

# A comparative analysis of electronic service quality in the online open market and social commerce: the case of Korean young adults

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**Abstract** Past research has revealed that the social commerce market has become both a new opportunity and a threat for companies. However, these studies analyzed the correlation for just one business model and provided inconclusive suggestions. We contribute to fill this gap in the electronic service quality literature by comparing two distinct electronic commerce models: the online open market and social commerce. Using the Kano model and analytic hierarchy process analysis, we empirically investigate 397 young adults in Korea who have experience in using both the online open market and social commerce. The results indicate that (1) the classification and priorities of the two kinds of e-commerce differ and (2) it is worthwhile to consider addressing specific strategies for different business models in order to improve the service quality of the electronic commerce market. We also discuss the main contributions of our research and the implications for managers in terms of improving electronic service quality.

**Keywords** Online open market · Social commerce · Service quality · Kano model · Analytic hierarchy process

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## 1 Introduction

The rise of Internet technology (IT) enables producers and customers to access the e-commerce market through various channels (Lee and Lim 2007; Cho et al. 2011). Because companies have to create new channels using various distribution systems alongside the development of IT, the e-commerce area is ever expanding. In particular, through mobile devices such as smartphones, companies can provide various methods of consumption for consumers. We call this system online-to-offline (O2O) commerce (Zhang et al. 2015). In O2O commerce, competition between companies has intensified. Moreover, changes to competition have occurred in the supply chain network that connects producers and consumers.

An analysis of competition in the e-commerce market using Porter's five-forces model (Porter 1990) shows that opportunities and threats coexist. For instance, new forms of business model such as the online open market and social commerce can intensify the threat of substitute products or services. In this regard, the entry barriers are very low because any products and services can be sold in the e-commerce market. Competition from rivals is also so severe that the division of a competitive area is meaningless. All domestic and foreign companies can become competitors in the e-commerce market. New competitors can easily enter; moreover, it is easy, technically and financially, to start an e-commerce business. At the same time, with the increasing supply of mobile devices and the diversification of users' ages, the market is gradually expanding and providing new business opportunities. As competition intensifies, however, a company requires a survival strategy and core competencies in order to attract customers (Thomas 2004).

A business model is a commonly seen systematic architecture of product, service, and information flows that is the source of value creation for suppliers and customers. E-commerce, which can be defined as online buying and selling transactions, provides a large number of different ways to build such architectures (or business models) based on value-chain deconstruction and reconstruction (Timmers 1999). For instance, Timmers (1999) proposed 11 types of e-commerce business model: e-shops, e-procurement, e-malls, third-party marketplaces, virtual communities, value-chain providers, value-chain integrators, collaboration platforms, and information brokerage/trust providers.

Further, companies can combine such e-business models into building blocks to maximize their competitive advantage (Weill and Vitale 2013). Some of these models are still experimental, while others are in full commercial operation. A comparative analysis of the Korean online open market and social commerce in this current study provides an interesting empirical setting to examine the determinants of e-commerce service quality and its consequences. Taking into account that the online open market and social commerce are repetitive business models in the Korean e-commerce market, we can expect them to play a key role in the process of understanding and developing e-commerce business in Korea. Because these two types of e-commerce model have their own business structures and features, they

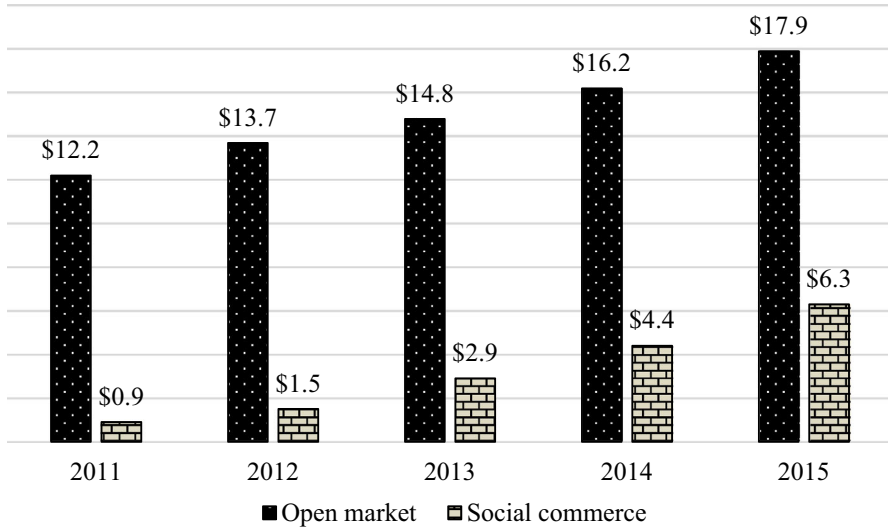
are a combination of atomic e-business models such as e-shops, e-malls, third-party market places, and value-chain integrators.

The online open market and social commerce are representative forms of e-commerce. The online open market is a type of e-commerce that makes it possible for retailers to sell goods to purchasers directly online. Thus, in the online open market, sellers can reduce intermediate distribution costs (Tsay and Agrawal 2004). In this regard, online open market providers act as intermediaries between sellers and consumers. Gmarket ([www.gmarket.co.kr](http://www.gmarket.co.kr)), Auction ([www.auction.co.kr](http://www.auction.co.kr)), and 11st ([www.11st.co.kr](http://www.11st.co.kr)), for instance, are representative providers in the Korean online open market. However, social commerce is a different e-commerce model that uses social network services (SNSs), providing products at discounted prices (Lee and Chen 2011; Lin and Liu 2012). Social commerce companies buy products in bulk from manufacturers and provide discounted prices for these products to consumers. Companies earn money through the mass sale of products. Product information and customers' opinions generated about products spread over the SNS network by online word of mouth (WOM) (Trusov et al. 2009). Coupang ([www.coupang.com](http://www.coupang.com)), TicketMonster ([www.ticketmonster.co.kr](http://www.ticketmonster.co.kr)), and WeMakePrice ([www.wemakeprice.com](http://www.wemakeprice.com)) are three big social commerce companies in Korea. In such a context, competition in the Korean e-commerce marketplace has become more intense. Any company has the opportunity to participate in the e-commerce marketplace. Other companies, such as home-shopping businesses (e.g., GS shop ([www.gsshop.com](http://www.gsshop.com))), department stores, and hypermarkets, have developed new services and are rushing into e-commerce competition with their own particular strengths. The boundaries of business models have become ambiguous, and competition has become even more brutal. In this environment, companies should have their own core competencies and should not simply mimic other companies' strategies. Companies also have to invest in e-service capabilities continuously. Scholars argue that companies should strengthen their basic e-service quality (e-SQ) and develop proper e-service core competencies (Satapathy et al. 2012).

