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Identifying and prioritizing the critical quality attributes for business-to-business cross-border electronic commerce platforms

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ABSTRACT

Business-to-business (B2B) cross-border e-commerce (EC) platforms play a critical role in reducing the psychological barriers to cross-border demand. For example, they simplify the search for and comparison of products and suppliers across countries. However, little research on the quality attributes of B2B cross-border EC platforms has been conducted. To alleviate this research gap, this study aimed to identify and prioritize the quality attributes of B2B cross-border EC platforms. Two research methods were applied: First, the modified Delphi technique was used to identify the critical quality attributes from journal articles with the approval of industrial practitioners. In addition, based on the theory of attractive quality, we conducted focus group interviews with industrial practitioners to prioritize the quality attributes of B2B cross-border EC platforms. The results of a Kano model analysis revealed 7 must-be, 15 one-dimensional, 14 attractive, and one indifference quality attributes of B2B cross-border EC platforms among the identified 37. This study provides practical insights for designers and sellers of B2B cross-border EC platforms.

1. Introduction

Economic globalization and the rapid evolution of e-commerce have accelerated the growth of cross-border e-commerce (EC) (Cheng et al., 2019; Cui et al., 2019). The emergence of cross-border EC has fueled the volume of international trade and driven the growth of countries' economies (Chen et al., 2022). In recent years, global cross-border EC transactions have experienced dramatic growth, and revenues are predicted to be around 250–350 billion US dollars by 2025 (Cui et al., 2019; Song et al., 2019). The global business-to-business (B2B) EC market reached 12 trillion dollars in 2019, which was more than six times the number of transactions in the global business-to-customer (B2C) EC (ecommerce DB 2019). Forrester Research predicted that cross-border transactions would exceed 20 % of the overall global EC by 2022, with sales of $627 billion US dollars (O'Grady, 2017). The increasing acceptance of cross-border EC as a new business model for international trade has attracted increasing attention from practitioners and academia (Giuffrida et al., 2017; Guo, 2022; Han and Kim 2019; Yin and Choi, 2021). Many cross-border EC studies focus on B2C cross-border EC (Cui et al., 2020; Huang et al., 2021; Li et al., 2019; Wang et al., 2019), but only a few have focused on B2B cross-border EC (Chen et al., 2022; Miao et al., 2019).

B2B cross-border EC is much more complicated than traditional international trade or domestic EC (Song et al., 2019). Cross-border EC platforms play a critical role because they involve an integrated industrial chain, marketing strategies, payments, logistics, financial services, and government policies (Hsu et al., 2018). The design of B2B cross-border EC platforms is important in alleviating barriers that occur in cross-border EC contexts. Quality attributes refer to the features of a B2B cross-border EC platform (Liu et al., 2019). Enterprises evaluate the quality attributes of cross-border EC platforms by using several factors and dimensions. Therefore, it is important to identify the quality attributes that create more satisfaction than others (Chen and Chuang, 2008). Moreover, although cross-border EC has evolved over the past decade, the academic research on B2B cross-border EC remains limited (Chen et al., 2022; Cui et al., 2019). Previous studies have shown the importance of overcoming obstacles and challenges in the development of cross-border EC. However, the question of what are the most emergent and critical quality attributes of B2B cross-border EC platforms has yet to be answered. Therefore, the objective of this study is to identify, categorize, and prioritize the critical quality attributes of B2B cross-border EC platforms. It applied the *Theory of Attractive Quality* to

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empirically classify and prioritize the quality attributes of B2B cross-border EC platforms from the seller's perspective. Overall, this study intended to answer the following research question:

1. What are the quality attributes of B2B cross-border EC platforms and their categories from the sellers' perspective?
2. What are the priorities of these quality attributes in the B2B cross-border EC platforms?

The remainder of this paper is organized as follows. Section 2 reviews the related studies on cross-border EC and introduces the theory of attractive quality. Section 3 presents the research methods, designs, and measurements of the two studies. Section 4 presents the data analysis and findings of the modified Delphi technique. Section 5 presents the data analysis and findings of the Kano model analysis. Section 6 discusses the findings from the modified Delphi technique and Kano model analysis. Section 7 concludes the findings, managerial and theoretical contributions, and limitations of the study, and suggests directions for future research.

2. Literature review

This section defines cross-border EC, discusses its challenges, and introduces the theory of attractive quality, which served as the theoretical background in this study.

2.1. The challenges of cross-border EC

Cross-border EC involves international business activities executed by trade entities located in different jurisdictions, with transactions conducted and payments settled through online platforms and merchandise delivered using international logistics systems (Hsiao et al., 2017; Ma et al., 2018). Cross-border EC is defined as transaction activities among different countries or customs territories through cross-border logistics and online trading platforms (Cui et al., 2019; Ma et al., 2018; Mou et al., 2019b). B2B cross-border EC is defined as international trade activity in which two enterprises in different countries conduct transactions and deliver merchandise through cross-border logistics (Chen et al., 2022). Extending from local markets, B2B cross-border EC opens another door for enterprises, especially for small- and medium-sized enterprises, to seek more opportunities in overseas markets (Guo et al., 2018; Liu et al., 2015). It is not only a channel for foreign trade, but also a new business model consisting of enterprise resource ability and a profit model (Chen and Yang, 2016). Prior studies on cross-border EC can be categorized into seven topics: environment, policy, tax (Xiao and Zhang, 2020; Zhang et al., 2022), online platforms (Chen et al., 2018; Niu et al., 2022), talent training (Cheng et al., 2019), logistics services (Hsiao et al., 2017; Kim et al., 2017; Niu et al., 2019), product development efficiency (Niu et al., 2022), online payments, and consumers' adoption intention (Huang and Chang, 2019).

Although cross-border EC has evolved over the past decade, academic research in this area is still rare, especially for B2B cross-border EC (Cui et al., 2019). The risks and challenges of B2B cross-border EC include the high information asymmetry between global buyers and sellers, different legal and tax conditions across countries (Zhang et al., 2022), language and cultural barriers, industry policy (Xiao and Zhang, 2020), talent training (Cheng et al., 2019), high delivery costs (Gomez-Herrera et al., 2014; Guo et al., 2018; Kim et al., 2017), unreliable and lengthy transit time (Heel et al., 2014; Song et al., 2019), complicated return processes (Kawa and Zdrenka, 2016; Miao et al., 2019; Song et al., 2019; Wang et al., 2019), customs bottlenecks (Li and Li, 2019; Wang et al., 2019), limited transparency on delivery and pricing (Guo, 2022; Song et al., 2019; Wang et al., 2019), credit evaluation of participants, and order fulfilment time (Giuffrida et al., 2017; Hsiao et al., 2017; Zhu et al., 2019). In particular, the uneven development of cross-border platforms has created significant challenges for B2B EC (Chen et al., 2022). The design of cross-border EC platforms has been found to be a critical success factor in the development of B2B cross-border EC (Cui et al., 2019; Hsiao et al., 2017; Kim et al., 2017). B2B cross-border EC platforms utilize an integrated industrial chain, marketing strategies, payments, logistics, financial services, and government policy. In addition, the B2B cross-border EC platform plays an important role in connecting buyers and sellers worldwide to establish trade policies and rules to foster trust among market participants (Qi et al., 2020). Therefore, the design of B2B cross-border EC platforms remains a critical research issue for both academia and industry.

2.2. Theory of attractive quality

Customers evaluate the quality of a product or service using several factors and dimensions. Quality engineering and management have transitioned from being production-oriented to quality-control-oriented to satisfying customer needs. Based on customer consumption psychology and motivation, the theory of attractive quality is an effective tool for classifying and prioritizing customer needs (Meng et al., 2014). The theory of attractive quality examines customer needs using systematic analysis to identify, classify, and prioritize quality attributes (Berger et al., 1993; Kano et al., 1984). Quality attributes of products or services refer to the features or components of the products or services (Liu et al., 2019). It is a two-dimensional model that explains the different relationships between customer satisfaction and product criterion performance (Kano et al., 1984). It is also known as the Kano model, which evaluates product or service attributes based on customers' evaluations of being satisfied, dissatisfied, or indifferent (Kano et al., 1984). Kano et al. (1984) argued different types of product or service attributes affect customer satisfaction differently and proposed the theory of an attractive model to classify quality attributes according to their impact on customer satisfaction (Bigorra et al., 2019). Providing a bridge for putting the theory into practice, the theory of attractive quality classifies quality attributes that customers prefer into five categories (See Fig. 1): one-dimensional quality (O), must-be quality (M), attractive quality (A), reverse quality (R), and indifferent quality (I) (Ferreira et al., 2018; Kano et al., 1984; Picolo and Tontini, 2018; Qi et al., 2016).

