

# A Study on the Effect of Online Activation Business Transaction Factors of Fresh Food Shopping Mall on e-Customer Relationship Quality and e-Customer Loyalty

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## Abstract

**Purpose** – For the development of fresh food shopping malls, consumers should continue to experience loyalty and favorability for the company's products or brands, and this should lead directly to purchase so that active word-of-mouth and recommendation should be encouraged. Therefore, the purpose of this study is to investigate the effect of e-service quality and e-ERM on e-loyalty with customer satisfaction and commitment as mediators.

**Research design, data, and methodology** – This study was conducted by sample survey method on 320 online customers who have experience in using major online fresh food shopping malls for more than one year. Data analysis methods were frequency analysis, confirmatory factor analysis, reliability analysis, correlation analysis, and structural equation model analysis.

**Result** – Hypothesis 1 through Hypothesis 7 were all supported. The results of this study suggest that e-service quality and e-CRM of online fresh food shopping malls have a significant effect on satisfaction and commitment. Therefore, the conclusion has been derived that the focus of this study, that such satisfaction and commitment have a significant effect on e-customer loyalty. has been supported theoretically and empirically.

**Conclusion** – This study suggests that studies on customer loyalty based on activation commerce factors related to fresh food in online shopping malls will be an index that can reflect on customer's needs corresponding with future trends of not only online shopping malls but also offline shopping malls.

**Keywords:** Online fresh food shopping mall, E-service quality, E-CRM, Satisfaction, Commitment, E-loyalty

**JEL Classification Code:** M10, M31.

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## **1. Introduction**

Due to the development of logistics system and communication technology, the environment of human society as well as the way of life have been rapidly changing. The retail industry has changed mainly through online shopping, and especially mobile shopping using smartphones has a significant impact on growth. So that retailers are trying to absorb mobile shopping customers. In addition, online shopping, which has a considerable growth potential based on mobile, can predict future growth based on the advantage of purchase at reasonable prices and without limitation of time and space.

Meanwhile, according to the Korea Fresh Food Market Trend for 2018 released by Nielsen Korea, annual purchases of fresh food products reached 22.7 trillion won in March 2018, up 10.2 percent year-on-year. The fresh food market is the main market for distribution channels, a field where future growth is highly expected. Both offline and online channels are fiercely competing for consumer choice. Since there is a study that shows fresh food is short to purchase and their purchase frequency can be anticipated, and that there is a high cross-purchasing rate of other products when purchasing fresh food. So that companies around the world has been expanding their business (simple-global, 2018).

In this regard, changes have taken place in online shopping in Korea to enhance the competitiveness of fresh food products. G-Market has launched its premium food 'G-table' brand product for online sales, while Ticketmonster has launched its own fresh food sales channel, 'Timon Fresh.' Kakao has started 'KakaoFarmer' as an online shopping site for direct sales of agricultural products in Jeju. Also, knowledge shopping in Naver is expanding its service to deliver fresh food and related business models.

This is not the only huge change in Korea. The US online business, Amazon, acquired the 'Fresh Food Market' which is a fresh food offline company, and operates the 'Amazon Fresh' food delivery service business. In Japan a new service has launched at convenience store 'Lawson' that customer can receive fresh food ordered from smartphones in March 2018. In China, online companies such as 'Alibaba' and 'Jingdong' have also entered into offline food stores that incorporate O2O (Online to Offline), and are fiercely competing in the on-line and off-line fresh food markets.

The potential of online fresh food shopping malls is due to the synergies created by the demand for fresh food, with the convergence between online and offline further strengthens this potentia. Also, this continuous development is expected in the future. In other words, the increase in purchases of fresh food through the Internet is a global trend, and Korea market should be prepared for higher purchasing rates by users' loyalty.

Currently, the online food market has been growing rapidly, and its growth potential is limitless. To develop these markets, thorough customer management is required. In particular, mobile shopping should provide an interactive environment where businesses can provide necessary information anytime and anywhere, so consumers can get the details. In addition, customers are expected the higher levels of service, so that the needs and tastes of customers can be more complex and diverse. The needs of these customers can be met through e-service quality and e-CRM . In other words, when the e-service quality and e-CRM are satisfied, the customer will experience satisfaction and commitment to the fresh food shopping mall.

In order to maximize the profit of the online fresh food shopping mall, companies should continuously provide excellent value to their customers and make them continuously experience loyalty to their products or brands. It is important to determine the success of the online fresh food shopping mall because it is crucial to make purchasing directly by purchasing, and further encourage active word-of-mouth and recommendation. The purpose of this study is to investigate the effect of e-service quality and e-CRM on online e-commerce shopping mall on e-loyalty through consumer satisfaction and commitment.

## **2. Literature Review**

### **2.1. e-service quality**

A study by Yaya, Frederic, and Marti (2012) found that e-S-QUAL is efficient and that the dimensions of efficiency, system availability, and security are consistent across a variety of models to capture key e-service qualities, but fulfillment only applies to websites that sell real products, regardless of the type of e-service. Park (2012) claimed five main characteristics of the quality of service that the social media of airlines should possess: customization, entertainment, usefulness, interactivity and ease of use. As mentioned earlier, the components that evaluate e-service quality in various service industries are being applied differently to researchers.

The results of reviews are as follows. First, the e-service quality of online shopping mall is influenced by e-service quality factors such as ease of use, efficiency, availability of system, accuracy, and order fulfillment. Also technological aspects can consist of the website, such as aesthetics, responsiveness, information provision, reflection of the latest technology, and system availability.

