

THE INFLUENCE OF BIG DATA RECOMMENDATION: AN APPROACH ON E-LOYALTY OF E-GROCERY BUSINESS

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ABSTRACT

As the number of conventional grocers transformed as e-grocers, which makes customers much more comfortable purchasing online groceries. However, e-loyalty always becomes a challenge for e-grocers; thus, it's a crucial thing to have understanding about e-loyalty of Indonesian's customers are formed. The main objective of this research investigates big data recommendation, e-tailing quality, and e-satisfaction that affect customer intentions to form e-loyalty of e-grocery business in Indonesia. A quantitative method as an empirical research was conducted using an online survey from major cities in Indonesia who have shopped at least twice at any e-grocers as analysis units were obtained. This research has a contribution to understanding the drivers of e-loyalty in the e-grocery business; also, e-grocer management can focus on the e-grocery platform by providing the best quality design, security, product availability and customer service.

Keywords

big data recommendation; e-grocery; e-loyalty; e-satisfaction; e-tail quality.

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Introduction

Nowadays, the grocery retail business evolution has increased significantly with ease of internet connection, and as consumers have used mobile and smart devices a lot [1], that causes a tremendous transaction increment in the digital world. The development of modern retail is characterized by the widespread use of cellular technology, fast internet connectivity, and contactless technology [2], including grocery business. The existence of this new atmosphere has encouraged conventional grocery retailers to redefine their business practices and enable consumers to shop in different ways. Since the risen of e-commerce in Indonesia, which added to the convenience of shopping through mobile devices, the ease of payment and the application of the latest technology make a new competition that can threaten business supremacy that has long been held by conventional retail business. Grocery retail business emphasizes its capability to renew by implementing industry 4.0, such as big data recommendation [3] and transformed as an e-grocer as well. Due to this easiness then no customers lean on a particular e-grocer. Customers can visit any of the e-grocers to browse many of product catalogs, do price comparison,

and purchase products [4]. Many grocery businesses became as a e-grocers and developed new business models to challenge conventional grocery retail.

Indonesia is part of the top five countries in the world that has a high e-grocery shopping growth rate of 30% [5]. People's purchasing power is good enough so that people start to switch from shopping at a conventional store to e-grocery. However, e-grocery business is at an emerging stage in Indonesia; even some people from major cities in Indonesia, such as Greater Jakarta, Surabaya, Medan, Bandung, and Denpasar already purchased e-grocery. However, people still need more time to familiar with this business model. Moreover, many big e-grocers in Indonesia still operate in the red. They face difficulties to retain online customers as part of e-loyalty because customers can easily compare the products and abundance of buying options. A condition of customers who are reluctant to revisit and repurchase through the same e-grocer can be classified as infidelity [6][7]. Therefore loyal customers are needed so that business activity can run well and as it should. Business activities must be able to provide the best service for its loyal customers so that in the end, the business activity can survive and be able to develop in the face of

heavy competition. Customer loyalty does not only occur in conventional business activities also occur in online businesses or known as e-loyalty. Supporting factors are needed to reduce the disloyalty of customer spending on e-grocery. E-grocers must be able to create e-satisfaction conditions that focus on customer service holistically to achieve and maintain e-satisfaction that should be suspected as one of the keys success for e-grocers to survive in a very competitive business environment [8]. In addition to this, to get a high level of e-satisfaction, e-grocers must be able to provide high-quality services that will bring their benefits to customers[9]. Furthermore, e-tailing sites must provide a good quality of design, systems, security and excellent customer service as the initial factors of success in maintaining e-satisfaction that leads to e-loyalty[10]. Big data becomes an phenomenon on industry 4.0 these days because can assist consumers in selecting products sold on the e-tailing platform[11]. Every company from all lines of business must face significant changes in the way they manage their business, manage their customers, and manage their business models due to the data-based revolution in management [12]. The future technology that is currently available is big data and has attracted the attention of many businesses because of its ability to provide high-value data. Big data recommendations in the digital economy are instrumental in generating data. However, it cannot always be interpreted and analyzed for the benefit of the company in providing convenience to customers [13]. The big data analysis process can encourage business intelligence to become useful knowledge to be able to provide certain preferences and recommendations for customers.