First, one-dimensional quality (O) indicates that customer satisfaction is linearly dependent on these quality attributes. In other words, the more quality attributes are fulfilled, the more satisfied customers' needs are (Hsu et al., 2018). Second, must-be quality (M) indicates that customer satisfaction does not increase with the presence of quality because customers consider quality to be indispensable. However, its absence results in absolute customer dissatisfaction (Ullah and Tamaki, 2011). If there is such a property, customer satisfaction will not improve, and if it does not exist, customer satisfaction will drop significantly. Third, attractive quality (A) refers to quality attributes that customers do not expect on the platform, but it would positively surprise them if fulfilled (Bigorra et al., 2019). In other words, the more attractive the quality attributes are, the greater the customer satisfaction. Customers are more satisfied if their quality is sufficient. In contrast, customers will

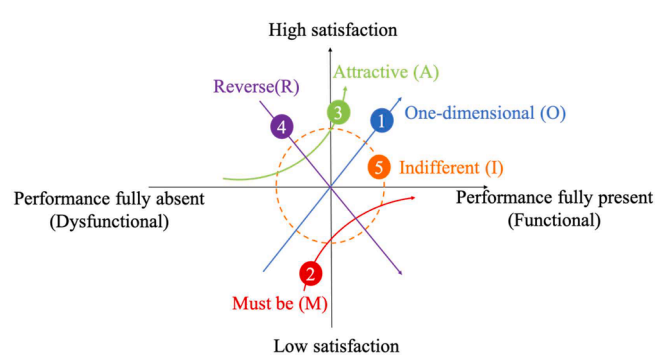

Fig. 1. Theory of attractive quality model.

not be dissatisfied if the quality is insufficient (He et al., 2017). However, attractive qualities do not necessarily cause dissatisfaction when they are not fulfilled. Among the five categories, attractive quality had the highest non-linear impact on satisfaction. Fourth, reverse quality (R) is the opposite of one-dimensional quality. The sufficiency of reverse quality leads to customer dissatisfaction and vice versa. Finally, indifferent quality (I) indicates that customer satisfaction is not affected by these attributes (Ma et al., 2019). That is, whether they exist does not affect customer satisfaction.

The theory of attractive quality suggests that it is significant to have the must-be (M) attributes and add a good number of one-dimensional (O) and attractive (A) attributes to integrate the voice of customers into the service processes in B2B cross-border EC platforms. In addition, the service design should avoid reverse (R) attributes as much as possible. Finally, the indifferent (I) quality attributes are enterprises that do not need to be focused on. The theory of attractive quality serves as a framework for demonstrating how different quality attributes create customer satisfaction in fundamentally different ways for specific customers (Lofgren et al., 2011). This provides an effective approach for identifying the priorities of quality attributes in product or service design.

3. Methods

This section discusses the two research approaches and the research design of this study. We used a modified Delphi technique to identify and categorize the quality attributes. The Kano model analysis was then applied to prioritize the quality attributes of B2B cross-border EC platforms.

3.1. Research design

As cross-border EC involves a wide outreach in terms of stakeholders and flows, its quality attributes are complicated. To identify and prioritize the quality attributes of B2B cross-border EC platforms, we used two research methods in this study (See Fig. 2): (1) a modified Delphi technique to elicit and categorize the quality attributes and (2) focus group interviews with Kano model analysis to prioritize these quality attributes. Fig. 2 shows the research design and the steps carried out in the two studies.

3.2. Study 1: Modified delphi technique

The modified Delphi technique combined the principles of evidence-based quality attributes in cross-border EC platforms, supported by a systematic literature review, with an iterative and anonymous voting process. The technique is a structured communication approach designed to elicit and collate the opinions of experts through anonymity, controlled feedback, statistical group responses, and multiple iterations (Fox et al., 2016; Shah et al., 2019). To identify and categorize quality attributes of B2B cross-border EC platforms, we applied the modified Delphi method, which contains five steps: literature review, measurement development, panel (industrial) expert invitation, first round of modified Delphi data analysis, and second round of modified Delphi data analysis until a consensus is reached (Fox et al., 2016).

3.2.1. Step 1: Literature review

We conducted a literature review as the secondary data analysis to identify all quality attributes in the cross-border EC context. Secondary analysis involves the use of current studies in an existing dataset to answer research questions (Donnellan and Lucas, 2013).

(1) Data Collection

We collected literature from different databases, such as ScienceDirect, JSTOR, EBSCO, and Google Scholar using keyword searches. These databases provided a thorough and structured description of indexed articles on cross-border EC. The following procedures were performed: First, keywords were used to search for journal articles. These keywords included cross-border e-commerce, cross-border EC, cross-border e-commerce platform, and CBEC. These keywords were used to set the search string, which included journal articles published between 2010 and 2022. Second, this study focused on original journal articles published in peer-reviewed journals in English. We also targeted several leading e-commerce journals, such as the *International Journal of Electronic Commerce*, *Electronic Commerce Research and Applications*, *Electronic Commerce Research*, *Journal of Electronic Commerce Research*, *Information & Management*, and the *International Journal of Information Management*. Conference papers and books were excluded because journal articles are subject to a more restricted and rigorous review process. Third, these journal articles were screened through discussions of factors, challenges, difficulties, and opportunities in cross-border EC. The final sample contained 56 journal articles.

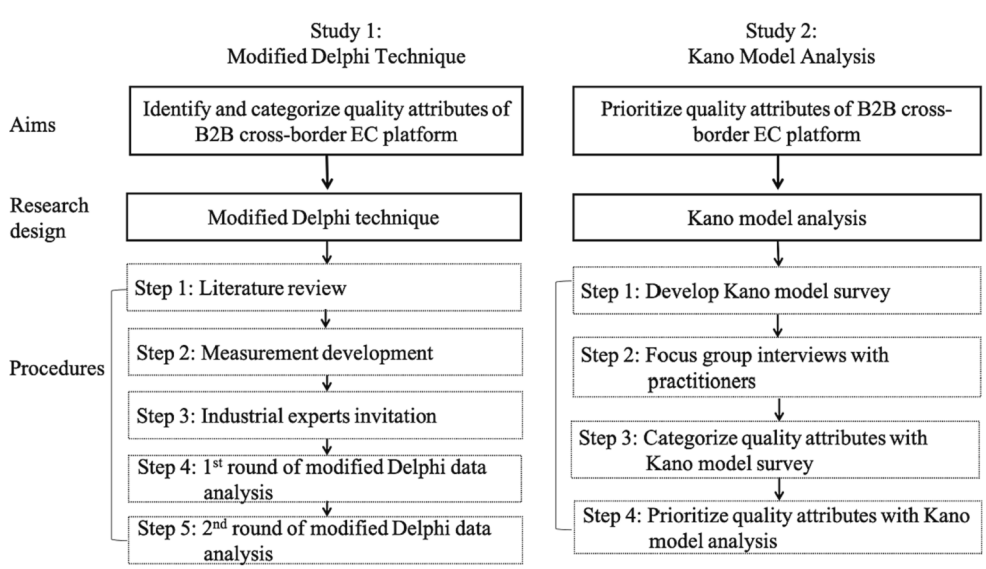

Fig. 2. Research design and procedure.

(2) Data Aggregation

Among the 56 studies, the majority focused on cross-border EC enterprises, platforms, and logistics in China, followed by the United States, Europe, and Asia. In the initial stage, we reviewed these articles and listed all the factors related to the challenges, difficulties, and opportunities affecting the development of cross-border EC. Before these factors were categorized, they were listed and merged with similar terms and renamed, and irrelevant factors were deleted. The factors affecting cross-border EC could be divided into eight categories: business strategies, financial flows, commercial flows, logistics flows, information flows, design flows, talent cultivation, and laws and policies. Business strategies, talent cultivation, and law policy were excluded from the flows of cross-border EC because they were other critical issues that are not platform-level issues. Overall, there were five major stakeholders in the cross-border EC environment: suppliers, buyers, cross-border EC platform, financial institutions, and logistics. Based on the categories and stakeholders of cross-border EC from literature review, we proposed a framework for B2B cross-border EC (See Fig. 3). Cross-border EC platforms can be considered as core components by integrating various stakeholders.

Trading activities among major stakeholders in cross-border EC are facilitated in terms of information flow, financial flow, logistical flow, design flow, and commercial flow by third-party EC platforms (Ma et al., 2018). *Financial flow* (FF) refers to the money or bill transfer among financial institutions in cross-border EC transactions due to the transfer. *Logistics flow* (LF) is defined as cross-border logistics services that deliver commodities from trading activities conducted via online trading platforms. *Commercial flow* (CL) refers to the planning and transition of commodity ownership among various entities. *Information flow* (IL) refers to the exchange of information, such as trading procedures, commodities, and services, among different stakeholders in the cross-border EC context. *Design flow* (DF) involves mechanism design for both buyers and suppliers in cross-border EC platforms (Hsiao et al., 2017). These five flows contain all trading activities and processes that connect major stakeholders in the cross-border EC context.

Based on the five flows of cross-border EC, these factors were categorized into different quality attributes. After several rounds of discussions and iterations with two professors, one manager of the Alibaba cross-border e-commerce platform, and two managers whose company utilized the cross-border EC platform for trading, we identified these 37 quality attributes and categorized them into 5 cross-border EC flows (See Table 1). For example, financial flow (FF) contained six quality attributes: online payment mechanics, payment diversity, payment safety, payment convenience, payment compatibility, and clear refund policy (See Table 1). There were 6, 7, 4, 10, and 10 quality attributes in the financial flow (FF), logistics flow (LF), information flow (IF), commercial flow (CF), and design flow (DF).

3.2.2. Step 2: Measurement development

Based on the quality attributes identified in the five flows of the cross-border EC platform, measurement items were developed to examine the appropriateness of these quality attributes in each flow. Overall, the structured questionnaire contained five categories for B2B cross-border EC with 37 items using a quantitative 5-point Likert scale (5 = very satisfied to 1 = very unsatisfied). In addition, open-ended questions allowed qualitative feedback for each item (See Appendix 1).