## **2.2. e-CRM**

In the past, CRM has been actively used management field, but due to changes in the market environment, labor costs for specialist customer contact points, lack of elasticity of consumer demand, no-contact sales and service were raised as problems. In addition, with the advancement of IT and the Internet, companies have begun to take an interest in improving the service quality of customers with the radical leap of e-commerce, and the necessity of e-CRM to implement CRM through the internet media has emerged (Hwang, 2002).

Kotorov (2002) defined e-CRM as the application of data and communication technology to expand the scope and scope of services for customers. Lee (2001) defined IT as e-CRM database or network based on the data collected and analyzed, and continuously provide the service or product required by the consumer to maintain the customer for the long term, thereby ultimately raising the lifetime value of the customers and enhancing the enterprise performance. This is defined as an integrated customer relationship management approach. In other words, e-CRM collects customer-related data, collecting key interests, purchase history, inquiries, and complaint data in real time on the click stream so it means that no cost is incurred.

## **2.3. Satisfaction and commitment**

Customer satisfaction means a strategy that meets customer expectations. This is a concept that is central to all businesses and is a relative concept. When a customer is given a positive experience by providing product quality and service appropriately, and then the experience meets customer expectations, satisfaction increases and the value of the product or brand increases. In other words, customer satisfaction means satisfaction with customer's desires and expectations, resulting in reuse of services or purchase of products (Kim, 2017), and connection to customers' trust (Blackwell & Miniard, 2001).

Commitment means a psychological state that is deeply involved in a specific act, and that makes the flow of time, space, and even the thought of oneself forgetful. Commitment means flow in a lexical sense, meaning a phenomenon in which people are naturally conscious and focused while not conscious of all the actions they perform. The emergence of the commitment concept is from synchronization theory. The motivational category can be divided into internal and external motives. Internal motivation is the motivation inherent in each individual, which means a reaction to self-needs arising from causes such as curiosity or interest.

People can pay attention to the fact that it can improve educational performance, organizational management and efficiency of work through commitment, and create a strong sense of satisfaction and self-esteem for their leisure activities (Ha, 2010). Also, culture should be perceived as leisure. This type of play, intrinsic motivation, and immersion that has a connection with the concept of self-realization is the basis of the theory of optimal experience. There will be moments when we can strongly control our actions (Choi, 2012). At this time, our feeling can be continuously increased so we can experience happiness. These experiences can also be a milestone in our memories that last for a long time and even further toward our lives. This experience is called the optimal experience.

## **2.4. e-loyalty**

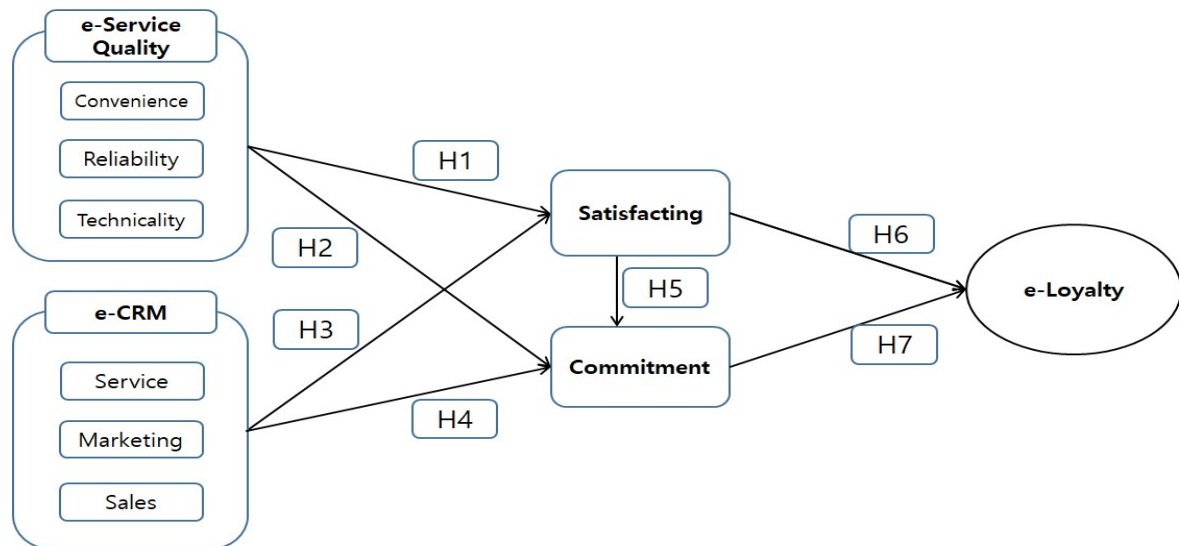
e-loyalty can be defined as an act in which consumers have an attachment and want to continue to use specific services (Hoffman & Novak, 2000). The concept of e-loyalty can be said to extend the concept of previous loyalty to online consumer behavior (Asim & Hashmi, 2005). In the online environment, loyalty appears to be consumer attitude toward the past experiences, and future expectations for a particular website or service (Hyun, 2013). is a factor which directly affects profitability and sales of a company. So, building and sustaining the loyalty is a key theme of marketing theory and practice that creates sustainable competitive advantage (Srinivasan, Anderson, & Ponnarolu, 2002).

Kang and Lee (2008) conducted a study to identify the effect of e-service quality on customer trust and e-loyalty among online travel company users. They defined that e-loyalty is positively related to a particular travel agency and recommendation to others. They also found that accessibility, interactivity and pricing of e-service quality have a significant impact. In addition, Kim (2010) suggests that e-loyalty can be divided into customer's preference, recommendation, repurchase and behavioral intention. It was suggested that a competitive advantage is a key factor that can be achieved cost reduction and high profits.