The scale of transactions by value in the Korean e-commerce marketplace is increasing annually. As shown in Fig. 1, the size of the market in Korea and trading on both the open market and in social commerce have risen gradually. Transaction value using open market devices is increasing annually, while social commerce is growing by an even greater extent.

Prior research of e-SQ has shown the positive relationship between e-SQ and customer satisfaction (Jiang et al. 2016), repurchase intention (Zhang et al. 2011; Lu et al. 2012), and WOM (Ambler and Bui 2011; Hajli et al. 2014). These studies analyzed the correlation for just one business model and provided insufficient suggestions. Taking into account these gaps in the research, this current study analyzes the classifications and priorities of e-commerce strategies across two forms of e-commerce by using the Kano model and analytic hierarchy process (AHP) analysis.

The online open market and social commerce are different types of e-commerce but are both subsets of e-commerce. The online open market and social commerce models have their own business structures and features in e-commerce. An online open market is an intermediary that connects sellers and customers. On an online



**Fig. 1** Turnover in the Korean online market (in \$US billion) (Source: Korea On-Line Shopping Association, 2015)

open market site, sellers sell products and services directly while buyers purchase these from sellers directly. However, social commerce refers to an online marketplace where products and services are sold using social network media. Social commerce companies purchase products and services from manufacturers and sell them to end customers. We assume that these different features generate operational differences in areas such as inventory management. Moreover, the differences in operational costs and processes require different survival strategies.

However, consumers regard the two types of business model as e-commerce and include both within the same competitive scope (Cennamo and Santalo 2015). Thus, competition is expanded to embrace companies with different business structures. We suggest searching for a strategy that provides differentiation by business model (Lüftenegger et al. 2015). In striving to sustain a successful business, we think it is good practice to understand the different features of the online open market and social commerce providers and develop proper strategies across them based on the integrated method of the Kano model and AHP analysis. When exploring effective strategic directions, it is expected that both these analytical methods will complement each other.

Consumers are rapidly moving from the offline market to the online market in order to increase the benefits (e.g., low prices and convenient information acquisition) that can be acquired from the latter (Uhlenbruck et al. 2006). Consumers are becoming increasingly smarter and pursuing inexpensive, convenient, and enjoyable consumption, which can be achieved through the online market. Because of the diversification of consumers' market preferences, business opportunities in the e-commerce market are gradually expanding. However, most companies that undertake business in the e-commerce market have struggled with

the provision of good e-service quality for many years, leading to operational profit deficits despite large investment in the market (Casadesus-Masanell and Zhu 2013). According to a policy report of the Korean Financial Supervisory Service (DART 2016; <http://dart.fss.or.kr>), the deficits of representative online companies in Korea, Coupang and 11st, were US\$565.3 million and US\$365.2 million, respectively, in 2016. Further, although the scope of business opportunities has been expanded and large-scale investment has been launched, there is a lack of empirical research that provides managerial and practical insights to overcome this situation and develop suitable e-commerce-oriented operational strategies (Thomas 2004).

From this practical standpoint, our study will provide a deeper understanding of how customers evaluate e-commerce services; consequently, companies can estimate the most important elements that satisfy customers across different e-commerce business models.

Our study can also provide companies with practical guidance by pointing out the roles of different e-commerce service attributes. Thus, companies will be able to make better decisions when they encounter trade-off situations where they have to make choices, for technical or financial reasons, about e-commerce service performance.

In the next section, we assess the literature concerning service quality in e-commerce and the Kano–AHP model for e-SQ. Section 3 describes the study’s research method, including the sample selection procedure and the measurement of the main variables. Then, in Sect. 4, we provide an empirical analysis, using the Kano and AHP analytical techniques, of the online open market and social commerce. Finally, in Sect. 5, we discuss the key findings of this research and suggest a service strategy for both the online open market and social commerce.

## 2 Literature review

In order to review the key literature of electronic service quality, this study conducts a rigorous systematic assessment of peer-reviewed articles published from January 1990 to December 2016. Service quality studies conducted prior to 1990 were excluded because most have appeared since then; moreover, most electronic databases only provide the full text of articles from 1990 onward. As with prior review studies, the systematic review process used here follows three stages to select the appropriate e-SQ literature. Articles have been included in the systematic review based on the criterion that they address e-SQ-related topics. In this regard, empirical and theoretical contributions are considered. The main sources for articles are three reliable databases: *EBSCO’s Business Source Premier*, *Elsevier’s Science@Direct*, and *JSTOR*. These three databases are the most comprehensive business research databases.

First, using these databases, 1470 potentially relevant articles were identified by applying the keyword “e-service quality.” Second, we excluded 882 articles by using multiple keywords in the three databases (i.e., “e-service quality + e-commerce” and “e-service quality + social commerce”), thereby identifying the studies based on e-commerce, the online open market, and social commerce. Third,

we examined manually all the selected articles between 1990 and 2016. By doing so, 772 articles were excluded based on the screening process of article titles, subjects, geographic keywords, abstracts, and main text. Finally, we used approximately 110 key articles for the literature review in this study. The literature provides theoretical and empirical contributions together with market-specific research related to e-SQ issues from advanced and developing countries.

## 2.1 Service quality in e-commerce

Prior research has studied service quality based on the SERVQUAL quality management framework (Parasuraman et al. 1988). This framework is composed of tangibles, reliability, responsiveness, assurance, and empathy. Cronin and Taylor (1992) suggested a modified SERVQUAL to evaluate online services instead of the conventional SERVQUAL.