Theoretical Background

Worldwide, researchers have investigated their interest in e-grocery [14][15][16][17][18][19] where most of the e-groceries are transformed from conventional or combination. Platform quality, or e-service quality or e-tail quality be an influencing factor determining the purchase

process in the online business [10][20][21][22][23]. Some grocery retailers have tried to gain a competitive advantage by involving their consumers who are willing to buy grocery needs through online channels [24]. The relationship between e-loyalty and e-tailing quality mediated by e-satisfaction has been discussed in many previous studies, but the only limited research that combines big data recommendation, especially as moderation effect. Associated with e-tailing site, customer needs a personalization of UI (user interface) and product offerings. And regarding big data recommendation in e-grocery then researchers have acknowledged that big data as part of industry 4.0 has an important role in e-service quality [11][25][26][27][28]. Accurate data from shopping history and customer activity is crucial and is needed to be able to provide the best to consumers[25]. Therefore, this research would like to investigate big data recommendation, e-tailing quality, and e-satisfaction that affect customer intentions to form e-loyalty of e-grocery business in Indonesia.

2.1. e-Tailing Quality

In some studies stating that retail is a part of service quality which defined as perceptions of consumers about the differences that exist between perceived service and expected service[29]. SERVQUAL which consists of physical evidence, reliability, responsibility, guarantee, and empathy to measure the perceptions and expectations of consumers of a service[30]. Associated with the use of the internet as a medium of commerce, this scale has also been used to determine the quality of service[31][32][33][34][35]. The next step is service quality becoming electronic service quality (e-service quality) refers to website services through an internet connection that allows customers to make transactions to buy and send products and services efficiently and effectively where customers rely on technology digital information [36].

Table 1. Reasons for e-tailing quality is essential for e-grocery business.

Ref	Countries	Comments
[10]	USA	Further research on SITEQUAL and can empirically prove the scale needed where it can support the creation of e-satisfaction and e-loyalty.
[20]	USA	Clear and comprehensive explanation about the important role of e-service quality.
[21]	USA	Modeling related to cross-cultural e-loyalty design through a web site in the form of navigation design, visual design, and information design.
[22]	USA	Develop an empirically tested model of e-Service Quality for consumers who have shopped online but rarely shop again. The dimensions of this model follow ETailQ, namely, website design, fulfillment, customer service, and privacy.
[23]	India	Continuing research refert to [2] related to e-satisfaction and e-loyalty and it was empirically tested with samples in India.

Basically, e-service is a two-way process where an e-tailing platform offers customers custom products and services that refer to information collected. Moreover, e-service transactions and e-fulfillment of customers can be done through information exchange in e-tailing platform[37]. The further concept of e-service is a service where the primary value exchanged is information[38]. Meanwhile, the access to information so that it can be followed up makes the e-commerce

platform more profitable when compared to physical store commerce due to the many activities such as workforce requirements or retailer performance being more successful due to the use of digital information technology including the web and mobile devices as part from e-service[39][40]. Furthermore, to measure the reliability of e-tailing quality, it is necessary to have a difference in scale with the quality of e-service.

Table 2. The scale of e-tailing quality.

Scales of Quality	Definition
Design	customer experience related to the site, personalization, browsing, product search, product selection, and order completion.
Fulfillment	accurate product descriptions so that customers receive what they are looking for, including providing products on time.
Privacy/Security	regarding security in payment systems and privacy when sharing information.
Customer Service	Regarding responses, assistance and answering customer questions.