### 3. Methodology

#### 3.1. Research Model & Hypotheses

Based on the relationship between e-service quality, e-CRM and satisfaction, immersion, and e-loyalty, the model of this study is described in <Fig. 1>.



**Figure 1:** Research Model

As a causal relation between service quality and satisfaction, service quality is a leading variable that affects customer satisfaction, which indicates that service quality enhances customer satisfaction (Anderson, Fornell & Lehmann, 1994; Spreng & Mackoy, 1996). Parasuraman, Zeithaml, and Berry (1985, 1988) emphasized that highly perceived service quality enhances customer satisfaction, and some researchers have also conducted empirical analysis to find out that service quality is a leading factor in customer satisfaction.

**Hypothesis 1:** The e-service quality (convenience, reliability, and technicality) in online fresh food shopping mall will have a positive effect on satisfaction.

**Hypothesis 1-1:** e-service quality (convenience) will have a positive effect on satisfaction.

**Hypothesis 1-2:** e-service quality (reliability) will have a positive effect on satisfaction.

**Hypothesis 1-3:** e-service quality (technicality) will have a positive effect on satisfaction.

It is estimated that e-service quality will provide users with online fresh food shopping mall experiences such as attention, pleasure and time distortion. Information quality, service quality, and system quality have been confirmed to have a positive impact on the flow experience (Cho & Lee, 2015). Skadberg and Kimmel (2004) researched on the online website of tourism product and proved that the speed of the web site which is the technical quality of the service quality has significant influence on the commitment.

**Hypothesis 2:** The e-service quality (convenience, reliability, and technicality) in the online fresh food shopping mall will have a positive effect on the commitment.

**Hypothesis 2-1:** e-service quality (convenience) will have a positive impact on commitment.

**Hypothesis 2-2:** e-service quality (reliability) will have a positive effect on immersion.

**Hypothesis 2-3:** e-service quality (technological ability) will have a positive effect on commitment.

Jeon and Lee (2001) emphasize that e-Service can enhance customer satisfaction and loyalty at a low cost in terms of the company, and has the advantage of being able to manage customers. Park (2008) showed that the perceived CRM activities, relationship benefits, and inconvenience of the fashion merchant customers and examined customer satisfaction and dissatisfaction and CRM effect according to the causal flow between these variables. So integrated strategy should be needed that minimizes dissatisfaction by eliminating the inconvenience. Kim (2011) analyzed enhance customer loyalty more efficiently at a much lower cost than maintaining existing customers and creating new customers through application of e-CRM system in small and medium enterprises. To provide customized services to individual customers by measuring highly detailed customer information and providing differentiated services from competitors, he emphasized that customer satisfaction can be enhanced and maintained as a lifetime customer.

**Hypothesis 3:** e-CRM (service, marketing, sales) in online fresh food shopping mall will have a positive effect on satisfaction.

**Hypothesis 3-1:** e-CRM (service) will have a positive effect on satisfaction.

**Hypothesis 3-2:** e-CRM (marketing) will have a positive effect on satisfaction.

**Hypothesis 3-3:** e-CRM (sales) will have a positive effect on satisfaction.

Companies would like to efficiently manage their customers through CRM activities. As a major variable of CRM activity in these companies, commitment has been highlighted in many studies as a variable that promotes interrelationships (MacNeil, 1980). Gruen, Summers, and Acito (2000) found that communication through CRM between the company and the customer would encourage customers to commit the company with good impression toward the company. Since it is not a face-to-face sales situation, commitment has become a necessary concept to maintain long-term and lasting relationships between customers and sellers (Alen & Meyer, 1990). Garbrino and Johnson (1999) also emphasized that the stronger the relationship with a company, the higher the level of penetration of the company and the resulting intention of continuing purchasing.

**Hypothesis 4:** e-CRM (service, marketing sales) in online fresh food shopping mall will have a positive effect on commitment.

**Hypothesis 4-1:** e-CRM (service) will have a positive effect on commitment.

**Hypothesis 4-2:** e-CRM (marketing) will have a positive (positive) impact on commitment.

**Hypothesis 4-3:** e-CRM (sales) will have a positive (positive) effect on commitment.

Kim (2005) suggest that job satisfaction has a positive and satisfactory emotional state associated with the job duties and leads to a subsequent commitment to work, thus providing a significant effect on a sense of unity. In a study on the effect of hotel kitchen environment on job satisfaction and organizational commitment of cooks, Park (2010) showed that job satisfaction has a significant effect on organizational commitment. Also, Kim and Seo (2011) found that job satisfaction has a significant effect on organizational commitment in a study on the multidimensional relationship between service orientation, job satisfaction, organizational commitment, and customer orientation of employees.

**Hypothesis 5:** Satisfaction in the online fresh food shopping mall will have a positive effect on the commitment.

The relationship between customer satisfaction and repeat purchase behavior, it was suggested that repurchase behavior increases as customers are satisfied (Kasper, 1988; Labarbara & Mazursky, 1983). Meanwhile, in terms of the relationship between customer satisfaction and intention to repurchase, which means it is possible that satisfaction will have a positive effect on customer loyalty in that this positive attitude affects the intention of re-buying again (Bitner, 1990), In addition, satisfaction with products and services has been proven to have a significant impact on buyer's decision-making (Anderson, 1994).