Yoo and Donthu (2001) proposed SITEQUAL as an integrated measure for website quality and e-SQ. SITEQUAL consists of ease of use, aesthetic design, processing speed, and security. Using exploratory analysis, Cox and Dale (2001) suggested the need for service quality determinants in e-commerce. Zeithaml (2002) proposed online service quality dimensions that are composed of efficiency, reliability, fulfillment, and privacy. The author also emphasized the importance of physical evidence of the safe delivery of products to customers. Yang and Jun (2002) compared the e-SQ of purchasers and non-purchasers in primary e-SQ dimensions. Srinivasan et al. (2002) provided eight factors of e-SQ: customization, contact interactivity, care, community, convenience, cultivation, choice, and character. The authors suggested measuring the items in terms of e-loyalty from the perspective of customers. Barnes and Vidgen (2002) suggested another measure for website quality, WebQual, which consists of usability, information quality, and service interaction quality. Further, Santos (2003) analyzed the determinants of service quality for e-commerce, and DeLone and McLean (2004) proposed an information systems success model for evaluating e-commerce factors.

Parasuraman et al. (2005) developed the quality measures of E-S-QUAL and E-RecS-QUAL by modifying SERVQUAL. The suggested model has four dimensions: efficiency, fulfillment, system availability, and privacy. Lee and Lin (2005) developed the dimensions of e-service quality by modifying the SERVQUAL model, taking into account the online shopping context. They found that some dimensions such as website design, reliability, responsiveness, and trust positively affect e-service quality; however, personalization (e.g., individualized service) does not. Thus, the authors suggested that online retailers should develop a marketing capability that better utilizes the trustworthiness, reliability, and responsiveness of e-services in order to improve customer-purchase intent. Collier and Bienstock (2006) provided an extended model for e-SQ that includes communication on websites, process quality, result quality, and recovery quality. Huang and Benyoucef (2013) suggested a new approach for evaluating websites' service quality that consists of customers, communities, and communication between e-commerce providers and customers. Wu et al. (2014) studied mutually cooperative learning effects and proposed measurement items for e-SQ linked to

SNS. Piercy (2014) suggested a model for evaluating the e-SQ of content, processes, and constructs. The author showed that it is not important for customers to have personalization or customization in e-retail. Doherty et al. (2015) presented the effects of e-SQ on the tendency of consumers to adopt e-commerce from the perspective of delivery. Huang et al. (2015) provided an e-SQ evaluation model, namely mobile service quality measurement, which offers a different approach for virtual and physical products. The model for virtual products consists of five factors (contact, responsiveness, fulfillment, privacy, and efficiency) and the model for physical products consists of four factors (contact, responsiveness, fulfillment, and efficiency), all of which serve to evaluate mobile service quality.

## 2.2 The Kano model and AHP

Many studies focus on service quality using the Kano model (Tan and Pawitra 2001; Nilsson-Witell and Fundin 2005; Mikulic and Prebezac 2011) and AHP analysis (Büyüközkan et al. 2011; Hsieh et al. 2012; Yu 2013). For instance, Tan and Pawitra (2001) provided the framework of continuous improvement for service quality, combining SERVQUAL, Kano's model, and quality function deployment. They found that the integrated methodology gives richer information than each individual method and suggested that managers should concentrate on targeting attractive attributes. Nilsson-Witell and Fundin (2005) presented the dynamics of e-service quality from the perspectives of individual customers and also market segments. Mikulic and Prebezac (2011) identified that the Kano model cannot classify the attributes of service quality properly; thus, it should be integrated with any research method that resolves this weakness. Büyüközkan et al. (2011) suggested a decision-making process for analyzing the perceived quality in a health care service. They modified SERVQUAL methodology to measure customers' satisfaction and evaluated the proposed model using AHP analysis. They found that empathy, professionalism, and reliability are the most important service quality factors for patients. Yu (2013) discovered that online service, resolving customer problems, and the confidentiality of personal information are negatively associated with service satisfaction and that the most important service factor is the confidentiality of personal information.

Li et al. (2009) analyzed customer requirements in terms of the house of quality matrix by using Kano and AHP models. The authors identified determinants and the priorities of customers' requirements. Alroaia et al. (2011) studied the priorities of e-banking service factors for customer satisfaction and found that employees' admittance of responsibility when handling customers, good relationships with customers, and vocational security for employees are the most important factors. In a similar context, Alroaia and Ardekani (2012) discovered that security and easy online access are the most important factors for effective service operations in an e-banking service. Kazemi et al. (2013) established that employees' skills and following rules are the most critical factors for an e-banking service, while Hemati and Ghorbanian (2011) analyzed service factors in the context of transportation using the hybrid Kano–AHP model and found that drivers' health and equipment

with GPS functionality are the most important factors when selecting a transportation company.

Momani et al. (2014) examined the health care industry by integrating the Kano model and fuzzy AHP analysis. They suggested that the provision of correct information and employee friendliness and respectfulness are the most significant factors for a health care service. Bauk (2015) studied customer satisfaction in the context of e-learning services and evaluated the systems by using AHP analysis. She then developed an ideal system for an e-learning service based on the Kano model. Shin et al. (2016) analyzed the service quality of Internet protocol television and found that reliability and responsiveness are the most important elements. The authors also identified a gap between managers and customers regarding such priorities and found that the evaluation of service elements changes depending on the situation.