The four factors that have been identified by [10] consist of design quality, fulfillment quality, privacy/security quality, and customer service quality. Furthermore, [40] considers the measurement of e-tailing platforms, where e-grocery is part of it, such as web sites, mobile web, and mobile apps. Also, customer service experiences significant factors in shaping e-service quality. Whereas [41] argues that the e-

tailing quality scale should be the first reliable psychometric scale and focuses on the quality of e-tailing platforms and generalized for use in a diversity of products and services. Along with advances in the field of digital information technology, the dimensions related to the quality of e-tailing are also experiencing further development. The factors that shape the quality scale of e-tailing with other variables provide a comprehensive understanding of the formation of

e-satisfaction, which ultimately leads to the formation of e-loyalty [40] [42] [43]. Moreover, [23] reformulated the quality dimensions of e-tailing, which consisted of web page display layout, web page information, customer service, compliance, and privacy/security, where this remained in line with the information system success model [44].

2.2. e-Satisfaction

Basically, satisfaction is a summary of the psychological state that results when emotions are following expectations coupled with consumer feelings for previous experience. From a consumer's perspective, satisfaction is probably best understood as an ongoing evaluation of the surprises inherent in obtaining a product and/or shopping experience [55]. At the same time, e-loyalty can be defined as customer satisfaction with previous purchasing experiences through digital channels or e-tailing platforms [56]. The rapid advancement of digital information technology that has existed since the beginning of web 2.0 has provided some digital platforms for e-grocers to interact with consumers directly. To achieve the best results, e-grocers must consider many effective media to be able to reach consumers as their target and what message is to be conveyed. The rapidly changing business environment requires a dynamic approach to staying competitive. The internet and digital information technology are revolutionary technologies that have an impact on the retail sector because they can reduce operational costs so that they are profitable and beneficial for consumers because of the ease of use and price transparency. With the price transparency displayed on the e-tailing platform, it increases competition among e-grocers; hence, the price power has shifted from producers to consumers, thus forcing e-grocers to adapt their business activities as a reflection of consumer needs [57].

E-tailing platform plays an active role in producing a pleasant shopping experience to

create e-satisfaction [58]. Also, [59][60] that past shopping experiences, advice from peers, and information from e-grocer competitors can shape consumer expectations. In the end, consumers compare the expectations that exist between shopping at physical outlets or through the e-tailing platform so that consumers can make a correct assessment of e-satisfaction to themselves [57]. Dissatisfied customers tend to look for information to other options and often end-up accepting offers from competitors compared to customers who are satisfied when transacting in e-tailing platforms. Disgruntled customers tend to reject e-grocer efforts in an update to develop a closer relationship so that dissatisfied consumers are likely to take steps to reduce dependence on an e-grocer, and dissatisfied consumers will likely think twice to make transactions on the same e-tailing platform [56]. e-grocers must provide the best service to meet customers' expectations when they go shopping for the first time and the second time. Enjoyment is a consistent and robust precedent of a positive attitude towards shopping online. The more customers enjoy experience online shopping, then the positive outlook that shows by customers can be increased; hence, the possibility of creating e-satisfaction is higher [61].

2.3. Big Data Recommendation

Data is something that can be recorded in a relational database and a non-relational database semantically and pragmatically. Semantics requires a data record that is understood as a statement of true or false. Pragmatics suggests that we prefer to record what appears to be concrete facts, and the recording that is interpreted is a true statement [45]. Human knowledge about data or what constitutes data can also be wrong. Therefore the data is hypothetical, and data are usually collected using instruments, measuring instruments, and sensors [46].

Table 3. Reason big data recommendation is important in e-grocery business

Ref	Countries	Comments
[25]	USA	Empirical research that customers need to personalize their platform appearance and product offerings. Accurate data from shopping history and consumer activity is crucial and is required to be able to provide the best for customers.