**Hypothesis 6:** Satisfaction in online fresh food shopping mall will have a positive effect on e-loyalty.

Choi (2008) considered loyalty as making consumers engage with brands and companies based on information gathered by companies, and trust and commitment of sellers have a direct positive effect on repurchase behavior (Morgan & Hunt, 1994).

**Hypothesis 7:** Commitment in online fresh food shopping malls will have a positive effect on e-loyalty.

### 3.2. Data analysis method

The collection of this study was conducted by a sample survey of 320 online customers who had experience using major online fresh food shopping malls for over a year. The analysis method of this study is to analyze the data collected and finalized by using the statistical program of IBM SPSS Statistics 22.0 Table 1 summarizes the main data analysis methods.

**Table 1:** Analysis contents and analysis method

Analysis Contents	Analysis Method
Demographic characteristics	Frequency analysis
Validation of measurement	Confirmatory factor analysis by AMOS
Reliability verification of measurement	Reliability analysis by SPSS22, AMOS22
Analysis of the relationship between measurement	Correlation analysis by SPSS22, AMOS22
Verification of Models and Hypothesis	Structural equation Modeling Analysis

## 4. Empirical Analysis

### 4.1. Demographic Characteristics

Among the respondents, 57 (17.8%) were males and 263 (82.2%) were females. The respondents were 235 (73.4%) in their 30s, 70 (21.9%) in their forties and 15 (4.7%) in their 50s or older. The Respondents had the highest number of university graduates, with 27 (8.4%) graduating from high school, 274 (85.6%) graduating from university, 13 (4.1%) graduating from high school and 6 (1.9%) others. In the occupation, there were 70 (21.9%) professions, 27 (8.4%) office and management workers, 29 (9.1%) technical, sales and service workers, 12 (3.8%) students, 56.9%). The respondents' income was 0 (0%) for less than 2 million won, 16 (5.0%) for 201 to 3 million won, 19 (5.9%) for 301 to 4 million won, and 199 (62.2%, 86 (26.9%) of 501 million won, and 0 (0%) of more than 6 million won. There were 49 unmarried (15.3%) married and 271 married (84.7%) married.

### 4.2. Reliability and Validity

#### 4.2.1. Factor analysis and reliability analysis of e-service quality and e-CRM

In this study, exploratory factor analysis was conducted to test reliability and validity. Principal component analysis was used for factor analysis, and the number of factors was determined based on the case where the eigenvalue was greater than 1. The results of factor analysis on e-CRM service, marketing, and sales are as follows. Convenience, reliability, and technological ability of e-service quality are all three. 12 measurement variables were analyzed by factor analysis, and reliability and technical characteristics were excluded. The results of factor analysis of service, marketing, and sales in e-CRM are as follows. In e-CRM, service, marketing, and sales are all three factor analysis of 12 measurement variables. 1 service, 1 marketing, 1 marketing were excluded since results were less than .5.

The e-service quality and e-CRM dispersion explanatory power are 96.766 and the factor loading value is more than .5, which is appropriate as the measurement item. As a result of the factor analysis, it can be said that the discriminant validity is divided into 6 independent factors (convenience, reliability, technology, service, marketing, sales) by the right angle rotation. And that there is some evidence that the measurement tools are valid.

**Table 2:** Factor analysis and reliability analysis of e-service quality and e-CRM

	Factors						Community	Eigenvalue	% of variance	Cronbach's α
	1	2	3	4	5	6				
Convenience 4	.972						.952	4.638	19.326	.780
Convenience 1	.970						.946			
Convenience 2	.864						.936			
Convenience 3	.759						.872			
Service 3		.891					.998	3.985	16.604	.798
Service 1		.790					.996			
Service 2		.685					.791			
Marketing 3			.896				.894	3.933	13.386	.794
Marketing 2			.792				.786			
Marketing 1			.787				.779			
Reliability 3				.881			.888	3.924	11.349	.793
Reliability 1				.881			.788			
Reliability 4				.781			.688			
Reliability 2				.772			.660			
Technicality 3					.890		.883	3.795	11.814	.780
Technicality 4					.881		.864			
Technicality 1					.780		.765			
Technicality 2					.638		.783			
Sales 2						.886	.891	2.949	1.287	.793
Sales 1						.885	.790			
Sales 3						.781	.777			

**4.2.2. Analysis of Factors and Reliability on Satisfaction, Commitment and e-Quality**

Factor analysis was conducted to verify reliability and validity of single dimension. Principal component analysis was used for factor analysis. In the single dimension, the total variance explanatory power is 96.163% and the factor load value is more than .5, which is appropriate as the measurement item. The reliability of each factor was tested using Cronbach's alpha coefficient. The coefficients of Cronbach's alpha of each factor were higher than .7. Thus, satisfaction, commitment, and e-customer loyalty are all proven to be single dimensions, and the reliability and validity of single-dimension measurement tools are shown in Table 3.

**Table 3:** Reliability and validity analysis of single dimension

	Factor			Communality	Eigenvalue	% of variance	Cronbach's $\alpha$
	1	2	3				
Satisfaction	.998			.897	2.981	33.125	.796
Satisfaction	.896			.791			
Satisfaction	.795			.691			
Commitment		.992		.887	2.921	22.458	.786
Commitment		.883		.770			
Commitment		.780		.662			
e-loyalty			.968	.839	2.752	1.581	.755
e-loyalty			.855	.713			
e-loyalty			.846	.604			

**4.2.3. Confirmatory Factor Analysis of the Model**

In order to confirm the constitutional concept and the optimal condition of the measured variables, the evaluation equation was used for the measurement equation model. In this study, p value,  $\chi^2$ , GFI, RMR, RMSEA, AGFI, NFI, AGFI, CFI and IFI were used in this study.