### 3 Research methodology

#### 3.1 Research model

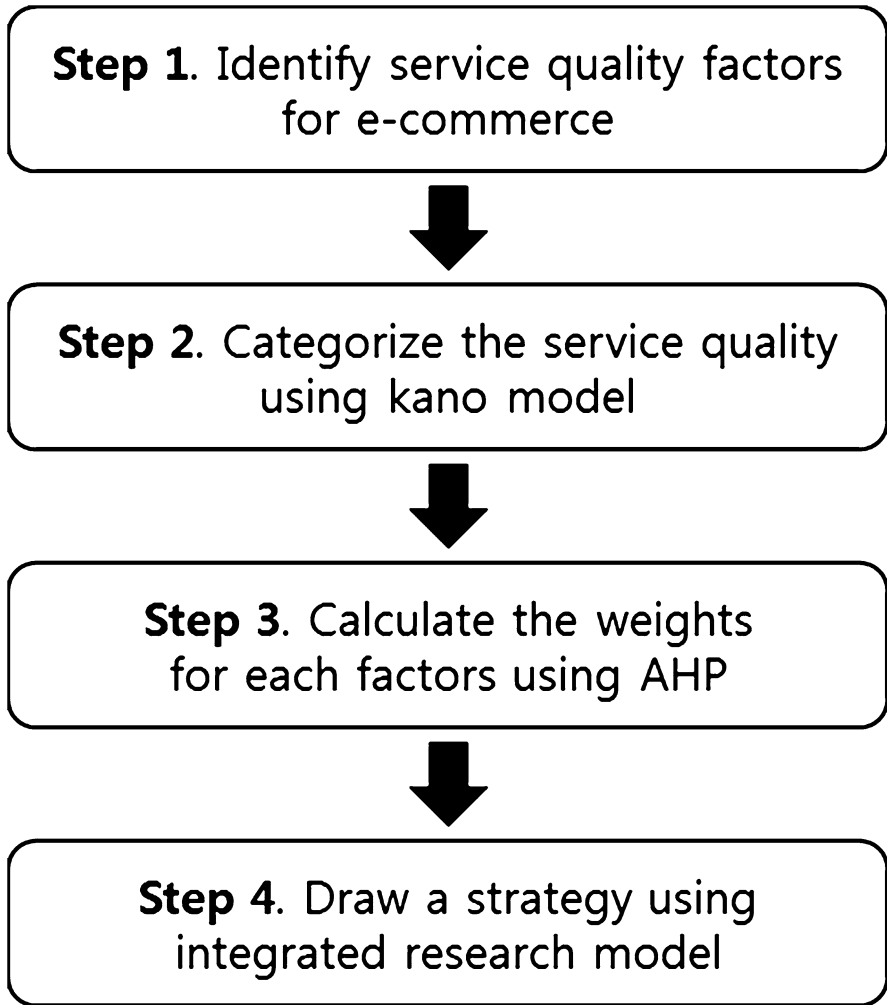
The e-commerce service quality prioritization procedure is as follows. The first step is to identify e-commerce service quality factors. We review the studies related to e-commerce service quality and provide four main criteria and then four sub-criteria for each main criterion. The second step is to categorize the e-commerce service quality factors into five quality elements using the Kano model. The third step is to determine the weight of each criterion using the AHP. With regard to the Kano model and AHP analysis, we conduct a survey for customers who have experience of e-commerce. In the last step, we suggest an integrated model to compare the results of the Kano model and AHP analysis. This study's proposed steps are shown in Fig. 2.

The study compares two types of e-commerce: the online open market and social commerce. We suggest classifications and strategic priorities of e-SQ factors using the integrated Kano model and AHP analysis.

We derive four e-SQ factors in order to analyze the two types of e-commerce market effectively in the context of the following: informativeness, product diversity, communication possibility, and responsiveness.

First, informativeness refers to the conveyance of accurate information on virtual goods (DeLone and McLean 2004; Collier and Bienstock 2006; Wu et al. 2014). Informativeness is an important factor for customers who choose online market products because customers are unable to experience the products before buying them. A product in an online market is intangible. In order to overcome this disadvantage, it is necessary to provide accurate information on the product and deliver this information in an easy and efficient way for customers. Thus, in terms of e-commerce, informativeness may influence customers' trust and purchase intentions. It may also affect customers' satisfaction on e-SQ profoundly (Lin 2007; Gao and Wu 2010).





**Fig. 2** The hierarchy steps for this research

Second, product diversity is the number of different products that a company provides and concerns mass customization. Maintaining various product items and continuously updating the inventory with new products is an even more important service quality element than the prices of products (Cronin and Taylor 1992; Srinivasan et al. 2002). Product diversity in the e-commerce market enables companies to sell many products at low cost without additional expenses (DeLone and McLean 2004). Companies can offer various categories of goods and services in the same way as department stores so that they increase customers' satisfaction regarding e-SQ.

Third, communication possibility refers to the interaction between sellers and customers (Collier and Bienstock 2006; Wu et al. 2014; Huang et al. 2015). Because

sellers and customers are geographically far apart in the online market, the ability to receive the customers' complaints and requests and provide suitable solutions to the customers' requirements are essential in order to increase e-SQ. This communication possibility affects the customers' satisfaction because they can communicate with sellers and solve their problems easily and efficiently. In the e-commerce market, a greater possibility of two-way communication through diverse online channels between sellers and buyers provides better e-service quality because appropriate information and quick responses to customers' needs can be realized efficiently.

Responsiveness is the quality of the connection between the online market and offline shipping and delivery (Lee and Lin 2005; Wu et al. 2014; Doherty et al. 2015). It is a vital service quality element that reduces the time before receipt once consumers purchase goods online. Companies in the e-commerce market try to develop this aspect of their services as a competitive strength in order to improve their e-SQ. Although establishing an effective system to increase responsiveness is expensive, most companies in the e-commerce market emphasize this responsiveness element in order to provide better e-SQ because this aspect of their work directly affects the satisfaction and loyalty of customers (Ribbink et al. 2004).

The criteria and sub-criteria of e-SQ factors are shown in Table 1.

### 3.2 The Kano model

The Kano model is an effective and useful tool for analyzing customers' needs for, or responses to, service/product quality. We categorize quality attributes into five

**Table 1** e-SQ criteria

Criteria	Sub-criteria
Informativeness	① Accuracy of product information
	② Explicit refund information
	③ Unique information service
	④ Latest product information
Product diversity	① Diversity of product item
	② Regular updates
	③ Various product groups
	④ Various price ranges
Communication possibility	① Customer consultation
	② Communication
	③ Information notification service
	④ One-to-one customized service
Responsiveness	① Solving inconvenience
	② Processing speed
	③ Promise to ship
	④ Quick delivery

quality elements using the Kano model. In this regard, we understand customers' requirements and their satisfaction as shown in Fig. 3.

The Kano model categorizes the e-SQ factors into six dimensions as follows: the (1) attractive quality element (A), (2) one-dimensional quality element (O), (3) must-be quality element (M), (4) indifferent quality element (I), (5) reverse quality element (R), and (6) skeptical quality element (S). We determine the service and product factors from customers' responses by using questionnaires related to the Kano model. Further details of each of the six dimensions are as follows.

- (1) The attractive quality: This element gives great satisfaction to customers; thus, they do not care about a product or service that does not have this element.
- (2) The one-dimensional quality: This element affects customers' satisfaction linearly. The higher the performance of this element, the more satisfied the customers.
- (3) The must-be quality: This element is an essential requirement of a service or a product to the extent that customers take it for granted.
- (4) The indifferent quality: Customers are unconcerned about whether or not this element is provided.
- (5) The reverse quality: Customers do not want this element; thus, it should be removed from a service or product in order to satisfy customers.