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|------|--------|---|
| [26] | USA | Empirical research that data from e-tailing sites can provide consumers with personalization in the form of preferences and recommendations. Data from social media can be collected and feedback for e-tailers so that services to consumers can be improved. |
| [27] | USA | Empirical research by dividing big data variables into five scales, which are customer, product, location, time, and channel. This can assist e-grocers in providing optimal services at more competitive prices based on customer type, product, location, time, and purchase channel. |
| [28] | Global | Empirical research proves that the system can offer trending products base-on auto learn from products that are often sought by customers; thus, Metasearch is also useful to assist customers in product synonyms, suggestions, auto-complete, and correction. |

There has been a change in the approach to sales and the creation of a competitive market where the market is affected by an increase in the amount of supply, has made consumers as real market rulers so that it takes the development of the utilization of big data to the next level known as ML (machine learning) [47]. Moreover, [48] states that the use of the PPS (Product-Service-Systems) method which is a method of machine learning has helped e-tailers to offer products and services to customers as expected to have become one of the critical factors for success in the market. Many data that can be obtained by e-tailers through various sensors-contained in each device can provide a valuable source of knowledge for e-grocers about the use of products by consumers, along with hopes and complaints. Related to big data, then [27] develops a scale which are:

- i) Customers means the ability of e-grocers to track consumers and link transactions from time to time because technological capabilities, thus, e-grocers can conduct data analysis and useful for marketing with limited amounts of data [49] and this can be used in loyalty programs [50][51] Thus, e-grocers can monitor consumers to provide the best offer and service. It helps e-grocers to understand consumers easier.
- ii) Product is information related to stock and product attributes such as size, taste, and others. The data is beneficial for e-grocers

to have product information, both dynamic and far more descriptive, allowing for a more considerable variation of the targeted product varieties; therefore, at-the-end will enable e-grocers to get an understanding sold product.

- iii) Location can be processed using big data, and it can find-out the spatial location of customers [52], which helps e-grocers to increase marketing effectiveness by providing various offers based on consumer location. In fact, when a customer's geo-spatial location is tied to a CRM database (Customer Relationship Management), e-grocers can access customer's shopping history and point to the nearest store.
- iv) Time is part of a consumer shopping history where there is a database containing consumer data connected to their purchases [53] so that e-grocers know the ongoing measurement of consumer behavior, product stock, displays in the e-tailing platform and existing demographic data.
- v) Channel is an access point for consumers to shop for e-grocery needs. Access point data helps e-grocers to understand, track, and map the journey of consumers across various touch access points and better allocate marketing budgets to channels that are widely accessed by consumers [54].

There is a positive impact to consumers related to personalized services.

2.4. e-Loyalty

Customer loyalty in every business transaction through an online channel in the form of an e-tailing platform is something that must be maintained and preserved by every business actor which is one of the strategies of business actors to be able to survive and achieve sustainable success in market competition [62][63]. Customer loyalty is a crucial factor for profit and long-term growth for retail companies. Despite the rapid growth and popularity of the e-tailing platform, there are still many retail companies that have difficulty gaining customer loyalty and trust [64]. The intention of customers to do repetitive activities such as visiting online stores and conducting repurchase transactions is part of e-loyalty [65][66]. There is a slight difference between customer loyalty and loyalty (customer e-loyalty, which refers to customer loyalty done through online channels. [67] This is because internet shopping centers have different structural features. After all, there are no human elements and material related to features in the cyberspace.

It is generally difficult to maintain consumers who are loyal to the online shopping environment [68]. Consumer e-loyalty is a critical antecedent for e-tailing success [69] [57]. Consumer loyalty as a favorable attitude towards e-grocers that leads to repeat purchases with a broader investigation of consumer loyalty in terms of e-tailing [70]. Therefore, e-loyalty is also associated with repeat purchases. If consumers make repeat purchases online can indicate that they have emerged a consumer e-loyalty attitude toward one particular e-grocer. Overall in the context of e-loyalty, online customers can access the e-tailing platform with just one click [71]. Four factors influence the consumer perceived value, customer satisfaction, consumer confidence, and transfer of costs incurred by consumers. Also, [72] states that customers tend to increase the number of purchase transaction activities through the e-tailing platform when there is a level of high brand identification as well. At-the-end, e-grocers are aiming to platforms that are more personalized to increase e-loyalty.

