloh et al., 2020; Ebrahimi et al., 2019)
Recommendation Quality (RQ)	13. I am always happy when I get recommendation items from the recommender system on the Shopee app. (RD5)	(Abumalloh et al., 2020)
	14. Recommender system suggestions are helpful. (RQ1)	(Ebrahimi et al., 2019)
	15. Recommender system suggestions are particularly relevant. (RQ2)	
	16. I became interested in a particular product after being suggested by the Shopee app. (RQ3)	
	17. I like the items suggested by the Shopee app. (RQ4)	(Abumalloh et al., 2020)
	18. Shopee application suggests the type of goods I like. (RQ5)	
	19. I feel that item suggestions help me decide what to buy. (RQ6)	
Trust (TR)	20. Recommender system is trustworthy. (TR1)	(Abumalloh et al., 2020; Nilashi et al., 2016)
	21. I feel this recommendation system is credible. (TR2)	
	22. This recommendation system can be relied upon to successfully complete purchase transactions. (TR3)	
	23. I can trust the performance of this recommender system to be good. (TR4)	(Abumalloh et al., 2020)
	24. This recommendation system is reliable for my online shopping. (TR5)	
Loyalty (LO)	25. Chances are I'll be back in e-commerce with this recommender system. (LO1)	
	26. I recommend that others use the recommendation system on e-commerce. (LO2)	(Abumalloh et al., 2020; Yoon et al., 2013)
	27. My preference for e-commerce with a recommendation system will not want to change. (LO3)	
	28. I will buy the recommended items if I have the opportunity. (LO4)	(Abumalloh et al., 2020)
	29. I have a high intention to buy the goods recommended by the recommender system. (LO5)	(Nilashi et al., 2016)
	30. I intend to continue using e-commerce with this recommendation system to buy in the future. (LO6)	

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