The Kano model (Kano et al. 1984) classifies e-SQ attributes with pairs of questions for each attribute. The classifications of e-SQ factors are shown in Table 2.

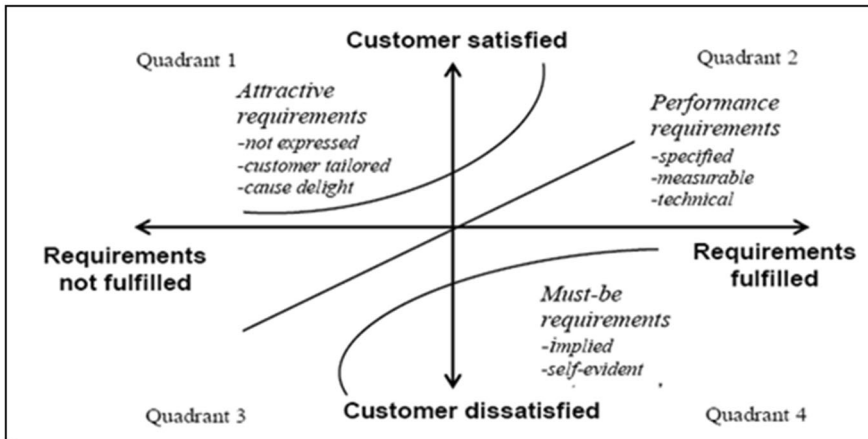


Fig. 3 Quality dimensions for Kano model (Kano et al. 1984)

**Table 2** Classification with pairs of questions by Kano model

Customer requirement	Answer to dysfunctional question					
	Like	Expect	Neutral	Accept	Dislike	
Answer to functional question	Like	Q	A	A	A	O
	Expect	R	I	I	I	M
	Neutral	R	I	I	I	M
	Accept	R	I	I	I	M
	Dislike	R	R	R	R	R

### 3.3 AHP

AHP analysis provides a comprehensive examination of multiple criteria and makes it possible to evaluate alternatives (Saaty 1990a). AHP is an effective tool for multi-criteria decision-making. It provides the weights for criteria and sub-criteria and prioritizes all factors. Thus, AHP is a decision-making method that undertakes qualitative analysis and quantitative analysis simultaneously.

We derive the weight of each attribute through pairwise comparisons using a nine-point scale. We design the questionnaire to facilitate all possible pairwise comparisons among the factors. The nine-point scale for the questionnaire is used to measure all possible importance ratios among the factors. Table 3 shows the nine-point scale for our AHP questionnaire. This approach follows the literature and has been widely applied (Saaty 1990b).

The ratios of the pairwise comparisons give the weighted scores for each criterion and sub-criterion in order to make decisions for multi-criteria preferences. The three steps for AHP analysis are to (1) draw a hierarchy of criteria and sub-criteria, (2) determine the weighted scores, and (3) confirm the reliability of the result.

**Table 3** The definition and explanation of the AHP 9-point scale

Intensity of relative importance	Definition
1	Equal importance
3	Moderate importance of one over another
5	Essential or strong importance
7	Demonstrated importance
9	Absolute importance
2, 4, 6, 8	Intermediate values between the two neighboring scales

### 3.4 Data collection and measurement

This study was conducted in Korea because of the high penetration rate of mobile phone and broadband IT and applications. We utilized a questionnaire-based survey of Korean customers who have experience using both the online open market and social commerce. The questionnaire was originally written in English and then translated to Korean. In this regard, we followed Brislin's (1980) translation-back procedure to translate the English version into Korean. Thus, a professional translator was asked to translate the original version into Korean. The Korean version was then translated back into English by a bilingual academic who was blind to the objectives of the study and had not seen the original survey. This latter translator was also asked to comment on any ambiguously worded items in order to ensure that the meaning was the same in the translated and the original questionnaires. We found no noteworthy changes in any of the items used in this study. A survey was conducted from January to March 2016 in the central cities of Korea such as Seoul and those of Kyunggy Province. A total of 500 questionnaires were distributed. We received 397 valid questionnaires after excluding respondents who had never visited the online open market and engaged in social commerce (thus, the response rate was 79.4%).

The respondents were mainly university students aged in their twenties because they are the most interested in using mobile devices and have substantial experience in social commerce. We summarize the demographics of the study's respondents in Table 4. This table shows that 87% of monthly purchase amounts are less than US\$90 and the visiting frequency under 10 times is 91%. Further, 11% of users of the online open market and social commerce do not make purchases. Most users also have experience of visiting major e-commerce providers.

## 4 Results

We categorize the service quality dimensions with the Kano model and decide priorities by conducting AHP analysis. The results are shown in Tables 5, 6, 7, and 8. The measures for the Kano model are based on pairs of questions and for the AHP analysis are based on a nine-point scale. We derive 16 items in four dimensions of service quality from prior research. Tables 5 and 6 show the results of the online open market and Tables 7 and 8 show the results of social commerce in terms of the Kano model and AHP analysis, respectively.

Tables 5 and 7 show the results of classifying the sub-criteria of the main service quality criteria into the dimensions of the Kano model and comparing classifications between the online open market and social commerce. As a result, there are seven sub-criteria in the one-dimensional quality (O) for the online open market and eight sub-criteria for social commerce. The one-dimensional quality (O) satisfies customers who have this element and dissatisfies those who do not have this element. In both business models, the sub-criteria are "accuracy of product information," "regular updates, communication," "solving inconvenience," and "processing speed." The sub-criteria in the online open market only are "various

**Table 4** Sample demographics

Category	Frequency	Percentage (%)
Gender		
Male	187	47
Female	210	53
Age		
≤ 19	48	12
20–24	306	77
25–29	43	11
Visits per month		
0 times	19	5
1–5 times	255	64
6–10 times	87	22
11–20 times	28	7
> 20 times	8	2
Income		
\$ 0	44	11
From \$1 to \$45	187	47
From \$45 to \$90	115	29
From \$90 to \$180	48	12
More than \$180	3	1
Open market visit experience (double checking available)		
G-Market	353	89
Auction	314	79
11st	330	83
Interpark	214	54
Others	12	3
Social commerce visit experience (double checking available)		
Coupang	365	92
TicketMonster	310	78
WeMakePrice	330	83
Others	4	1

price ranges” and “customer consultation,” while the sub-criteria in social commerce only are “diversity of product items,” “various product groups,” and “quick delivery.” Consumers’ desires for basic attributes appear similar but differ in each business model. Customers are dissatisfied when they are without the must-be quality (M). The online open market has three sub-criteria of must-be quality (M); namely, explicit refund information, diversity of product items, and promise to ship. Social commerce has two sub-criteria; namely, explicit refund information and customer consultation. Indifferent quality (I) is an indifferent attribute for customers. The sub-criteria for indifferent quality (I) in the online open market are unique information service, information notification service, and one-to-one customized service; the sub-criteria for indifferent quality (I) in social commerce are unique information service, latest product information, and information