Research Methodology

3.1. Scale Development

The research design is quantitative research approaches. It is defined as a systematic investigation of phenomena by gathering quantifiable data and performing statistical. Responses were generated from online shoppers using a 6-points Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The optimal point in Likert scale is between four and seven. If below four, the results of validity and reliability are not optimal, whereas if above seven, the results of validity and reliability are not increasing significantly [75]. The method for processing and analyzing data in this research uses PLS-SEM (Partial Least Square-Structural Equation Modeling) because it is more focused on data and with a limited estimation procedure so that the misspecification model problem does not affect the estimated parameters [76].

3.2. Hypothesis

The e-tailing quality variable used in this research was adapted adopt from [23] research model by eliminating the hedonism factor. Even there are different definitions, the supporting factors are almost the same as [10] that develops the eTailQ model and is also applied by [23]. It can be concluded that eTailQ is an adjustment from the e-service quality model. Respectively to eTailQ name itself then this research modifies as e-Tailing Quality with four dimensions, which are design quality, fulfilment quality, privacy quality, and customer service quality. Thus, the following hypothesis is proposed:

H1: *e-tailing quality has a direct influence on e-satisfaction.*

The role of big data becomes essential in industry 4.0 era these days, especially relates to online transactions due to big data that can provide a better personalization, suggestion, and recommendation to the customer. Research about correlation e-tailing quality and e-satisfaction with big data recommendation was conducted by [11] and [28] that can bring benefits to customers. Refer to [27] then this research applies five dimensions, which are customer, product, location, time, and channel. Thus, the following hypothesis is proposed:

H2: *big data recommendation as moderation has a direct influence on the relationship between e-tailing quality and e-satisfaction.*

Along with e-tailing quality, e-satisfaction also influences the formation of e-loyalty. E-satisfaction has a significant correlation with e-loyalty [59], and it has been noted as an influencing factor for the affective perceptions that a consumer develops toward an e-tailer [65]. This has also been pointed out in the online context, with the quality of a consumer's relationship with an e-tailer clearly influencing e-affective commitment. Thus, the following hypothesis is proposed:

H3: *e-satisfaction has a direct influence on e-loyalty in the grocery.*

3.3. Proposed Model

Early research about e-service quality which examined how customers form expectations on technology-based self-service quality and suggested five main attributes of e-service quality: speed of delivery, ease of use, reliability, enjoyment, and control [73] which resulting that control and satisfaction were significant determinants of service quality, ease of use was also a key determinant in service quality, but only for high waiting time and control groups, while the speed of delivery and reliability had no impact on service quality. The most common approach to measure service quality is the SERVQUAL model developed by [30], where this model is still popular and being used. Meanwhile, in the online business context, many researchers modified SERVQUAL to become several models. The most well-known models are WebQual developed by [74], eTailQ by [10], E-S-Qual by [20], and the latest hierarchical model of e-service quality proposed by [22] which is adopted by [23] as well.

Irrespectively from many e-service quality models development in the context of online business but there is still a lack of research related to the quality of e-service or e-tailing quality, which addresses it by combining the construct of big data recommendation [25]. Therefore, the research aims to gain a more in-depth insight into factors such as e-tailing quality, big data recommendation, and e-satisfaction that contribute to the formation of e-loyalty in the context of e-

grocery business. In this research, a model is proposed to map diverse interactions between the construction of the eTailQ construct and the big data recommendation as a moderator and researching its role in the formation of e-satisfaction and e-loyalty. Refer to the literature review of previous studies, and this research proposes a conceptual model as per figure 1.