3.2.3. Step 3: Invitation to industrial experts to participate in the Delphi process

This study invited industrial experts with experience using B2B cross-border EC platforms for their companies. These companies were sellers on B2B cross-border EC platforms, and were primarily small and medium enterprises. We elaborated on the research objectives and required them to evaluate the appropriateness of these items for measuring the quality attributes of B2B cross-border EC platforms. Twelve industrial experts were invited to complete the questionnaires. Ten agreed to participate in the panel and to help identify the critical quality attributes of B2B cross-border EC platforms. The demographic characteristics of the participants are presented in Table 2. Ten was an acceptable number of experts for the modified Delphi method (Fox et al., 2016; Murry and Hammons, 1995; Shah et al., 2019). The participants included managers, sales managers, general managers, a chief executive officer, a sales specialist, and procurement staff. Although two of the participants did not hold managerial positions in their companies, they were the key persons involved in the B2B cross-border EC. The companies were in different industries, such as sports, consumption electronics, food, automobiles and accessories, beauty, and personal care. The participants had 1–11 years of experience in using B2B cross-border EC platforms for their companies.

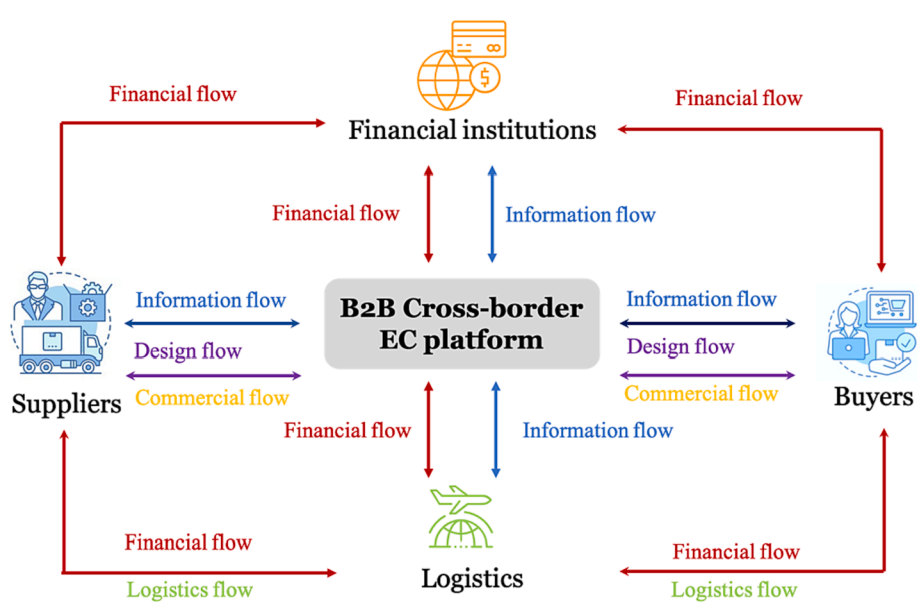

Fig. 3. Framework of cross-border EC.

Table 1
Quality attributes of cross-border EC platforms.

Category	Quality attribute	Studies
Financial Flow (FF)	Online payment mechanics	Guo et al. (2015); Kim et al. (2017); Tu and Shangguan (2018)
	Payment diversity	Kawa and Zdrenka (2016); Hsiao et al. (2017); Chen et al. (2018); Valarezo et al. (2018)
	Payment safety	Hsiao et al. (2017); Chen et al. (2018); Rong and Zhong (2018); Valarezo et al. (2018)
	Payment convenience	Chen et al. (2018); Rong and Zhong (2018)
	Payment compatibility	Giuffrida et al. (2017)
	Clear refund policy	Ong and Teh (2016); Ma et al. (2018); Miao et al. (2019); Lin et al. (2018)
Logistics Flow (LF	Transparency on delivery	Heel et al. (2014); Kim et al. (2017); Liu et al. (2019); Song et al. (2019); Wang et al. (2019)
	Reliability of delivery	Heel et al. (2014); Liu et al. (2015); Giuffrida et al. (2017); Kim et al. (2017); Song et al. (2019); Wang et al. (2019)
	Delivery flexibility	Heel et al. (2014); Song et al. (2019); Wang et al. (2019); Chen et al. (2022)
	Logistics delivery facilitation	Cho (2010); Ma et al. (2018); Tu and Shangguan (2018)
	Safety of logistics delivery	Cho (2010); Mou et al. (2020); Tu and Shangguan (2018)
	Effectiveness of logistic delivery	Guo et al. (2018); Cui et al. (2019); Miao et al. (2019); Do et al. (2022); Yang (2020); Zha et al. (2022)
	Cross-border warehousing	Liu et al. (2015); Ren et al. (2020); Shi et al. (2020)
Information Flow (IF)	Information transparency	Kawa and Zdrenka (2016); Liu et al. (2019); Mou et al. (2019b); Mou et al. (2020); Zha et al. (2022)
	Product information exposure on social media	Cui et al. (2019); Han and Kim (2019)
	Information security	Cui et al. (2019)
	Information privacy	Janita and Miranda (2013); Cui et al. (2019); Mou et al. (2019b)
Commercial Flow (CF)	Simplicity of transaction process	Ma et al. (2018)
	Order fulfilment time	Kawa and Zdrenka (2016); Guo et al. (2018); Ren et al. (2020); Yang (2020)
	Clear return policy	Janita and Miranda (2013); Heel et al. (2014); Kim et al. (2017); Huang and Chang (2019); Song et al. (2019); Wang et al. (2019)
	Simplicity of return processes	Heel et al. (2014); Kim et al. (2017); Song et al. (2019)
	Consumer disputes mechanic	Ma et al. (2018)
	Variety of services	Rong and Zhong (2018)
	Customer services response time	Janita and Miranda (2013); Rong and Zhong (2018)
	Effectiveness of return and exchange	Rong and Zhong (2018); Miao et al. (2019)
	Customer complaint services	Ong and Teh (2016), Yang (2020)
	Product audit mechanics	Mou et al. (2019a)
Design Flow (DF)	Product upload function	Cui et al. (2019)
	Product management function	Cui et al. (2019); Niu et al. (2022)
	Product comparison function	Kim et al. (2017)
	Product description function	Mou et al. (2019a); Zhu et al. (2019)
	Order management function	Cui et al. (2019); Niu et al. (2022)
	Ease of use	Janita and Miranda (2013); Guo et al. (2018); Chen and Yang (2021)
	Friendly interface	Rong and Zhong (2018); Huang and Chang (2019)
	Simplified search function	Kim et al. (2017); Huang and Chang (2019)
	Personalized interface	Kim et al. (2017)
	Flow management function	Mou et al. (2019a); Niu et al. (2022)

Table 2
Demographics of the Participants.

ID	Gender	Position	Business	Years of Experience	No. of Years of Company Use of Cross-Border EC Platform
A01	Woman	Sales manager	Sports	22 years	5 years
A02	Man	General manager	Consumption electronics	20 years	2 years
A03	Man	CEO	Food	3 years	4 years
A04	Man	General manager	Automobile accessories	19 years	11 years
A05	Woman	Procurement staff	Beauty and personal care	1 year	1 year
A06	Woman	Procurement manager	Backpacks and suitcases	8 years	5 years
A07	Woman	Sales manager	Automobile accessories	4 years	2 years
A08	Woman	Manager	Packaging and printing	11 years	2 years
A09	Man	Manager	Personal accessories	6 years	3 years
A10	Woman	Sales specialist	Furniture	1 year	1 year

4. Study 1: Data analysis of the modified Delphi technique

4.1. Step 4: First round of the modified Delphi data analysis

Descriptive statistics were calculated to analyze the first-round questionnaire for group consensus. In the modified Delphi technique, there are two common measurements for consensus agreement: quartile deviation (QD), and median (mdn) (Holden and Wedman, 1993; Paquette-Warren et al., 2017). First, QD is defined as one-half the interquartile range, which is the difference between the 25th and 75th percentiles in a frequency distribution (Holden and Wedman, 1993). If an item has QD ≤ 0.6, it has achieved high consensus. If an item has QD > 0.6 and ≤ 1.0, it has medium consensus. If an item has QD > 1, it has low consensus. Second, on a 5-point Likert scale, expert agreement is considered mdn ≥ 4, disagreement mdn ≤ 2, and neutral mdn $= 3$ (von der Gracht, 2012). To validate the experts' consensus on the first-round questionnaire, we calculated the quartile deviation and median to evaluate the consensus of each quality attribute in the five flows of B2B cross-border EC platforms. In the first round, 31 items reached high consensus agreement (QD ≤ 0.6, and mdn ≥ 4), 6 items (DFC) had median consensus agreement ($0.6 <$ QD≤ 1.0, or mdn $= 3$) and 0 items had non-consensus (QD > 1, or mdn ≤ 2) (See Table 3). The high consensus agreement in the first round is primarily a result of the solid literature review. Moreover, the qualitative responses provided insights into the differences in experts' perspectives. Disagreement and non-consensus items were modified using qualitative feedback, and

Table 3
Statistical Analysis of the First-Round Delphi Questionnaire.