**Table 4:** Confirmatory Factor Analysis of the Model

Factor	$\chi^2$	p	CMIN /DF	GFI	RMR	RMSEA	AGFI	NFI	CFI	IFI
e-service quality	213.860	.000	12.193	.896	.029	.141	.974	.902	.913	.903
e-CRM	171.517	.000	19.812	.901	.028	.114	.840	.901	.918	.908
Commitment	192.527	.000	21.942	.922	.042	.116	.974	.989	.993	.925
Satisfaction	252.372	.000	12.343	.935	.043	.153	.834	.874	.883	.931
e-loyalty	85.265	.000	1.651	.901	.024	.129	.842	.917	.906	.921

The results of confirmatory factor analysis for e-service quality were GFI = .896, RMR = .029, RMSEA = .141, AGFI = .974, NFI = .902, CFI = .913 and IFI = .903. The results of the confirmatory factor analysis for e-CRM are as follows:  $\chi^2 = 171.517$  (p = .000), Q value (CMIN / DF) divided by free value of  $\chi^2$  is 19.812 and other fit index GFI = .901, RMR = .028, RMSEA = .114, AGFI = .840, NFI = .901, CFI = .918, and IFI = .908. So that all was judged to be appropriate because it showed satisfactory level. The results of the factor analysis showed that the Q value (CMIN / DF) of  $\chi^2 = 192.527$  (p = .000) and the  $\chi^2$  value was 21.942 and the fit index GFI = .922 and RMR = .043. The results of the confirmatory factor analysis of satisfaction showed that the Q value (CMIN / DF) divided by the free value of  $\chi^2$  value was 12.343 and the fit index GFI = .935, RMR = .043, RMSEA = .153, AGFI = .834, NFI = .874, CFI = .883 and IFI = .931, respectively. The Q factor (CMIN / DF) divided by the free value of  $\chi^2$  value was 1.651 and the fit index GFI = .901 RMR (p = .000) = .024, RMSEA = .129, AGFI = .842, NFI = .917, CFI = .906 and IFI = .921. Table 5 shows the overall fitness of the research model test through AMOS analysis.

In order to test the fit of the model in general, it is necessary to judge the fit of the model by  $\chi^2$ , GFI, RMR, RMSEA, NFI, TLI, CFI and AGFI .

First, in the case of the Chi square statistic, it is said that the set model satisfies the reality because the value of  $\chi^2$  is 2.878, the degree of freedom is 1, and the probability p value of  $\chi^2$  value is .000 and satisfies the acceptance criterion.

Second, the basic fit index (GFI), which is evaluated as the most appropriate standard for the proposal model validation, is .954, indicating that various factors and paths of the model have been thoroughly verified, it can be judged that it is a good measurement model.

Third, the Adjustment Suitability Index (AGFI) was .892, indicating that it had adequate explanatory power at an acceptable level.

Fourth, relatively cohesion (CFI) is expressed as .936.

Fifth, the root mean square error (RMSEA) was .037, which was below .05, the acceptance standard.



Sixth, the value of residual square root mean square (RMR) is also .021, which is better than modeled as .05.

Seventh, the incremental fit index (IFM) is shown as .916, and it can be expressed that it has good explanatory power at a good level. The NFI is 90%, and the fitness of the estimated model is 90% when the fitness of the saturated model is set to 100% and the fitness of the independent model is set to 0%. Respectively. This can be evaluated as a good fit by meeting acceptance criteria of 91.5% of the Standard Compliance Index (NFI).

**Table 5:** Criteria and Results of Conformity of Research Model

Index of Fit		Criteria	Results
	p value	-	.000
Absolute fit index	Chi-square	-	2.878
	RMSEA	.05 or less	.037
	GFI	Close to 1 .9 or higher	.954
	RMR	.05 or less	.021
Incremental fit index	CFI	Close to 1 .9 or higher	.936
	NFI	Close to 1 .9 or higher	.915
	IFI	The closer to 1 .9 or higher	.916
	TLI	The closer to 1 .9 or higher	.884
Parsimonious Fit Index	Parsimonious CFI	The closer to 1 .9 or higher	.853
	Parsimonious NFI	The closer to 1 .9 or higher	.879
	AGFI	The closer to 1 .9 or higher	.892

Finally, CFI = .936, RMR = .021, and RMSEA = .037, which are more satisfactory when compared with the general evaluation criteria. The absolute fit indices were  $\chi^2 = 2.878$ , GFI = .954, RMR = .021, and RMSEA = .037. In the case of GFI, the value is better than .9 and the RMR value is less than .05 and the RMSEA value is also less than .05. In the case of GFI and RMR, the index is satisfactory because it is better than .9 and less than .05. For the incremental fit index, NFI = .915, TLI = .884, and CFI = .936. For the simplicity fit index, the AGFI value is .892, which is better for .9 and above than 1, but .892 for .8 and above is acceptable and model fit is acceptable.

Therefore, as a result of verifying the fitness of the above study model, many conformance indices for model estimation surpasses all of the recommended standards, so until the causal relationship is reset or the measurements are refined or additional variables are added, the model can be accepted.