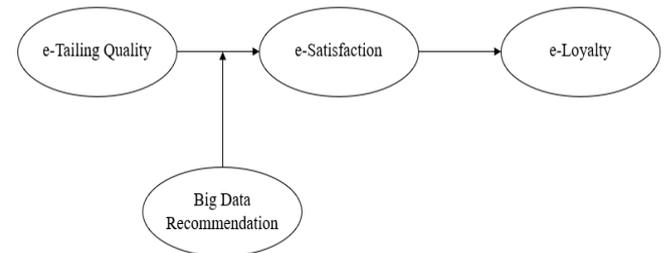


Figure 1. Conceptual Model

Result

A class interval is a maximum value minus the minimum value divided by the number of classes. This analysis is to answer the research objectives using PLS (Partial Least Square), which is a multivariate technique that examines the series of dependency relationships between latent variables. This analysis model is commonly used in explaining a theory. Also, in the estimation, even though the sample size used is small, PLS does not require normal multivariate assumptions. Both of these constitute a PLS value over SEM-LISREL in the case of structural model parameter estimates.

4.1. Data Collections

In order to test the proposed model, an online self-administered survey was distributed.

Table 4. Profile of respondents

Characteristic	Freq.
<i>Gender:</i>	
• Male	47
• Female	57
<i>Age:</i>	
• <20	0
• 21-30	43
• 31-40	27
• 41-50	22
• >50	2
<i>e-Grocery monthly spending:</i>	
• < IDR 1 million	28
• IDR 1 million – IDR 3 million	54
• > IDR 3 million	22

The analysis units are individual who have online-shopped at least twice within last six months at any e-grocers in Indonesia. Those respondents are coming from major cities in Indonesia and 132 respondents were collected but only 104 are valid.

4.2. Analysis

Reliability and validity are concepts used to evaluate the quality of research due to both of them indicate how well a method, technique, or test measures something. Reliability is about the consistency of a measure, and validity is about the accuracy of a measure. Calculation of the validity

and reliability of a construct in this research consists of Cronbach's Alpha, Composite Reliability and AVE (Average Variance Extracted) that automatically generalized by SmartPLS where the Cronbach's Alpha value of 0.6 as moderate score [77], and the value of AVE ≥ 0.4 can still be accepted [78].

The constructs in this research contain variable and dimension, and those data are run in PLS-Algorithm first where the weighting scheme is configured as Path with maximum iterations is 500, and the stop criterion is 7. At the beginning of the conceptual model, then there are 26 indicators in this research. However, not all indicators had minimum Cronbach's alpha score.

Table 5. Validity and Reliability

Constructs	Cronbach's Alpha	Composite Reliability	AVE
BDA	0.814	0.863	0.477
BDA_mod	1.000	1.000	1.000
CS qlty	1.000	1.000	1.000
Location	1.000	1.000	1.000
Product	1.000	1.000	1.000
channel	0.620	0.840	0.724
customer	1.000	1.000	1.000
design qlty	0.820	0.918	0.848
eLo	0.744	0.829	0.555
eSa	0.725	0.834	0.565
eTQ	0.864	0.899	0.602
fulfillment qlty	0.781	0.901	0.820
privacy qlty	1.000	1.000	1.000
time	0.724	0.879	0.783