Flow	Quality Attribute	Mean	Median (mdn)	Quartile Deviation (QD)	Consensus
Financial Flow (FL)	Online payment mechanic	4.5	5	0.5	High
	Payment diversity	4.9	5	0	High
	Payment safety	4.8	5	0.13	High
	Payment convenience	5	5	0	High
	Payment compatibility	4.9	5	0	High
	Clear refund policy	4.7	5	0.5	High
Logistical Flow (LF)	Transparency on delivery	4.7	5	0.5	High
	Reliability of delivery	4.7	5	0.13	High
	Delivery flexibility	4.8	5	0	High
	Logistics delivery facilitation	5	5	0	High
	Safety on logistics delivery	5	5	0	High
	Effectiveness of logistic delivery	4.4	5	0.63	Medium
	Cross-border warehousing	4.5	5	0.63	Medium
Information Flow (IF)	Information transparency	4.7	5	0.13	High
	Product information exposure on social media	4.5	5	0.13	High
	Information security	4.7	5	0.5	High
	Information privacy	4.7	5	0.5	High
Commercial Flow (CF)	Simplicity of transaction process	4.7	5	0	High
	Order fulfilment time	4.9	5	0	High
	Clear return policy	4.9	5	0.5	High
	Simplicity of return processes	4.7	5	0.5	High
	Consumer disputes mechanic	4.6	5	0.5	High
	Variety of services	4.6	5	0	High
	Customer services response time	5	5	0	High
	Effectiveness of return and exchange	4.9	5	0.13	High
	Customer complaint services	4.8	5	0.63	Medium
	Product audit mechanic	4.4	5	0.13	High
Design Flow (DF)	Product upload function	4.7	4	0.5	High
	Product management function	4.3	4	0.5	High
	Product comparison function	4.4	5	1	Medium
	Product description function	4.6	5	0.5	High
	Order management function	4.6	5	0.5	High
	Ease of use	4.8	5	0.13	High
	Friendly interface	4.8	5	0.13	High
	Simplified search function	4.9	5	0	High
	Personalized interface	4.4	5	1	Medium
	Flow management function	4.3	5	0.53	Medium

Note: High consensus QD $\leq$ 0.6 and mdn $\geq$ 4; Medium consensus 0.6 $<$ QD$\leq$1.0 or mdn = 3.

participants were asked to reevaluate the statements in the next round.

4.2. Step 5: Second round of the modified Delphi Technique- summarize opinions and reach a consensus

We summarized the practitioners' opinions to provide a basis for designing a second-round questionnaire. The "Yes, or No" classification and Likert scale were used by the group of experts to express their opinions until a consensus was reached on the topics (Chin and Tsai, 2013). Typically, the modified Delphi technique requires a minimum of two rounds but usually no more than four to achieve consensus (Murry and Hammons, 1995). In the second-round survey, we invited the same 10 participants from the first round to participate in the expert panel. Because most of the items had high consensus agreement, the first-round results were shown to the experts and their opinions were asked about the items that did not have high consensus agreement. Consistency in the second round was measured as the percentage of item agreement. An item that reaches 75 % agreement has high consensus (Nayahangan et al., 2018). Data-source triangulation depicts the use of multiple data sources in the same study for validation purposes (Farquhar et al., 2020; Hussein, 2019). Triangulation of the qualitative and quantitative data was performed after each round to support the modification of materials and the generation of subsequent-round questionnaires. Trustworthiness and credibility were supported by clearly indicating the data sources, providing examples, and asking participants to repeat the rating of medium consensus and modified items in the second round (Paquette-Warren et al., 2017). In the second round, the six items had 100 % agreement, signifying high consensus. Because the participants were practitioners with expert experience in B2B cross-border EC platforms, they were able to reach a consensus after the second round of questionnaires.

5. Study 2: Kano model analysis

To prioritize these quality attributes, we conducted an empirical study using Kano model analysis. There are four steps in the Kano model analysis, and the process can be specified as follows:

5.1. Step 1: Kano model survey development

A Kano model survey measurement was developed based on the Modified Delphi survey from Study 1 (See Appendix 1). The Kano model questionnaires were further developed with one positive and one negative item on the quality attributes of B2B cross-border EC platforms. The Kano model provides a two-dimensional way to characterize the concept of non-symmetric customer perceptions of two scenarios: functional presence (positive delight) and dysfunctional absence (negative disgust). Based on the questionnaire from the modified Delphi study, the industrial practitioners needed to select one statement among the answers such as "like," "must-be," "neutral," "live-with" and "dislike" separately for both functional and dysfunctional scenarios.

5.2. Step 2: Focus group interviews with practitioners

We conducted focus-group interviews for the Kano model survey. Focus group interviews are a frequently used technique that involves collecting qualitative data by interviewing a group of individuals (Chen et al., 2018). Members of the focus group were chosen carefully to ensure that they all met certain criteria. We invited practitioners in small and medium enterprises who were key persons using the Alibaba B2B cross-border EC platform to sell their products or services. These companies were primarily small and medium enterprises in Taiwan, except for one enterprise that was larger in scale than the small and medium companies. The only exception was a clothing enterprise, which had around 300 employees with 16 million US dollars of registered capital. The others all had less than 100 employees, ranging from 7 to 60 employees with 35,000 to 1 million US dollars of registered capital. > 16 companies have been established for > 30 years, with the highest being 63 years and least 3 years.

Table 4 presents descriptive statistics of the participants. The occupations of these 33 practitioners included chief executive officer, general managers, managers, procurement specialists, sales specialists, manufacturing staff, and assistants. Among the 33 participants, 21 hold managerial positions, accounting for 64 % of the participants. Although there were 12 professionals who did not hold managerial positions in their companies, they were the key persons involved in the B2B cross-border EC. They included an executive assistant, sales specialists, and procurement specialists. They were at the core of the implementation and evolution of B2B cross-border EC in their companies. These participants represented the primary conductors of business in cross-border EC platforms. Their years of experience using B2B cross-border EC platforms ranged from 1 to 11 years. The areas of business of their companies varied and included automobile accessories, backpacks and suitcases, beauty and personal care, clothes, consumption electronics, food, furniture, gardening equipment, handicrafts, packaging and printing, personal accessories, and sports. The companies had been using B2B cross-border EC platforms for 1 to over 12 years. Around one-third (39.4 %) started to use the cross-border EC platform in the past 2 years.

Table 4
Descriptive Statistics of the Participants in the Focus Group Interviews.

Characteristics	No	%	Characteristics	No	%
Age			Company use CBEC Platform		
<24	3	9.1 %	1–2 years	13	39.4 %
25–34	10	30.3 %	3–5 years	11	33.3 %
35–44	16	48.5 %	6–8 years	3	9.1 %
45–54	2	6.1 %	9–11 years	5	15.2 %
>55	2	6.1 %	>12 years	1	3.0 %
Gender			Business		
Man	17	51.5 %	Automobile accessories	2	6.1 %
Woman	16	48.5 %	Backpack and suitcase	1	3.0 %
Occupation			Beauty and personal care	2	6.1 %
CEO	2	6.0 %	Cloth	1	3.0 %
Executive assistant	1	3.0 %	Consumption electronics	5	15.1 %
General manager	4	12.0 %	Food	1	3.0 %
Manager	8	24.0 %	Furniture	1	3.0 %
Sales manager	7	21.0 %	Gardening equipment	3	9.1 %
Sales specialist	6	18.0 %	Packaging and printing	1	3.0 %
Procurement specialist	5	15.0 %	Personal accessories	4	12.0 %
Using CBEC Platforms			Sports	1	3.0 %
1–2 years	15	45.5 %	Manufacturing	9	27.2 %
3–5 years	11	33.3 %	Others	2	6.1 %
6–8 years	3	9.1 %	Total	33	
9–11 years	4	12.1 %			

5.3. Step 3: Categorize quality attributes with Kano model survey

This study classified the quality attributes of B2B cross-border EC platforms into five categories based on the modified Delphi study. Based on Table 4, 25 possible combinations of assessments can be classified into the following Kano categories: attractive quality (A), one-dimensional quality (O), must-be quality (M), reverse quality (R), and indifferent quality (I) (See Table 5). Based on the customer's subjective experience and objective performance of a product or service, the Kano model proposed a two-dimensional representation of quality using a specific questionnaire, classification table, and evaluation table (Meng et al., 2014). To satisfy enterprises that use B2B cross-border EC platforms, a set of core quality attributes must be present and perform acceptably (McNeilly and Barr, 2006).

The content validity of the questionnaire was examined by experts in prior stages of the Modified Delphi technique. To test the reliability of our measurement, we used Cronbach α to measure the internal consistency of the measurement (Chen et al., 2020; Ma et al., 2019). As the Kano model measurement has a pair of positive and negative items for a quality attribute, the reliability test was applied for both items. Cronbach's α for the positive responses was 0.93, whereas that for the negative responses was 0.92. The overall Cronbach's α was much higher than 0.7, indicating that the measurement was highly reliable. Table 6 shows the Kano category for each quality attribute on the B2B cross-border EC platform.

5.4. Step 4: Prioritize quality attributes with the Kano model analysis

It is critical to identify the quality attributes that generate more satisfaction than others (Chen and Chuang, 2008). We conducted a Kano analysis to prioritize the quality attributes of B2B cross-border EC platforms. A, O, M, R, and I represent the "attractive," "one-dimensional," "must-be," "reverse," and "indifferent" quality attributes. The Kano model can be demonstrated in a two-dimensional 5 × 5 matrix K for different classification requirements (Zhang et al., 2018) as shown in [1].

Table 5
Quality Attributes Classification in the Kano Model.