#### 4.2.4. Convergent Validity

Convergent validity is related to the degree to which multiple measures of the same concept measure match. Even though it is a different indicator, if you are measuring the concept, the correlation will be high (Lee, 2013). As a result of analysis of the conceptual reliability value in the following Table 6, it was found that each standard factor load value was over .5, and the conceptual reliability value of all factors was more than .8. The variance extraction index also showed good agreement with the standard value of .5 or higher.

**Table 6:** Factor loading and t value

Factor		Standardized Regression Weight	t value	Construct reliability	Average variance extracted
e-service quality	Convenience 1	.807	4.804	.962	.741
	Convenience 2	.776	4.311		
	Convenience 3	.812	4.274		
	Convenience 4	.741	2.988		
	Reliability 1	.795	4.543		
	Reliability 2	.806	4.769		
	Reliability 3	.865	6.811		
	Reliability 4	.580	1.543		
	Technicality 1	.787	2.926		
	Technicality 2	.795	3.664		
	Technicality 3	.754	3.293		
	Technicality 4	.755	3.146		
e-CRM	Service 1	.828	6.133	.953	.700
	Service 2	.828	4.814		
	Service 3	.858	5.837		
	Marketing 1	.796	2.653		
	Marketing 2	.990	58.235		
	Marketing 3	.794	2.068		
	Sales 1	.605	1.524		
	Sales 2	.731	2.924		
	Sales 3	.516	0.923		
Satisfaction	Satisfaction 1	.771	3.974	.850	.655
	Satisfaction 2	.799	4.963		
	Satisfaction 3	.727	1.269		
Commitment	Commitment 1	.775	4.167	.839	.637
	Commitment 2	.749	3.121		
	Commitment 3	.621	1.368		
e-loyalty	Loyalty 1	.784	3.124	.870	.691
	Loyalty 2	.807	2.475		
	Loyalty 3	.772	3.027		

#### 4.2.5. Correlation analysis

Correlation analysis was conducted to determine the direction and extent of the relationship between each unit of study used in this study. As shown in table 7, all of the correlative directions between the units of study are shown in the direction of definition, so that the items used in this study are reasonable in terms of the nomological validity.

**Table 7:** Correlation Analysis between Research Factors

	average	standard deviation	convenience	service	marketing	reliability	technicality	sales	satisfaction	commitment	e-loyalty
convenience	4.1506	.80074	1								
service	3.9102	.79424	.033	1							
marketing	4.1641	.44179	-.035	-.018	1						
reliability	3.8914	.51097	.031	.264**	-.056	1					
technicality	3.9781	.28188	-.086	-.020	.041	-.044	1				
sales	3.9729	.79222	.169**	.008	-.099	.133*	-.017	1			
satisfaction	4.1635	.44556	-.031	-.011	.497**	-.055	.041	-.085	1		
commitment	3.8594	.49801	.091	-.165**	.015	.074	-.150**	-.092	.014	1	
e-loyalty	4.1552	.79786	.495**	.034	-.027	.030	-.095	.157**	-.024	.097	1

### 4.3. Hypotheses testing

#### 4.3.1. Direct effect analysis

The direct effect size of e-service quality and satisfaction was found to be .238, and the significance rate was  $p = .000 < .05$ . Based on the results of Table 8, e-service quality was statistically significant in satisfaction. The direct effect size on the e-service quality and commitment was .157 and the e-service quality was statistically significant for the commitment because the significance probability was  $p = .004 < .05$ . The direct effect size for e-CRM and Satisfaction was .073, and e-CRM was statistically significant in satisfaction because the significance probability was  $p = .012 < .05$ . The direct effect size of e-CRM on commitment was .128, and the significance was  $p = .007 < .05$ , indicating that e-CRM was statistically significant for commitment. The direct effect size on satisfaction and commitment was analyzed as .206 and satisfaction was found to be statistically significant for commitment because the significance probability was  $p = .000 < .05$ . The direct effect size for satisfaction and e-loyalty was .118, and the significance was analyzed as  $p = .046 < .05$ , so satisfaction was statistically significant for e-loyalty. The direct effect size on commitment and e-loyalty was analyzed as .117 and the implication was statistically significant for e-loyalty because the significance probability was  $p = .000 < .05$ .

**Table 8:** Direct effect analysis

Path			Direct effect	significance probability
e-service quality	→	satisfaction	.238	.000
e-service quality	→	commitment	.157	.004
e-CRM	→	satisfaction	.073	.012
e-CRM	→	commitment	.128	.007
satisfaction	→	commitment	.206	.000
satisfaction	→	e-loyalty	.118	.046
commitment	→	e-loyalty	.117	.000

#### 4.3.2. Indirect effect analysis

The bootstrapping method is used for verification of the indirect effect. Bootstrapping is a method of estimating the standard error by sampling the sample data randomly extracted from the group by sampling the standard error, and it is possible to generate the distribution of the parameters based on the sample data without knowing the distribution of the population and then estimate the parameters.

According to following table 9, the indirect effects of e-service quality on e-loyalty were .012, which indicates that e-service quality increase one unit, satisfaction increases .012 unit. The indirect effect of satisfaction on e-service

quality and e-loyalty was statistically significant because the significance probability of indirect effect satisfaction was  $p = .004 < .05$ . The indirect effect of commitment on e-service quality and e-loyalty was .009, and the significance was  $p = .008 < .05$ , which means statistically significant. The indirect effect size of satisfaction on e-CRM and e-loyalty was .129, and the significance was  $p = .039 < .05$ , so the indirect effect of satisfaction on e-CRM and e-loyalty was statistically accepted. The indirect effect size for e-CRM and e-loyalty was .024, and the significance probability was  $p = .004 < .05$ , so the indirect effect of commitment on e-CRM and e-loyalty was statistically significant.