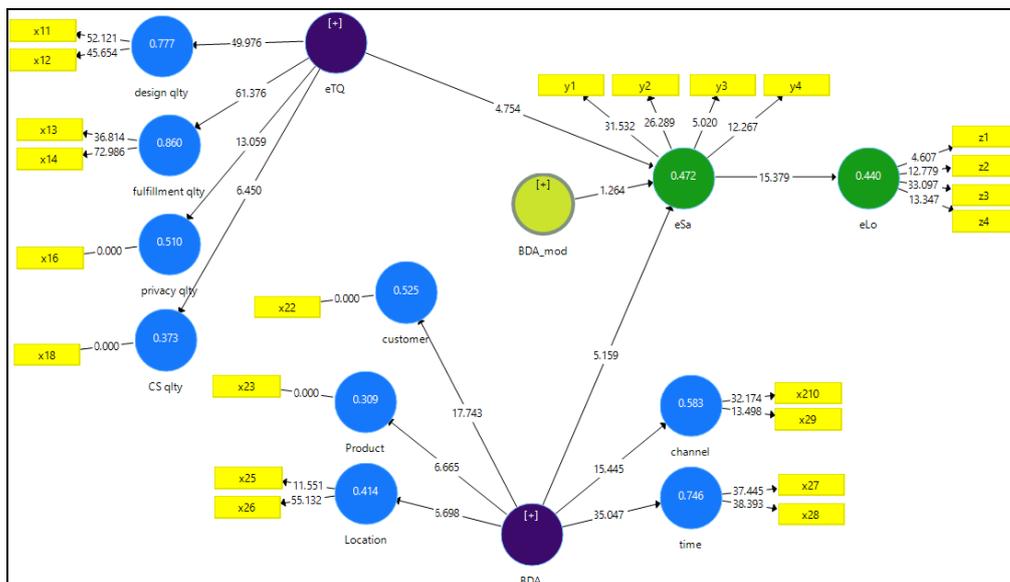


Figure 2. Measurement Model

Therefore, some of the indicators were dropped; they are one indicator in the privacy quality dimension and one indicator in customer service quality where both dimensions are part of the e-tailing quality variable. In this research, we found that even the outer loading result of two indicators in the customer service quality dimension are fine. Still, the Cronbach's Alpha of the dimension itself below 0.6; thus, one of them must be dropped.

Furthermore, one indicator in the customer dimension, one indicator in the product dimension, one indicator in the location dimension where those three dimensions are part of the big data recommendation as moderator also being dropped. Finally, after re-calculated using PLS Algorithm mode, then the Cronbach's Alpha shows all constructs have valid and reliable results

Table 6. Path Coefficients

	O	M	STDEV	T Statistics	P Values
BDA -> Location	0.643	0.636	0.096	6.698	0.000
BDA -> Product	0.556	0.555	0.083	6.665	0.000
BDA -> channel	0.764	0.770	0.049	15.445	0.000
BDA -> customer	0.725	0.727	0.041	17.743	0.000
BDA -> eSa	0.444	0.441	0.086	5.159	0.000
BDA -> time	0.864	0.865	0.025	35.047	0.000
BDA_mod -> eSa	0.083	0.083	0.065	1.264	0.207
eSa -> eLo	0.663	0.670	0.043	15.379	0.000
eTQ -> CS qlty	0.611	0.603	0.095	6.450	0.000
eTQ -> design qlty	0.882	0.883	0.018	49.976	0.000
eTQ -> eSa	0.400	0.405	0.084	4.754	0.000
eTQ -> fulfillment qlty	0.928	0.927	0.015	61.376	0.000
eTQ -> privacy qlty	0.714	0.718	0.055	13.059	0.000

The model was calculated in Bootstrapping mode with the subsamples was configured as 1,000 where those do parallel processing, and the Confident Interval Method was configured as Bias-Corrected and Accelerated (BCa) Bootstrap with test type was two-tailed and significant level was configured as 0.05 (5%).

The result of bootstrapping mode calculation was configured with some types where the data group was configured as complete data. The inner model and the outer model were configured as t-values. Also, construct was configured as R square. For a deep analysis of the relationship among all constructs, then utilize the path coefficient report that shows the detail which contains of Mean, STDEV, T-Values, P-Values.

The T-Statistic is intended to test whether the independent variable partially, whether it has a positive influence on the dependent variable or not. The rules of thumbs are if the T-Statistic is more than 1.96 and if the P-value less than 0.05, then it has a positive influence.

H1 (hypothesis 1) that is represented by eTQ -> eSA shows that T-statistic is 4.754, and P-values is 0.00, which means the e-tailing quality is

supporting the e-satisfaction variable. H3 (hypothesis 3) that is by eSa -> eLo shows that T-statistic is 15.379, and P-values is 0.00, which means the e-satisfaction is supporting the e-loyalty variable. Meanwhile, H2 (hypothesis 2) that is represented by BDA_mod -> eSA, which is a moderation variable between e-tailing quality and e-satisfaction that does not have significant results due to T-statistic is 1.264 which less than 1.96 and P-value is 0.207 which greater than 0.05. However, the moderation variable has four types, which are predictor moderation, potential moderation, quasi moderation, and pure moderation [79]. Predictor moderation is described as if the specification variable is related to the criterion and/or predictor variable but does not interact with the predictor. Therefore, the BDA_mod -> eSa as a moderating effect is classified as predictor moderation because the BDA -> eSa has a significant result of T-Statistic and P-value, but BDA_mod -> eSA does not have significant results of T-Statistic and P-value.