Functional form of the questions (Positive questions)	Dysfunctional form of the questions (Negative questions)				
	Like (1)	Must be (2)	Neutral (3)	Live with it (4)	Dislike (5)
I like it that way (1)	Q	A	A	A	O
It must be that way (2)	R	I	I	I	M
I am neutral (3)	R	I	I	I	M
I can live with it that way (4)	R	I	I	I	M
I dislike it that way (5)	R	R	R	R	Q

Table 6
Quality attributes of B2B CBEC platforms and kano categories.

Flow	Code	Quality Attribute	A	O	M	I	R	Kano Category
Financial Flow	FF1	Online payment mechanics	5	11	14	3	0	M
	FF2	Payment diversity	12	9	5	7	0	A
	FF3	Payment safety	1	19	11	2	0	O
	FF4	Payment convenience	9	15	8	1	0	O
	FF5	Payment compatibility	19	8	2	3	1	A
	FF6	Clear refund policy	4	15	11	3	0	O
Logistic Flow	LF1	Transparency of delivery	4	14	9	6	0	O
	LF2	Reliability of delivery	7	13	7	6	0	O
	LF3	Delivery flexibility	12	11	3	7	0	A
	LF4	Logistics delivery facilitation	15	10	4	4	0	A
	LF5	Safety of logistics delivery	9	12	8	4	0	O
	LF6	Effectiveness of logistic delivery	14	8	4	7	0	A
	LF7	Cross-border warehousing	17	4	2	10	0	A
Information Flow	IF1	Information transparency	9	10	8	5	1	O
	IF2	Product information exposure on social media	12	6	4	10	1	A
	IF3	Information security	3	16	11	3	0	O
	IF4	Information privacy	1	16	12	4	0	O
Commercial Flow	CF1	Simplicity of transaction process	13	9	6	5	0	A
	CF2	Order fulfilment time	14	8	5	6	0	A
	CF3	Clear return policy	3	13	13	4	0	M
	CF4	Simplicity of return processes	7	13	7	6	0	O
	CF5	Consumer disputes mechanic	5	12	10	6	0	O
	CF6	Variety of services	17	6	4	6	0	A
	CF7	Customer services response time	13	8	5	7	0	A
	CF8	Effectiveness of return and exchange	9	12	7	5	0	O
	CF9	Customer complaint services	3	13	7	10	0	O
	CF10	Product audit mechanism	9	9	7	8	0	A
Design flow	DF1	Product upload function	2	10	20	1	0	M
	DF2	Product management function	5	12	16	0	0	M
	DF3	Product comparison function	10	6	5	12	0	I
	DF4	Product description function	6	11	14	2	0	M
	DF5	Order management function	4	12	15	2	0	M
	DF6	Ease of use	9	9	12	3	0	M
	DF7	Friendly interface	9	11	11	2	0	O
	DF8	Simplified search function	5	13	11	4	0	O
	DF9	Personalized interface	12	5	5	11	0	A
	DF10	Flow management function	10	8	9	6	0	A

Note: O = one-dimensional quality, M = must-be quality, A = attractive quality, I = indifferent quality, and R = reverse quality.

$$K = \begin{bmatrix} QAAAO \\ RIIIM \\ RIIIM \\ RIIIM \\ RRRRQ \end{bmatrix} \tag{1}$$

The positive degree of functional presence (D_j^+) and negative degree of dysfunctional absence (D_j^-) can be measured using equations [2] and [3] (Wang, 2013).

$$D_j^+ = \frac{A_j + O_j - R_j}{A_j + O_j + M_j + R_j + I_j} \tag{2}$$

$$D_j^- = \frac{O_j + M_j - R_j}{A_j + O_j + M_j + R_j + I_j} \tag{3}$$

D_j^+ represents an increase in the satisfaction coefficient of the *j quality attribute* and the value of D_j^+ is typically positive. In other words, user satisfaction correspondingly increases when a certain quality attribute is improved. The closer the value of D_j^+ is to 1, the greater the effect of improving user satisfaction. In contrast, D_j^- represents a dissatisfaction coefficient that is usually negative. When certain quality attributes are weakened, user satisfaction decreases. The closer the value of D_j^- is to −1, the faster user satisfaction decreases (Wang, 2013; Zhang et al., 2018). The satisfaction and dissatisfaction coefficients of each quality attribute in the five flows of B2B cross-border EC platforms, which are based on equations [2] and [3], are presented in Table 7.

6. Discussion

Among the 37 quality attributes in the B2B cross-border EC platform, there were 7 must-be quality attributes, 15 one-dimensional quality attributes, 14 attractive quality attributes, and one indifference quality attribute. To better understand the results of the Kano model analysis, we illustrated them for each category. First, the product comparison function was the only indifference (I) quality attribute, indicating that it neither increased nor decreased customer satisfaction on the B2B cross-border EC platform. In other words, the existence of a product comparison function does not affect customer satisfaction (Ma et al., 2019). This quality attribute is not important in the design flow of B2B cross-border EC platforms. In particular, there was only one indifference quality attribute among the 37 quality attributes, echoing the results of the modified Delphi technique. Second, the seven must-be (M) quality attributes were online payment mechanics, clear return policy, product upload function, product management function, product description function, order management function, and ease of use. The presence of these seven must-be quality attributes does not increase customer satisfaction. However, their absence significantly decreases customer satisfaction (Ullah and Tamaki, 2011). Therefore, these seven must-be

Table 7
Quality attributes of B2B Cross-Border EC platforms and kano categories.

Flow	Code	Quality Attribute	Kano Category	Satisfaction (D_j^+)	Dissatisfaction (D_j^-)
Financial Flow (FF)	FF1	Online payment mechanic	M	0.48	−0.76
	FF2	Payment diversity	A	0.64	−0.42
	FF3	Payment safety	O	0.61	−0.91
	FF4	Payment convenience	O	0.73	−0.70
	FF5	Payment compatibility	A	0.84	−0.31
	FF6	Clear refund policy	O	0.58	−0.79
Logistics Flow (LF)	LF1	Transparency on delivery	O	0.55	−0.70
	LF2	Reliability of delivery	O	0.61	−0.61
	LF3	Delivery flexibility	A	0.70	−0.42
	LF4	Logistics delivery facilitation	A	0.76	−0.42
	LF5	Safety on logistics delivery	O	0.64	−0.61
	LF6	Effectiveness of logistic delivery	A	0.67	−0.36
	LF7	Cross-border warehousing	A	0.64	−0.18
Information Flow (IF)	IF1	Information transparency	O	0.59	−0.56
	IF2	Product information exposure on social media	A	0.56	−0.31
	IF3	Information security	O	0.58	−0.82
	IF4	Information privacy	O	0.52	−0.85
Commercial Flow (CF)	CF1	Simplicity of transaction process	A	0.67	−0.45
	CF2	Order fulfilment time	A	0.67	−0.39
	CF3	Clear return policy	M	0.48	−0.79
	CF4	Simplicity of return processes	O	0.61	−0.61
	CF5	Consumer disputes mechanic	O	0.52	−0.67
	CF6	Variety of services	A	0.70	−0.30
	CF7	Customer services response time	A	0.64	−0.39
	CF8	Effectiveness of return and exchange	O	0.64	−0.58
	CF9	Customer complaint services	O	0.48	−0.61
	CF10	Product audit mechanism	A	0.55	−0.48
Design Flow (DF)	DF1	Product upload function	M	0.36	−0.91
	DF2	Product management function	M	0.52	−0.85
	DF3	Product comparison function	I	0.48	−0.33
	DF4	Product description function	M	0.52	−0.76
	DF5	Order management function	M	0.48	−0.82
	DF6	Ease of use	M	0.55	−0.64
	DF7	Friendly interface	O	0.61	−0.67
	DF8	Simplified search function	O	0.55	−0.73
	DF9	Personalized interface	A	0.52	−0.30
	DF10	Flow management function	A	0.55	−0.52

Note: O = one-dimensional quality, M = must-be quality, A = attractive quality, I = indifferent quality, and R = reverse quality.

quality attributes should be top priority for B2B cross-border EC platforms. They belong to the financial flow (1), commercial flow (1), and design flow (5) of B2B cross-border EC platforms. In particular, the design flow of the B2B cross-border EC platform contains most must-be quality attributes.

The 15 one-dimensional (O) quality attributes included payment safety, payment convenience, clear refund policy, transparency of delivery, reliability of delivery, safety of logistics delivery, information transparency, information security, information privacy, simplicity of return processes, consumer dispute mechanics, effectiveness of return and exchange, customer complaint services, and simplified search function. Customer satisfaction is linearly dependent on these 15 one-dimensional quality attributes. That is, the more these 15 one-dimensional quality attributes are fulfilled, the more satisfied the customers' needs are (Chen et al., 2010; Hsu et al., 2018). The 15 one-dimensional quality attributes should be the attributes that are next in priority. These one-dimensional quality attributes are financial flow (3), logistics flow (3), information flow (3), commercial flow (4), and design flow (2).

Finally, the 14 attractive (A) quality attributes included payment diversity, payment compatibility, delivery flexibility, logistics delivery facilitation, effective logistics delivery, cross-border warehousing, product information exposure on social media, simplicity of transaction process, order fulfilment time, variety of services, customer service response time, product audit mechanism, personalized interface, and flow management function. The more these attractive quality attributes are fulfilled, the greater the customer satisfaction (Bigorra et al., 2019). However, the insufficiency of 14 attractive attributes would not lead to customer dissatisfaction. These included financial flow (2), logistics flow (4), information flow (1), commercial flow (5), and design flow (2). Attractive attributes are usually vital for boosting customer satisfaction and expanding customer base (Ou et al., 2018). These are important quality attributes for a B2B cross-border EC platform to differentiate itself from its competitors. The 14 attractive quality (A) attributes determined in the present study offer relative advantages in designing B2B cross-border EC platforms.