Therefore, analyzing the indirect effects of Table 9, it can be said that e-service quality and e-CRM have a significant effect on indirect effects of satisfaction and commitment on e-loyalty.

**Table 9:** Indirect effect analysis

Path (satisfaction, commitment)			Indirect effect	significance probability
e-service quality	→	e-loyalty (satisfaction)	.012*	.004
e-service quality	→	e-loyalty (commitment)	.009*	.008
e-CRM	→	e-loyalty (satisfaction)	.129*	.039
e-CRM	→	e-loyalty (commitment)	.024*	.004

#### 4.3.3. Total effect analysis

The total effect is the sum of the direct effect and the indirect effect of each concept (variable) on the e-loyalty through the path model.

**Table 10:** Total effect analysis

Path(Satisfaction, Commitment)			Total effect	Direct effect	Indirect effect
e-service quality	→	satisfaction	.238	.238*	.000
e-service quality	→	commitment	.157	.157*	.000
e-CRM	→	satisfaction	.073	.073*	.000
e-CRM	→	commitment	.128	.128*	.000
satisfaction	→	commitment	.206	.206*	.000
satisfaction	→	e-loyalty	.118	.118*	.000
commitment	→	e-loyalty	.117	.117*	.000
e-service quality	→	e-loyalty (satisfaction)	.012	.000	.012*
e-service quality	→	e-loyalty (commitment)	.009	.000	.009*
e-CRM	→	e-loyalty (satisfaction)	.129	.000	.129*
e-CRM	→	e-loyalty (commitment)	.024	.000	.024*
e-service quality		commitment(satisfaction)	.294*	.277*	.017
e-CRM		commitment (satisfaction)	.209*	.196*	.013
satisfaction		e-loyalty(commitment)	.199*	.153	.046*

<Table 10> shows the total effect of the exogenous and endogenous concepts on e-loyalty in the research model. The effect of the e-service quality (.238) and e-CRM (.073) on satisfaction was found to be affected by the factors of the research model. CRM (.128), satisfaction (.206), which are a direct effect with commitment. The effect on e-

loyalty was indirect effect with e-service quality (satisfaction .012), e-service quality (commitment .009), e-CRM (satisfaction .129) and e-CRM (commitment .024).

In the case of the total effect, the effect on the e-loyalty through the mediation of satisfaction is .153. Direct effect is .046. The indirect effect is .046 and the total effect is 1.99. The total effect on commitment is the path to e-service quality mediated through satisfaction. The total effect is .294, direct effect .277, and indirect effect .017. The total effect of e-CRM on satisfaction through mediation is .209. The direct effect is .196 and the indirect effect is .013. Among them, e-service quality → satisfaction (.238), e-service quality → commitment (.157), e-CRM → satisfaction (.073), e-CRM → commitment (.128), Satisfaction → e-loyalty (.118), commitment → e-loyalty (.117) have only direct effects. e-service quality → satisfaction → e-loyalty (.012), e-service quality → commitment → e-loyalty (.009), e-CRM → satisfaction → e-loyalty (.129) → e-loyalty (.024) only affects indirect effects. In contrast, e-service quality → satisfaction → commitment (.294), e-CRM → satisfaction → commitment (.209), satisfaction → commitment → e-loyalty (.199) In the case of satisfaction, commitment and e-loyalty, the direct effect and the indirect effect were analyzed. When it comes to e-service quality → satisfaction → commitment, the direct effect (.277) + indirect effect (.017) = total effect (.294). In addition, in the case of e-CRM → satisfaction → commitment, direct effect (.196) + indirect effect (.013) = total effect (.209). The total effect of satisfaction → commitment → e-loyalty (.199) is the sum of direct effect (.153) + indirect effect (.046).

Thus, analyzing the total effect of <Table 10> shows that e-service quality and e-CRM have a significant effect on e-loyalty indirectly by using satisfaction and commitment as parameters.

#### 4.3.4. Research hypothesis

Hypothesis 1 is to test hypothesis that e-service quality will have a positive effect on satisfaction in online fresh food shopping mall. As a result of hypothesis 1 that online fresh food shopping mall will have a positive effect on satisfaction, the path coefficient of satisfaction with e-service quality is .238 ( $t = 14.230$ ), which is significant. Therefore, Hypothesis 1 was supported.

Hypothesis 2 is to test the hypothesis that e-service quality will have a positive impact on the commitment in the online fresh food shopping mall. As a result of hypothesis 2 that e-service quality affects satisfaction in online fresh food shopping mall, the path coefficient of e-service quality on commitment was .157 ( $t = 12.235$ ) Therefore, Hypothesis 2 was supported.

Hypothesis 3 is to test the hypothesis that e-CRM will have a positive impact on satisfaction in the online fresh food shopping mall. As a result of hypothesis 3 that e-CRM will have a positive effect on satisfaction in online fresh food shopping mall, the path coefficient of satisfaction .073 ( $t = 7.768$ ) was significant ( $p = .01$ ). Therefore, Hypothesis 3 was supported.

Hypothesis 4 is intended to test the hypothesis that e-CRM will have a positive impact on commitment in the online fresh food shopping mall. As a result of hypothesis 4 that e-CRM affects affection on online fresh food shopping mall, it has a significant effect on the path coefficient of commitment .128 ( $t = 9.986$ ). Therefore, Hypothesis 4 was supported.