**Table 5** Kano classification for service quality on online open market

Criteria	Sub-criteria	Quality dimension						Total	Types of quality
		A	M	O	I	R	S		
Informativeness	① Accuracy of product information	22	75	217	75	8	0	397	O
	② Explicit refund information	23	173	82	119	0	0	397	M
	③ Unique information service	52	44	59	232	8	2	397	I
	④ Latest product information	153	67	59	115	2	1	397	A
Product diversity	① Diversity of product item	59	142	90	105	0	1	397	M
	② Regular updates	44	59	180	113	1	0	397	O
	③ Various product groups	136	67	82	111	1	0	397	A
	④ Various price ranges	67	52	176	102	0	0	397	O
Communication possibility	① Customer consultation	59	82	150	98	8	0	397	O
	② Communication	67	67	157	105	1	0	397	O
	③ Information notification service	53	59	52	194	31	8	397	I
	④ One-to-one customized service	105	52	59	180	1	0	397	I
Responsiveness	① Solving inconvenience	38	134	173	38	14	0	397	O
	② Processing speed	31	98	201	52	15	0	397	O
	③ Promise to ship	52	150	67	119	1	8	397	M
	④ Quick delivery	173	75	90	38	21	0	397	A

A attractive quality element, *O* one-dimensional quality element, *M* must-be quality element, *I* indifferent quality element, *R* reverse quality element, *S* skeptical quality element

notification service. Attractive quality (A) adds distinctive attractive features. Thus, companies can use the sub-criteria for competitive strategies. The latest product information, various product groups, and quick delivery are attractive qualities (A) in the online open market; various price ranges, one-to-one customized service, and promise to ship are attractive qualities for social commerce.

Our empirical investigation describes the types of e-commerce service quality issue and finds that some critical quality attributes are placed under a different category, between must-be and one-dimensional. This finding differs from those of prior studies. For instance, in the current study, many components that measure e-commerce service quality are one-dimensional quality elements according to the classification made by Kano’s model. These elements include accuracy of product information, regular updates, communication, and solving inconvenience.

As prior research has highlighted (Finch 1999; Witell and Löfgren 2007), consumers’ evaluations are expected to be the most subjective of all the service

**Table 6** Weight for AHP analysis for online open market

Criteria	Weight	Sub-criteria	Weight in group	Total weight	Rank in group	Total rank
Informativeness	0.261	① Accuracy of product information	0.429	0.112	1	1
		② Explicit refund information	0.206	0.054	3	11
		③ Unique information service	0.136	0.035	4	16
		④ Latest product information	0.229	0.060	2	8
Product diversity	0.277	① Diversity of product item	0.269	0.075	2	3
		② Regular updates	0.193	0.053	4	12
		③ Various product groups	0.239	0.066	3	6
		④ Various price ranges	0.299	0.083	1	2
Communication possibility	0.215	① Customer consultation	0.292	0.063	1	7
		② Communication	0.266	0.057	2	10
		③ Information notification service	0.213	0.046	4	15
		④ One-to-one customized service	0.229	0.049	3	13
Responsiveness	0.257	① Solving inconvenience	0.293	0.075	1	4
		② Processing speed	0.229	0.059	3	9
		③ Promise to ship	0.191	0.049	4	14
		④ Quick delivery	0.287	0.074	2	5

quality elements; thus, the main problem with the classification of this element is that a particular difficulty may be expected for one person but another person may be satisfied (Finch 1999). We assume that the e-commerce service environment in Korea, which is still under development and dynamic, may facilitate all the diverse factors that affect consumers' responses to service quality in a different way from commerce in the traditional offline market. One possible explanation is that product and service attributes are dynamic; consequently, over time, an attribute may change from being one-dimensional to a must-be item. Indeed, our results suggest that the dynamics of the e-commerce market mature and many people appreciate its value over time; hence, a one-dimensional attribute may become a must-be item (Kano 2001; Nilsson-Witell and Fundin 2005).

Tables 6 and 8 show the results of the AHP analysis. It is necessary in AHP analysis to ensure that the consistency ratio (CR) is less than 0.1 for all criteria. In our study, the CR results for the online open market are 0.003 for the sub-criteria of informativeness, 0.003 for the sub-criteria of product diversity, 0.002 for the sub-



**Table 7** Kano classification for service quality on social commerce

Criteria	Sub-criteria	Quality dimension						Total	Types of quality
		A	M	O	I	R	S		
Informativeness	① Accuracy of product information	23	149	209	16	0	0	397	O
	② Explicit refund information	19	207	120	50	0	1	397	M
	③ Unique information service	153	17	31	196	0	0	397	I
	④ Latest product information	91	48	101	157	0	0	397	I
Product diversity	① Diversity of product item	118	52	132	95	0	0	397	O
	② Regular updates	66	99	118	110	2	2	397	O
	③ Various product groups	124	50	136	83	2	2	397	O
	④ Various price ranges	157	25	134	81	0	0	397	A
Communication possibility	① Customer consultation	25	188	157	27	0	0	397	M
	② Communication	60	118	151	68	0	0	397	O
	③ Information notification service	87	33	52	215	10	0	397	I
	④ One-to-one customized service	170	37	72	118	0	0	397	A
Responsiveness	① Solving inconvenience	19	170	190	18	0	0	397	O
	② Processing speed	91	48	234	23	1	0	397	O
	③ Promise to ship	128	56	126	83	4	0	397	A
	④ Quick delivery	35	147	190	23	0	2	397	O

A attractive quality element, *O* one-dimensional quality element, *M* must-be quality element, *I* indifferent quality element, *R* reverse quality element, *S* skeptical quality element

criteria of communication possibility, 0.008 for the sub-criteria of responsiveness, and 0.003 for the main criteria. The CR results for social commerce are 0.004 for the sub-criteria of informativeness, 0.002 for the sub-criteria of product diversity, 0.002 for the sub-criteria of communication possibility, 0.007 for the sub-criteria of responsiveness, and 0.003 for the main criteria.