7. Conclusion

B2B cross-border EC platforms play a critical role in reducing the psychological barriers to cross-border demand, such as simplifying the search for and comparison of products and suppliers across countries. However, studies on the quality attributes of B2B cross-border EC platforms are limited, and still in their infancy, both theoretically and empirically. The issues in B2B cross-border EC platforms remain interesting research gaps for practitioners and academics. To fill these research gaps, this study aims to identify, categorize, and prioritize the critical quality attributes of B2B cross-border EC platforms.

In the first study, we conducted a modified Delphi technique to review the quality attributes of cross-border EC in journal papers and validate them with experts and practitioners in the B2B cross-border EC industry. We listed the critical quality attributes of B2B cross-border EC platforms, using data from 56 peer-reviewed journal articles. We performed modified Delphi surveys with a group of experts to develop a consensus on the quality attributes of B2B cross-border EC platforms. Industrial practitioners identified 37 quality attributes that can be categorized into five flows in the cross-border EC context. There are 6, 7, 4, 10, and 10 quality attributes in the financial flow (FF), logistics flow (LF), information flow (IF), commercial flow (CF), and design flow (DF), respectively, in the B2B cross-border EC context. From the first modified Delphi study, we illustrated how these five flows connect critical stakeholders in the B2B cross-border EC context. After two rounds of surveys with industrial practitioners, a consensus was reached. These findings provide sellers in the B2B cross-border EC business a clear picture of the critical quality attributes in connecting five flows of B2B cross-border EC context.

In the second study, an empirical test was conducted using focus group interviews and the Kano model survey. Based on the theory of attractive quality, this study prioritized the identified 37 quality attributes of the B2B cross-border EC platforms. Among the 37 quality attributes identified in the B2B cross-border EC platform, there were seven must-be quality attributes, 15 one-dimensional quality attributes, 14 attractive quality attributes, and one indifference quality attribute. In particular, the seven must-be quality attributes should be considered first priority for B2B cross-border EC platforms. The 15 one-dimensional quality attributes should be considered next priority. To distinguish itself from other competitors, B2B cross-border EC platforms should also pay attention to the 14 attractive quality attributes. There was only one indifference quality attribute among the 37 quality attributes, which echoes the results from the modified Delphi technique. Classifying quality attributes into Kano categories provides B2B cross-border EC platforms with valuable information that can be used when designing new services or improving existing ones. Our findings from these prioritized quality attributes can also be incorporated into marketing strategies to recruit enterprise members from B2B cross-border EC platforms.

The theoretical and practical contributions of this study can be summarized as follows: First, our findings provide practical insights into the needs of enterprises searching for B2B cross-border EC platforms. For sellers for whom B2B cross-border EC is new, these quality attributes are critical indices for selecting cooperative B2B cross-border EC platforms. Second, our findings contribute to the design and improvement of services and mechanics of quality attributes in the five flows of B2B cross-border EC platforms. Third, the results of the modified Delphi study provide a clear picture of the B2B cross-border EC framework. Fourth, the findings from the Kano model analysis reveal the key quality attributes for B2B cross-border EC platform design that further meet the potential demands of enterprise users. Finally, this study is theoretical in nature because it aims to understand the state-of-the-art quality attributes in B2B cross-border EC platforms through secondary data analysis and modified Delphi analysis. Our findings provide theoretical insights for Information System (IS) researchers through an empirical test of the theory of attractive quality in the current limited number of B2B cross-border EC studies. This study had two limitations: First, it invited practitioners from enterprises that primarily used the Alibaba B2B cross-border EC platform. Further research could include users from different B2B cross- border EC platforms. Second, the research participants were all from Taiwanese enterprises. Future research can include enterprises from different countries to compare cultural differences in using B2B cross-border EC platforms.

CRediT authorship contribution statement

Shu-Chun Ho: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Wei-Li Chuang:** Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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Appendix A

Modified delphi survey

This questionnaire was designed to understand your experience regarding the quality attributes of using the Alibaba B2B cross-border EC platform. (The answers to the modified Delphi questionnaire were based on a Likert scale ranging from “Very satisfied” to “Very dissatisfied.”).

I. **Financial Flow (FF)**	
FF1	How do you feel if a CBEC platform has online payment availability?
FF2	How do you feel if a CBEC platform has payment diversity?
FF3	How do you feel if a CBEC platform has payment compatibility?
FF4	How do you feel if a CBEC platform has payment convenience?
FF5	How do you feel if a CBEC platform has payment interoperability?
FF6	How do you feel if a CBEC platform has clear refund policy?
II. **Logistical Flow (LF)**	
LF1	How do you feel if a CBEC platform has transparency on delivery?
LF2	How do you feel if a CBEC platform has reliability of delivery?
LF3	How do you feel if a CBEC platform has delivery flexibility?

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LF4	How do you feel if a CBEC platform has logistics facilitation?
LF5	How do you feel if a CBEC platform has logistics safety?
LF6	How do you feel if a CBEC platform has effectiveness of logistic delivery?
LF7	How do you feel if a CBEC platform has availability of cross-border warehousing?
III. **Information Flow (IF)**	
IF1	How do you feel if a CBEC platform has information transparency?
IF2	How do you feel if a CBEC platform has product information exposure on social media?
IF3	How do you feel if a CBEC platform has information security?
IF4	How do you feel if a CBEC platform has information privacy?
IV. **Commercial Flow (CF)**	
CF1	How do you feel if a CBEC platform has simplicity of transaction process?
CF2	How do you feel if a CBEC platform has order fulfilment time?
CF3	How do you feel if a CBEC platform has clarity of return processes?
CF4	How do you feel if a CBEC platform has simplicity of return processes?
CF5	How do you feel if a CBEC platform has consumer disputes?
CF6	How do you feel if a CBEC platform has commodity diversity?
CF7	How do you feel if a CBEC platform has response time of customer service?
CF8	How do you feel if a CBEC platform has effectiveness of return and exchange?
CF9	How do you feel if a CBEC platform has customer complaint rate?
CF10	How do you feel if a CBEC platform has product audit mechanism?
V. **Design Flow (DF)**	
DF1	How do you feel if a CBEC platform has product upload?
DF2	How do you feel if a CBEC platform has product management?
DF3	How do you feel if a CBEC platform has implementation of product comparison?
DF4	How do you feel if a CBEC platform has product description?
DF5	How do you feel if a CBEC platform has order management?
DF6	How do you feel if a CBEC platform has ease of use of a website?
DF7	How do you feel if a CBEC platform has Page friendliness?
DF8	How do you feel if a CBEC platform has function of simple search?
DF9	How do you feel if a CBEC platform has personalized websites?
DF10	How do you feel if a CBEC platform has flow management?

References

Berger, C., Blauth, R.E., Boger, D., Bolster, C., Burchill, G., DuMouchel, W., Pouliot, F., Richter, R., Rubinoff, A., Shen, D., Timko, M., Walden, D., 1993. Kano's methods for understanding customer-defined quality. Center Qual. Manage. J. 2 (4), 3–36. https://doi.org/10.4236/ojpm.2014.46060.

Bigorra, A.M., Isaksson, O., Karlberg, M., 2019. Aspect-based Kano categorization. Int. J. Inform. Manage. 46, 163–172. https://doi.org/10.1016/j.ijinfomgt.2018.11.004.

Chen, C.-C., Chuang, M.-C., 2008. Integrating the kano model into a robust design approach to enhance customer satisfaction with product design. Int. J. Product. Econ. 114 (2), 667–681. https://doi.org/10.1016/j.ijpe.2008.02.015.

Chen, S., He, Q., Xiao, H., 2022. A study on cross-border e-commerce partner selection in B2B mode. Electron. Comm. Res. 22 (2), 1–21. https://doi.org/10.1007/s10660-020-09403-6.

Chen, M.-C., Hsu, C.-L., Lee, L.-H., 2020. Investigating pharmaceutical logistics service quality with refined Kano's model. J. Retail. Consum. Serv. 57, 102231 https://doi.org/10.1016/j.jretconser.2020.102231.

Chen, H.-C., Lee, T.-R., Lin, H.-Y., Wu, H.-C., 2010. Application of TRIZ and the kano method to home life industry innovation. Int. J. Innovat. Learn. 7 (1), 64–84. https://doi.org/10.1504/IJIL.2010.029474.

Chen, N., Yang, J., 2016. Mechanism of government policies in cross-border e-commerce on firm performance and implications on m-commerce. Int. J. Mob. Commun. 15 (1), 69–84. https://doi.org/10.1504/IJMC.2017.080578.

Chen, N., Yang, Y., 2021. The impact of customer experience on consumer purchase intention in cross-border E-commerce - Taking network structural embeddedness as mediator variable. J. Retail. Consum. Serv. 59 https://doi.org/10.1016/j.jretconser.2020.102344.

Chen, K.J., Yeh, T.M., Pai, F.Y., Chen, D.F., 2018. Integrating refined Kano model and QFD for service quality improvement in healthy fast-food chain restaurants. Int. J. Environ. Res. Public Health 15 (7), 1310. https://doi.org/10.3390/ijerph15071310.

Cheng, X., Su, L., Zarifis, A., 2019. Designing a talents training model for cross-border e-commerce: a mixed approach of problem-based learning with social media. Electron. Commer. Res. 19 (4), 801–822. https://doi.org/10.1007/s10660-019-09341-y.