Conclusion

5.1. Research Findings

As explained above, the researchers have used the one independent variable, one moderation variable, one mediation variable, and one dependent variable where this model is refined from a model developed by [22] in the Indonesia setting and named the e-service quality as e-tailing quality which inspired from research developed by [23].

This research found that e-tailing quality, big data recommendation, and e-satisfaction play a very important role in influencing e-loyalty. However, big data recommendation is found as predictor moderation; thus, this variable will give more influence as intervening.

This research shows that more males (55.3% of respondents) shopped than females. It was assumed that females would be more prevalent when it comes to shop e-grocery, but this research has proven differently. The findings reveal that the majority who shopped e-grocer were between 21 and 50 years old. This is due to the fact that most of the customers already have buying power who also employees. They earn a living and likely to make a purchase online instead of going to a conventional store directly to save time.

In terms of e-grocery platform where all customers will utilize to purchase, then this research shows that e-grocery customers are needed accuracy and faster fulfillment of their orders. The design quality of e-grocery sites also influences the customers to purchase because of the easiness of browsing and navigating. Means that both fulfillment quality and design quality dimension have a major effect on e-tailing quality variable.

Align with the fulfillment then time is a very crucial indicator in big data recommendation due to e-grocer can provide better suggestion, recommendation and personalization to its customer based-on order history. Also, customer dimension and channel dimension in big data recommendation variable show e-grocer must be able to track its customers and link transactions from time to time due to technological capabilities and provide many purchase channels); hence, e-grocer can do data analysis and be effective for marketing activities. Means that both time

dimension and channel dimension have a major effect on big data recommendation variable.

E-satisfaction with the whole transaction process has an effect on e-loyalty, which makes the e-grocery customer repurchase, whether through an e-tailing platform or another channel. Customers' e-satisfaction is the evidence of whether the customers like or do not like with the experience using the e-grocery platform and personalization. The more customers like, the higher chance of repurchasing.

5.2. Managerial Implications

A. Reliable e-grocery platform. E-grocers should focus more on developing and maintaining their system and platform through many channels to provide good quality; therefore, customers will feel comfortable and enjoy. The user-friendly navigation will ensure customers easy to find the exact products and smooth during the purchase process due to UX (User Experience) is a new loyalty. Also, e-grocers must ensure the products are available with many options of the e-payment method.

B. Personalization. Online customers want to have specific products offering based-on their personality and behavior. E-grocers must develop a great big data system. Big data, as part of artificial intelligence, can give good recommendations and suggestions to customers. Big data can support e-grocers to provide optimal services at more competitive prices based on customer type, product, location, time, and purchase channel. Also predict supply-chain and shipping needs.

5.3. Limitation and Future Research

This research investigates customer e-loyalty through e-tailing quality which mediated by e-satisfaction and moderated by big data recommendation of e-grocer business in Indonesia. Due to time constraints, the samples were taken in major big cities only. Furthermore, the e-loyalty level can be more accurate by collecting sample from district areas due to internet connections and the use of mobile applications already spread widely to remote areas in Indonesia. Based on our findings, some of the e-grocery customers bought expensive products

because of happiness and motivation to show their social status. Hence, further research can be combin another factor such as hedonism [23] to see level of e-loyalty.

Also need to identify how customer e-loyalty can be built from multi-channel such as a purchase from social media channels, WhatsApp messenger, etc. Future research can grab more data for a better understanding of e-loyalty and its potential benefits for consumers, e-tailer, and researchers.

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