The weights for the main criteria for the online open market are 0.277 for product diversity, 0.261 for informativeness, 0.257 for responsiveness, and 0.215 for communication possibility, while those for social commerce are 0.275, 0.267, 0.245, and 0.223, respectively. The most important sub-criterion for the online open market and social commerce is accuracy of product information (0.112 and 0.119, respectively). The second most important sub-criterion for both is various price ranges of diverse products (0.083 and 0.080, respectively). The third most important sub-criterion for the online open market is diversity of product items (0.075), which differs from that of social commerce, namely various product groups (0.072). The

**Table 8** Weight for AHP analysis for social commerce

Criteria	Weight	Sub-criteria	Weight in group	Total weight	Rank in group	Total rank
Informativeness	0.267	① Accuracy of product information	0.447	0.119	1	1
		② Explicit refund information	0.223	0.060	2	9
		③ Unique information service	0.134	0.036	4	15
		④ Latest product information	0.196	0.052	3	14
Product diversity	0.275	① Diversity of product item	0.237	0.065	3	6
		② Regular updates	0.209	0.057	4	12
		③ Various product groups	0.263	0.072	2	3
		④ Various price ranges	0.291	0.080	1	2
Communication possibility	0.223	① Customer consultation	0.294	0.066	1	5
		② Communication	0.269	0.060	3	10
		③ Information notification service	0.161	0.036	4	16
		④ One-to-one customized service	0.276	0.062	2	7
Responsiveness	0.245	① Solving inconvenience	0.254	0.062	2	8
		② Processing speed	0.239	0.059	3	11
		③ Promise to ship	0.215	0.053	4	13
		④ Quick delivery	0.292	0.072	1	4

least important sub-criteria for the online open market are promise to ship (0.049), information notification service (0.046), and unique information service (0.035). Those for social commerce are latest product information (0.052), unique information service (0.036), and information notification service (0.036). All the comparisons with the Kano model and AHP analysis are shown in Table 9.

Tables 10 and 11 show the comparative results between the Kano classifications and the AHP analysis. The results prove high-ranking consistency for the sub-criteria of one-dimensional quality (O) and must-be quality (M) in the AHP analysis and the low ranking for the sub-criteria of indifferent quality (I).

**Table 9** Comparison with Kano model and AHP analysis

Criteria	Sub-criteria	Open market		Social commerce	
		Types of quality by Kano	Rank by AHP	Types of quality by Kano	Rank by AHP
Informativeness	① Accuracy of product information	O	1	O	1
	② Explicit refund information	M	11	M	9
	③ Unique information service	I	16	I	15
	④ Latest product information	A	8	I	14
Product diversity	① Diversity of product item	M	3	O	6
	② Regular updates	O	12	O	12
	③ Various product groups	A	6	O	3
	④ Various price ranges	O	2	A	2
Communication possibility	① Customer consultation	O	7	M	5
	② Communication	O	10	O	10
	③ Information notification service	I	15	I	16
	④ One-to-one customized service	I	13	A	7
Responsiveness	① Solving inconvenience	O	4	O	8
	② Processing speed	O	9	O	11
	③ Promise to ship	M	14	A	13
	④ Quick delivery	A	5	O	4

## 5 Conclusion

This study provided a comparative analysis of the e-SQ of the online open market and social commerce by classifying and prioritizing e-SQ factors based on the Kano model and AHP analysis. The AHP analysis shows that the most important element is accuracy of product information in the informativeness criterion for both the online open market and social commerce. The Kano model shows that the accuracy of product information is a one-dimensional quality element. This element is an essential factor for customers' satisfaction. Customers' evaluations of the other elements differ for both e-commerce models. Our study shows that the classifications and priorities of the two types of e-commerce differ and that the integrated Kano model and AHP analysis method makes it possible to provide

**Table 10** Rank in Kano dimensions for online open market

Types of quality by Kano	Criteria	Sub-criteria	Rank in type	Total rank by AHP
O	Informativeness	① Accuracy of product information	1	1
O	Product diversity	④ Various price ranges	2	2
O	Responsiveness	① Solving inconvenience	3	4
O	Communication possibility	① Customer consultation	4	7
O	Responsiveness	② Processing speed	5	9
O	Communication possibility	② Communication	6	10
O	Product diversity	② Regular updates	7	12
M	Product diversity	① Diversity of product item	1	3
M	Informativeness	② Explicit refund information	2	11
M	Responsiveness	③ Promise to ship	3	14
A	Responsiveness	④ Quick delivery	1	5
A	Product diversity	③ Various product groups	2	6
A	Informativeness	④ Latest product information	3	8
I	Communication possibility	④ One-to-one customized service	1	13
I	Communication possibility	③ Information notification service	2	15
I	Informativeness	③ Unique information service	3	16

suitable strategies for successful services across the e-commerce types (Hemati and Ghorbanian 2011; Alroaia and Ardekani 2012; Kazemi et al. 2013; Bauk 2015).

The implications of this study are as follows. First, we confirm earlier findings from Barnes and Vidgen (2002) and Delone and McLean (2004) that companies should provide accurate information to consumers. In e-commerce environments, consumers face a major drawback in that they cannot check goods before purchasing them. Thus, consumers who use e-commerce depend on product information provided by companies or the experience of other consumers. Companies must provide, without distortion, information associated with products. Alternatively, information must be supplemented with new technologies such as cloth-fitting techniques that use virtual reality. In order to resolve the disadvantages that customers experience (Yang and Jun 2002), companies should provide information that is more accurate by developing such techniques. It is also necessary to establish standards for the benchmarking of goods that are provided differently by each e-commerce company (Batagan et al. 2009). Moreover, this study extends prior research on e-commerce. Our results show that enhancing the accuracy of

**Table 11** Rank in Kano dimensions for social commerce

Types of quality by Kano	Criteria	Sub-criteria	Rank in type	Total rank by AHP
O	Informativeness	① Accuracy of product information	1	1
O	Product diversity	③ Various product groups	2	3
O	Responsiveness	④ Quick delivery	3	4
O	Product diversity	① Diversity of product item	4	6
O	Responsiveness	① Solving inconvenience	5	8
O	Communication possibility	② Communication	6	10
O	Responsiveness	② Processing speed	7	11
O	Product diversity	② Regular updates	8	12
M	Communication possibility	① Customer consultation	1	5
M	Informativeness	② Explicit refund information	2	9
A	Product diversity	④ Various price ranges	1	2
A	Communication possibility	④ One-to-one customized service	2	7
A	Responsiveness	③ Promise to ship	3	13
I	Informativeness	④ Latest product information	1	14
I	Informativeness	③ Unique information service	2	15
I	Communication possibility	③ Information notification service	3	16

information about products or services plays an important role in improving consumers' satisfaction within specific business models in the e-commerce market, such as the online open market and social commerce, in the context of emerging countries such as Korea.