Chin, J.B., Tsai, C.H., 2013. Developing a service quality evaluation model for luxurious restaurants in international hotel chains. Total Qual. Manag. Bus. Excell. 24 (10), 1160–1173. https://doi.org/10.1080/14783363.2012.661132.

Cho, S.E., 2010. Perceived risks and customer needs of geographical accessibility in electronic commerce. Electron. Commer. Res. Appl. 9 (6), 495–506. https://doi.org/10.1016/j.elerap.2010.02.005.

Cui, Y., Mou, J., Cohen, J., Liu, Y., 2019. Understanding information system success model and valence framework in sellers' acceptance of cross-border e-commerce: a sequential multi-method approach. Electron. Commer. Res. 19 (4), 885–914. https://doi.org/10.1007/s10660-019-09331-0.

Cui, Y., Mou, J., Cohen, J., Liu, Y., Kurcz, K., 2020. Understanding consumer intentions toward cross-border m-commerce usage: A psychological distance and commitment-trust perspective. Electron. Commer. Res. Appl. 39, 100920 https://doi.org/10.1016/j.elerap.2019.100920.

Do, Q. H., Kim, T. Y., Wang, X., 2022. Effects of logistics service quality and price fairness on customer repurchase intention: The moderating role of cross-border e-commerce experiences, *Journal of Retailing and Consumer Services,* 70, http://10.1016/j.jretconser.2022.103165.

Donnellan, M.B., Lucas, R.E., 2013. Secondary data analysis. In: Little, T.D. (Ed.), The Oxford Handbook of Quantitative Methods: Statistical Analysis. Oxford University Press, pp. 665–667. https://doi.org/10.1093/oxfordhb/9780199934898.013.0028.

Farquhar, J., Michels, N., Robson, J., 2020. Triangulation in industrial qualitative case study research: widening the scope. Ind. Mark. Manage. 87, 160–170. https://doi.org/10.1016/j.indmarman.2020.02.001.

Ferreira, D.C., Marques, R.C., Nunes, A.M., Figueira, J.R., 2018. Patients' satisfaction: The medical appointments valence in Portuguese public hospitals. Omega 80, 58–76. https://doi.org/10.1016/j.omega.2017.08.009.

Fox, A.R., Gordon, L.K., Heckenlively, J.R., Davis, J.L., Goldstein, D.A., Lowder, C.Y., Nussenblatt, R.B., Butler, N.J., Dalal, M., Jayasundera, T., Smith, W.M., Lee, R.W., Adamus, G., Chan, C.C., Hooks, J.J., Morgans, C.W., Detrick, B., Sen, H.N., 2016. Consensus on the diagnosis and management of nonparaneoplastic autoimmune retinopathy using a modified delphi approach. Am. J. Ophthalmol. 168, 183–190. https://doi.org/10.1016/j.ajo.2016.05.013.

Giuffrida, M., Mangiaracina, R., Perego, A., Tumino, A., 2017. Cross-border B2C e-commerce to Greater China and the role of logistics: a literature review. Int. J. Phys. Distrib. Logist. Manage. 47 (9), 772–795. https://doi.org/10.1108/IJPDLM-08-2016-0241.

Gomez-Herrera, E., Martens, B., Turlea, G., 2014. The drivers and impediments for cross-border e-commerce in the EU. Inf. Econ. Policy 28, 83–96. https://doi.org/10.1016/j.infoecopol.2014.05.002.

Guo, L., 2022. Cross-border e-commerce platform for commodity automatic pricing model based on deep learning. Electron. Commer. Res. 22, 1–20. https://doi.org/10.1007/s10660-020-09449-6.

Guo, Y., Le-Nguyen, K., Jia, Q., Li, G., 2015. Seller-buyer trust in cross-border e-commerce: a conceptual model. Proceeding of the 21st Americas Conference on Information Systems (AMCIS). Puerto Rico.

Guo, Y., Bao, Y., Stuart, B.J., Le-Nguyen, K., 2018. To sell or not to sell: Exploring sellers' trust and risk of chargeback fraud in cross-border electronic commerce. Inf. Syst. J. 28 (2), 359–383. https://doi.org/10.1111/isj.12144.

Han, J.H., Kim, H.M., 2019. The role of information technology use for increasing consumer informedness in cross-border electronic commerce: an empirical study. Electron. Commer. Res. Appl. 34, 100826 https://doi.org/10.1016/j.elerap.2019.100826.

He, L., Song, W., Wu, Z., Xu, Z., Zheng, M., Ming, X., 2017. Quantification and integration of an improved Kano model into QFD based on multi-population adaptive genetic algorithm. Comput. Ind. Eng. 114, 183–194. https://doi.org/10.1016/j.cie.2017.10.009.

Heel, B. V., Lukic, V., Leeuwis, E., 2014. *Cross-border e-commerce makes the world flatter*. The Boston Consulting Group. Retrieved from https://www.bcg.com/publications/2014/post-parcel-sales-channel-transformation-cross-border-e-commerce.

Holden, M.C., Wedman, J.F., 1993. Future issues of computer-mediated communication: the results of a delphi study. Educ. Technol. Res. Dev. 41, 5–24. https://doi.org/10.1007/BF02297509.

Hsiao, Y.H., Chen, M.C., Liao, W.C., 2017. Logistics service design for cross-border e-commerce using Kansei engineering with text-mining-based online content analysis. Telematics Inform. 34 (4), 284–302. https://doi.org/10.1016/j.tele.2016.08.002.

Hsu, S.-W., Qing, F., Wang, C.-C., Hsieh, H.-L., 2018. Evaluation of service quality in Facebook-based group-buying. Electron. Commer. Res. Appl. 28, 30–36. https://doi.org/10.1016/j.elerap.2018.01.006.

Huang, S.L., Chang, Y.C., 2019. Cross-border e-commerce: consumers' intention to shop on foreign websites. Internet Res. 29 (6), 1256–1279. https://doi.org/10.1108/INTR-11-2017-0428.

Huang, W.L., Hu, P., Tsai, S., Chen, X.D., 2021. The business analysis on the home–bias of E–commerce consumer behavior. Electron. Commer. Res. 21, 855–879. https://doi.org/10.1007/s10660-020-09431-2.

Hussein, A., 2019. The use of triangulation in social sciences research: can qualitative and quantitative methods be combined? J. Compar. Soc. Work 1 (1), 1–12. https://doi.org/10.31265/jcsw.v4i1.48.

Janita, M.S., Miranda, F.J., 2013. Exploring service quality dimensions in B2B e-marketplaces. J. Electron. Commer. Res. 14 (4), 363–386. http://www.jecr.org/sites/default/files/14_4_p06.pdf.

Kano, N., Seraku, N., Takahashi, F., Tsuji, S.I., 1984. Attractive quality and must-be quality. J. Jpn. Soc. Qual. Control 14 (2), 147–156. https://doi.org/10.20684/quality.14.2_147.

Kawa, A., Zdrenka, W., 2016. Conception of integrator in cross-border e-commerce. *Scientific Journal of Logistics*, *12*(1), 63-73. 10.17270/J.LOG.2016.1.6.

Kim, T.Y., Dekker, R., Heil, C., 2017. Cross-border electronic commerce: distance effects and express delivery in European Union markets. Int. J. Electron. Commer. 21 (2), 184–218. https://doi.org/10.1080/10864415.2016.1234283.

Li, G., Li, N., 2019. Customs classification for cross–border e–commerce based on text–image adaptive convolutional neural network. Electron. Commer. Res. 19 (1), 779–800. https://doi.org/10.1007/s10660-019-09334-x.

Li, J., Yao, Y., Xu, Y., Li, J., Wei, L., Zhu, X., 2019. Consumer's risk perception on the Belt and Road countries: evidence from the cross–border e–commerce. Electron. Commer. Res. 19 (4), 823–840. https://doi.org/10.1007/s10660-019-09342-x.

Lin, A.J., Li, E.Y., Lee, S.Y., 2018. Dysfunctional customer behavior in cross-border e-commerce: a Justice-affect-behavior model. J. Electron. Commer. Res. 19 (1), 36–54. http://www.jecr.org/sites/default/files/19_1Paper3.pdf.

Liu, X., Chen, D., Cai, J., 2015. The operation of the cross-border e-commerce logistics in China. Int. J. Intell. Inf. Syst. 4 (2–2), 15–18. https://doi.org/10.11648/j.ijiis.s.2015040202.14.

Liu, Y., Jiang, G., Zhao, H., 2019. Assessing product competitive advantages from the perspective of customers by mining user-generated content on social media. Decis. Support Syst. 123 (7), 113079 https://doi.org/10.1016/j.dss.2019.113079.

Lofgren, M., Witell, L., Gustafsson, A., 2011. Theory of attractive quality and life cycles of quality attributes. Total Qual. Manage. J. 23 (2), 235–246. https://doi.org/10.1108/17542731111110267.

Ma, S., Chai, Y., Zhang, H., 2018. Rise of cross-border e-commerce exports in China. Chin. World. Econ. 26 (3), 63–87. https://doi.org/10.1111/cwe.12243.

Ma, M.-Y., Chen, C.-W., Chang, Y.-M., 2019. Using Kano model to differentiate between future vehicle-driving services. Int. J. Ind. Ergon. 69, 142–152. https://doi.org/10.1016/j.ergon.2018.11.003.