Hypothesis 5 is to test the hypothesis that satisfaction in online fresh food shopping mall will have a positive effect on commitment. As a result of hypothesis 5 that satisfaction in online fresh food shopping mall will have a positive effect on satisfaction, it was found that path coefficient on commitment was .206 ( $t = 15.365$ ), which had a positive effect on  $p = .01$ . Therefore, Hypothesis 5 was supported.

Hypothesis 6 is to test the hypothesis that satisfaction in online fresh food shopping mall will have a positive impact on e-loyalty. As a result of the hypothesis 6 that satisfaction at the online fresh food shopping mall will have a positive effect on the e-loyalty, the path coefficient to the e-loyalty was significantly influenced as .118 ( $t = 9.123$ ). Therefore, Hypothesis 6 was supported

Hypothesis 7 is intended to test hypothesis that commitment in online fresh food shopping mall will have a positive impact on e-loyalty. As a result of the hypothesis 7 that immersion in online fresh food shopping mall had a positive effect on e-loyalty, the path coefficient to e-loyalty was .117 ( $t = 8.528$ ). Therefore, Hypothesis 7 was supported.

## 5. Empirical Analysis

It is reasonable to identify the factors affecting the e-loyalty of online fresh food shopping malls and develop them intensively. However, as the proportion of total online transactions is still small, there is not many researches related to it. In this study, it is considered that customer management for online fresh food shopping mall is the key. This

study investigates the effect of e-CRM on e-loyalty through customer satisfaction and commitment in order to satisfy customers' needs and tastes in e-service quality and interactive environment.

As a result of reviewing the concept of the online fresh food shopping mall, online fresh food shopping mall doesn't have time and space limitation in purchasing the product. In addition, it is revealed that it is able to make profit by selling to consumers based on quality and safety through maintaining freshness of food in online shopping mall, which is a virtual shop which can conveniently sell goods at a reasonable cost.

In addition, satisfaction of purchase at the online fresh food shopping mall is achieved by establishing mutual trust through bidirectional communication. The e-service quality and e-CRM provided to the customers at the online fresh food shopping mall showed that it could enhance the e-loyalty by satisfying customers' satisfaction and commitment. Therefore, e-service quality and e-CRM of online fresh food shopping mall can effectively meet consumers' needs. This allows companies to continue to provide value to their customers through the concept of e-loyalty. It can be seen that consumers will have a positive effect on e-loyalty because they encourage company's promotion activities through recommendation and maintain continuous purchasing.

## **6. Conclusion**

In this study, we analyzed e-service quality and e-CRM of online fresh food shopping mall through satisfaction, commitment, and e-loyalty according to e-CRM. It is expected that research will have a big academic significance. Therefore, in this study, it is considered that the thorough customer management for the online fresh food shopping mall which is in a rapid growth trend is the key, so that the e-service quality for providing higher level service and the satisfaction of customers' needs in the interactive environment. This study is to examine the effect of e-CRM on e-loyalty through customer satisfaction and commitment.

In order to verify this study, e-service quality and e-CRM is set as independent variable, satisfaction and commitment as parameters, and e-loyalty as dependent variable to set a research model and to establish 7 hypotheses. For empirical analysis, the questionnaire survey of 400 customers who were online users by filtering by gender, age, and region was used. The frequency analysis for analyzing the sample characteristics, the factor analysis for the validity and reliability verification of the measurement tool, and the reliability analysis and the correlation analysis for the hypothesis verification were performed using SPSS 22.0 and AMOS Version 22.0 statistical programs. The results of this study suggest that e-service quality and e-CRM in online fresh food shopping mall have a significant effect on satisfaction and commitment, and that satisfaction and commitment have a significant effect on e-customer loyalty.

This study will be an index to reflect customer needs in line with future trends of offline shopping malls as well as online shopping malls. Future industries such as artificial intelligence (AI) shopping service implementation and virtual reality (VR) shopping will be reflected in online shopping malls by analyzing and combining customer needs so that it is suggested that it will be a basis for research on service quality, customer satisfaction and loyalty.

This study focuses on convenience, reliability and technology of e-service quality of domestic online fresh food shopping mall. It implements an easy way of fresh food. Also the functionality of the website is needed in order to purchase of food properly. Also, we need to pursue consumer satisfaction in management practice. In addition, we strengthen e-service quality factors until consumer is committed in the website and increase e-loyalty to online fresh food shopping mall, which will contribute to securing sales.

In the aspect of customer management, customers should create satisfaction by utilizing DB, by improving the accuracy of customer-specific marketing, and providing product information to consumers to buy fresh foods in a timely manner. This e-loyalty to the online fresh food shopping mall should be strengthened by supporting the purchasing process and the quality service for the after sales service by allowing the customers to experience satisfaction and commitment.

This study is limited to cross-sectional study because the data collected is analyzed at a certain point. Because the sampling of the study sample is a convenience sampling method, it is difficult to generalize it to the results of the entire online fresh food shopping mall users. Therefore, in future research, it is necessary to strengthen the reliability of research by combining quantitative analysis, experience extraction method, and interview method such as individual interview. Furthermore, this study deals only with e-service quality and e-CRM as factors affecting e-loyalty. If studies on individual characteristics, technical characteristics (eg, system quality attributes) and social variables are conducted, it will be a wider and more meaningful study. In this study, e-loyalty and its utilization behavior were predicted. However, since the actual usage behavior of online fresh food shopping mall can be different from the prediction, so it is necessary to follow-up study to predict the behavior in consideration of various aspects such as frequency of use, persistence and strength.

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