The second implication is that companies should provide a variety of product segments (Kau et al. 2003). The factor of various price ranges is the second most important consideration for the one-dimensional quality element in the online open market. In social commerce, it is also the second most important factor, although it is an attractive quality element. Offering a variety of products in the online open market seems to be essential because customers know that social commerce provides limited products. Likewise, varied choice can be an attractive quality element for social commerce.

Consumers who have experience of making e-commerce purchases may make e-commerce repurchases (Liang et al. 2011). Initially, only specific consumers were able to purchase in the online market; however, a range of consumers are now able to visit the e-commerce marketplace because of the widespread devices that provide access.

It is necessary to expand the variety of goods rather than be limited to low-priced products. Strategic approaches are needed in the various segments. The present inventory should not be limited to low-priced products; instead, products with a variety of price ranges, brands, and product categories must be provided. Because it is difficult for one company alone to provide this, companies must coordinate with each other and utilize various supply network channels (Rosenbloom 2007).

The third implication is that e-commerce companies should provide differentiated services in order to meet individual consumer's expectations (Cox and Dale 2001; Liu and Wei 2003). Each business model should follow different priorities. For example, the third most important factor for the online open market is the diversity of product items and the must-be quality element; however, for social commerce, it is various product groups and the one-dimensional quality element. This finding shows that each business provider must devise a strategy in accordance with the needs of its consumers.

Through the online space, companies are able to perform one-to-one marketing to individual consumers. Individual consumers use e-commerce for various purposes and reasons. This is why companies should prepare customized operations for individual consumers (Delone and Mclean 2004; Merle et al. 2010). Consumers who use the online open market expect a diverse selection of goods. They compare various selections and then choose the most appropriate products in the same product group. Social commerce companies should be able to provide products that are affordable in order to fulfill expectations. Such companies must also provide a variety of product categories that meet consumers' purchasing purposes (Santos 2003).

## 6 Limitations and further research

The limitations of this study and suggestions for further research are as follows. First, most respondents in the sample are aged in their twenties because they are the main users of the Internet and mobile devices for e-commerce. Our empirical investigation was also conducted using only consumers in the Korean e-commerce market. Future research needs to be expanded to other age groups and other countries in order to increase the validity of the research findings. Second, we focused on the e-SQ of e-commerce from the consumer's perspective. However, other factors affect e-commerce service quality, such as devices. Future research needs to consider, from various perspectives, these other factors. Finally, we suggest that the research on the relationship between e-SQ and the advancement of new information technology such as payment systems should be enhanced.

## Appendix

Kano questionnaire

No.	Question	Answer
1	If product information is accurate on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If product information is not accurate on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
2	If refund information is explicit on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If refund information is not explicit on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
3	If information service is unique on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If information service is not unique on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
4	If latest product information is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If latest product information is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied

No.	Question	Answer
5	If product item is diverse on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If product item is not diverse on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
6	If regular updates are provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If regular updates are not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
7	If product groups are various on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If product groups are not various on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
8	If price ranges are various on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If price ranges are not various on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied



No.	Question	Answer
9	If customer consultation is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If customer consultation is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
10	If communication is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If communication is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
11	If information notification service is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If information notification service is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
12	If 1:1 customized service is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If 1:1 customized service is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied

No.	Question	Answer
13	If inconvenience is solved on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If inconvenience is not solved on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
14	If processing speed is fast on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If processing speed is not fast on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
15	If shipping as promised is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If shipping as promised is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
16	If quick delivery is provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied
	If quick delivery is not provided on e-commerce, how do you feel?	1. Satisfied 2. Must-be 3. Indifferent 4. Live with it 5. Dissatisfied

AHP questionnaire

Criterion A	Comparative importance										Criterion B							
	← A is more important than B					B is more important than A →												
Informativeness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Product diversity
Informativeness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Communication possibility
Informativeness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Responsiveness
Product diversity	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Communication possibility
Product diversity	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Responsiveness
Communication possibility	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Responsiveness
Informativeness																		
Sub-criterion A	← A is more important than B					B is more important than A →					Sub-criterion B							
Accuracy of product information	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Explicit refund information
Accuracy of product information	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Unique information service
Accuracy of product information	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Latest product information
Explicit refund information	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Unique information service
Explicit refund information	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Latest product information
Unique information service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Latest product information
Product diversity																		
Sub-criterion A	← A is more important than B					B is more important than A →					Sub-criterion B							
Diversity of product item	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Regular updates
Diversity of product item	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Various product groups

Product diversity																		
Sub-criterion A	← A is more important than B				B is more important than A →				Sub-criterion B									
Diversity of product item	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Various price ranges
Regular updates	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Various product groups
Regular updates	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Various price ranges
Various product groups	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Various price ranges
Communication possibility																		
Sub-criterion A	← A is more important than B				B is more important than A →				Sub-criterion B									
Customer consultation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Communication
Customer consultation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Information notification service
Customer consultation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	One-to-one customized service
Communication	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Information notification service
Communication	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	One-to-one customized service
Information notification service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	One-to-one customized service
Responsiveness																		
Sub-criterion A	← A is more important than B				B is more important than A →				Sub-criterion B									
Solving inconvenience	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Processing speed
Solving inconvenience	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Promise to ship
Solving inconvenience	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Quick delivery
Processing speed	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Promise to ship
Processing speed	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Quick delivery
Promise to ship	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Quick delivery

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