McNeilly, K.M., Barr, T.F., 2006. I love my accountants - they're wonderful: understanding customer delight in the professional services arena. J. Serv. Market. 20 (3), 152–159. https://doi.org/10.1108/08876040610665607.

Meng, Q., Zhang, L., He, L., 2014. Classification of service quality elements based on Fuzzy Kano model: An empirical study in Chinese machinery industry. *11th International Conference on Service Systems and Service Management*, 1-5. 10.1109/ICSSSM.2014.6874079.

Miao, Y., Du, R., Li, J., Westland, J.C., 2019. A two-sided matching model in the context of B2B export cross-border e-commerce. Electron. Commer. Res. 19 (4), 841–861. https://doi.org/10.1007/s10660-019-09361-8.

Mou, J., Ren, G., Qin, C., Kurcz, K., 2019a. Understanding the topics of export cross-border e-commerce consumers feedback: an LDA approach. Electron. Commer. Res. 19 (4), 749–777. https://doi.org/10.1007/s10660-019-09338-7.

Mou, J., Zhu, W., Benyoucef, M., 2019.. 2019b Impact of product description and involvement on purchase intention in dross-border e-commerce. Ind. Manag. Data Syst. 120 (3), 567–586.

Mou, J., Cohen, J.F., Dou, Y., Zhang, B., 2020. International buyers' repurchase intentions in a Chinese cross-border e-commerce platform. Internet Res. 30 (2), 403–437. https://doi.org/10.1108/INTR-06-2018-0259.

Murry, J.W.J., Hammons, J.O., 1995. Delphi: a versatile methodology for conducting qualitative research. Rev. High. Educ. 18 (4), 423–436. https://doi.org/10.1353/rhe.1995.0008.

Nayahangan, L.J., Stefanidis, D., Kern, D.E., Konge, L., 2018. How to identify and prioritize procedures suitable for simulation-based training: experiences from general needs assessments using a modified Delphi method and a needs assessment formula. Med. Teachnol. 40 (7), 676–683. https://doi.org/10.1080/0142159X.2018.1472756.

Niu, B., Wang, J., Lee, C.K.M., Chen, L., 2019. "Product + logistics" bundling sale and co–delivery in cross–border e–commerce. Electron. Commer. Res. 19, 915–941. https://doi.org/10.1007/s10660-019-09379-y.

Niu, B., Dong, J., Dai, Z., Liu, Y., 2022. Sales data sharing to improve product development efficiency in cross-border e-commerce. Electron. Commer. Res. Appl. 51, 101112 https://doi.org/10.1016/j.elerap.2021.101112.

O'Grady, M., 2017. *Cross-border services will help cross-border eCommerce reach $627 Billion by 2022*. Forrester. Retrieved from https://www.forrester.com/report/CrossBorder+Services+Will+Help+CrossBorder+eCommerce+Reach+627+Billion+By+2022/RES137902.

Ong, C.E., Teh, D., 2016. Redress procedures expected by consumers during a business-to-consumer e-commerce dispute. Electron. Commer. Res. Appl. 17, 150–160. https://doi.org/10.1016/j.elerap.2016.04.006.

Ou, W., Huynh, V.-N., Sriboonchitta, S., 2018. Training attractive attribute classifiers based on opinion features extracted from review data. Electron. Commer. Res. Appl. 32, 13–22. https://doi.org/10.1016/j.elerap.2018.10.003.

Paquette-Warren, J., Tyler, M., Fournie, M., Harris, S.B., 2017. The diabetes evaluation framework for innovative national evaluations (DEFINE): construct and content validation using a modified delphi method. Can. J. Diabetes 41 (3), 281–296. https://doi.org/10.1016/j.jcjd.2016.10.011.

Picolo, J.D., Tontini, G., 2018. Integrating methods for the prioritization of innovations and improvements in services. J. Serv. Mark. 32 (7), 820–834. https://doi.org/10.1108/JSM-12-2015-0383.

Qi, X., Chan, J.H., Hu, J., Li, Y., 2020. Motivations for selecting cross-border e-commerce as a foreign market entry mode. Ind. Mark. Manage. 89, 50–60. https://doi.org/10.1016/j.indmarman.2020.01.009.

Qi, J., Zhang, Z., Jeon, S., Zhou, Y., 2016. Mining customer requirements from online reviews: a product improvement perspective. Inf. Manage. 53 (8), 951–963. https://doi.org/10.1016/j.im.2016.06.002.

Ren, S., Choi, T.M., Lee, K.M., Lin, L., 2020. Intelligent service capacity allocation for cross-border-e-commerce related third-party-forwarding logistics operations: a deep learning approach. Transport. Res. Part E Logist. Transport. Rev. 134, 101834 https://doi.org/10.1016/j.tre.2019.101834.

Rong, J., Zhong, D., 2018. Influence factors of customer satisfaction in cross-border e-commerce. J. Discret. Math. Sci. Cryptogr. 21 (6), 1281–1286. https://doi.org/10.1080/09720529.2018.1526401.

Shah, S.A.A., Solangi, Y.A., Ikram, M., 2019. Analysis of barriers to the adoption of cleaner energy technologies in Pakistan using Modified Delphi and Fuzzy Analytical Hierarchy Process. J. Clean. Prod. 235, 1037–1050. https://doi.org/10.1016/j.jclepro.2019.07.020.

Shi, Y., Wang, T., Alwan, L. C. Analytics for cross-border e-commerce: Inventory risk management of an online fashion retailer, *Decision Science*, 51(6), 1347-1376.

Song, B., Yan, W., Zhang, T., 2019. Cross-border e-commerce commodity risk assessment using text mining and fuzzy rule-based reasoning. Adv. Eng. Inf. 40, 69–80. https://doi.org/10.1016/j.aei.2019.03.002.

Tu, Y., Shangguan, J.Z., 2018. Cross-border e-commerce: a new driver of global trade. In: Agarwal, J., Wu, T. (Eds.), Emerging Issues in Global Marketing. Springer, Cham. https://doi.org/10.1007/978-3-319-74129-1_4.

Ullah, A.M.M.S., Tamaki, J., 2011. Analysis of Kano-model-based customer needs for product development. Syst. Eng. 14 (2), 154–172. https://doi.org/10.1002/sys.20168.

Valarezo, Á., Pérez-Amaral, T., Garín-Muñoz, T., García, I.H., López, R., 2018. Drivers and barriers to cross-border e-commerce: evidence from Spanish individual behavior. Telecommun. Policy 42 (6), 464–473. https://doi.org/10.1016/j.telpol.2018.03.006.

von der Gracht, H.A., 2012. Consensus measurement in Delphi studies: review and implications for future quality assurance. Technol. Forecast. Soc. Change 79 (8), 1525–1536. https://doi.org/10.1016/j.techfore.2012.04.013.

Wang, C.-H., 2013. Incorporating customer satisfaction into the decision-making process of product configuration: a fuzzy kano perspective. Int. J. Prod. Res. 51 (22), 6651–6662. https://doi.org/10.1080/00207543.2013.825742.

Wang, F., Yang, Y., Tso, G.K.F., Li, Y., 2019. Analysis of launch strategy in cross-border e-commerce market via topic modeling of consumer reviews. Electron. Commer. Res. 19 (4), 863–884. https://doi.org/10.1007/s10660-019-09368-1.

Xiao, L., Zhang, Y., 2020. An analysis on the policy evolution of cross-border ecommerce industry in China from the perspective of sustainability. Electron. Commer. Res. 22, 875–899. https://doi.org/10.1007/s10660-020-09427-y.

Yang, Y., 2020. Research on the optimization of the supplier intelligent management system for cross-border e-commerce platforms based on machine learning. IseB 18 (4), 851–870. https://doi.org/10.1007/s10257-019-00402-1.

Yin, Z.H., Choi, C.H., 2021. The effects of China's cross-border e-commerce on its exports: a comparative analysis of goods and services trade. Electron. Commer. Res. https://doi.org/10.1007/s10660-021-09483-y.

Zha, X., Zhang, X., Liu, Y., Dan, B., 2022. Bonded-warehouse or direct-mail? Logistics mode choice in a cross-border e-commerce supply chain with platform information sharing. Electron. Commer. Res. Appl. 54 https://doi.org/10.1016/j.elerap.2022.101181.

Zhang, J., Chen, D., Lu, M., 2018. Combining sentiment analysis with a fuzzy kano model for product aspect preference recommendation. IEEE Access 6, 59163–59172. https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8486974.

Zhang, X., Zha, X., Zhang, H., Dan, B., 2022. Information sharing in a cross-border e-commerce supply chain under tax uncertainty. Int. J. Electron. Commer. 26 (1), 123–146. https://doi.org/10.1080/10864415.2021.2010007.

Zhu, W., Mou, J., Benyoucef, M., 2019. Exploring purchase intention in cross-border E-commerce: a three stage model. J. Retail. Consum. Serv. 51, 320–330. https://doi.org/10.1016/j.jretconser.2019.07.004.

Further Reading

Griffin, A., Hauser, J., 1991. The voice of the customer. Mark. Sci. 12 (1), 1–27. https://doi.org/10.1287/mksc.12.1.1.

Pai, F.Y., Yeh, T.M., Tang, C.Y., 2018. Classifying restaurant service quality attributes by using Kano model and IPA approach. Total Qual. Manag. Bus. Excell. 29 (3–4), 301–328. https://doi.org/10.1080/14783363.2016.1184082.