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## **Exploring service quality combining Kano model and importance-performance analysis – customer satisfaction of luxury housing service management**

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**Abstract:** The housing service management business in Taiwan is extremely competitive especially for luxury apartments. While many studies have discussed service quality in a variety of fields, little research has been done in the field of housing service management. This study aims to combine the Kano model with importance-performance analysis (IPA) to identify the factors related to more customer-oriented service quality in the housing service management market. The combined IPA-Kano model avoids the limitations of the Kano model which neglects attribute performance and importance, and eliminates the weakness of the IPA model which considers only one-dimensional qualities. A case study of a housing service management company in Taipei was conducted. The top three service items that contribute highly to overall satisfaction for luxury apartment residents were identified, corresponding managerial implications were discussed, and strategies and actions for improvement were suggested.

**Keywords:** service quality; housing service management; Kano model; importance-performance analysis; IPA.

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## **1 Introduction**

Taiwan has had one of the fastest growing economies over the past five decades. In order to obtain more job opportunities and a better quality of life, an increasing number of people are moving to urban areas, leading to the development of more buildings, such as multi-functional apartments and office buildings. The monetary value of these property assets has also been rising; consequently, the necessity for highly-competent housing service management businesses to manage and maintain these apartments and buildings has also been increasing.

The housing service management business in Taiwan is extremely competitive. Most housing service management companies traditionally have tended to use price wars as marketing strategies to attract clients; however, only focusing on price-oriented strategies to achieve and sustain a competitive advantage is insufficient in today's market. It neglects the most important factor in the housing service management market, that of providing a safe and comfortable environment for householders/tenants (Hui, 2005; Hussein, 2011). As a consequence, companies are now seeking new opportunities and/or restructuring their administrative models. For example, many high-priced buildings are being organised as serviced apartments, which provide more facilities and maintenance services to occupants (Hao and Liu, 2013; MacDonald et al., 2013). According to a database from the Ministry of the Interior in Taiwan, trading volume of luxury housing in the first quarter of 2013 rose by 140% compared with the second quarter of the same year (MOI, 2013).

Moreover, in Taipei city, an upward trend continues with regard to price per ping (3.30 sq.m. or 35.59 sq.ft.). In 2014, 108 of 185 buildings under construction were priced at over US\$33,000 dollars per ping. This 55% figure is a 20% rise from 2013. Additionally, Taiwan began opening its luxury housing market to Chinese investors in 2009. Mainland buyers started their investment in the market on the island following a series of trade deals, and this demand stimulus then encouraged a corresponding rash of property investment on the island by the Taiwanese. As a result, it is of interest to better understand how customers perceive the service/product they are offered in this context, as well their specific demands, so that firms in the highly competitive housing service management market can attract more business. Identifying and delivering outstanding customer value and satisfaction are crucial in obtaining market strength for firms. Much research has shown a variety of links between service quality and performance and other measures such as profitability, customer loyalty, price sensitivity, positive word-of-mouth, and firm market share (Matzler et al., 2004; Deng, 2007). As Gurnani et al. (2018) noted in their survey of the literature many papers do focus on specific forms of service; however, there is a distinct paucity of research concerning the luxury housing industry, which differs from many other areas in that there is no traditional manufacturer,

wholesaler, retailer, or after-sales service-provider involved as there is with many other services/products. As such, this paper adds to the literature in this field.

The importance of identifying, measuring, and managing customer satisfaction (CS) is widely recognised. One technique to identify the critical performance factors involved in CS data is importance-performance analysis (IPA). The IPA technique was suggested by Martilla and James (1977) to assist in understanding CS as a function of both expectations of attributes and actual performance of such attributes. If only the performance aspect is measured, there is a problem for marketers in translating the results into action; consequently, the IPA allows practitioners to analyse quality attributes on: their performance level (satisfaction) and their importance to the customer (Lee and Lee, 2009). Evaluations are combined into a matrix that allows a firm to identify key drivers of satisfaction and to formulate improvement priorities (Matzler et al., 2004). Following a CS survey and IPA, business managers can make rational decisions about how to best deploy scarce resources to attain the highest degree of CS.

Although the IPA is a valuable method, and has been used in a variety of settings, there is evidence that it has some shortcomings (Matzler et al., 2004; Deng, 2007). In the IPA, attribute importance and performance are the key decision factors. They are deemed to be independent and the relationship between attribute-level performance and overall performance is assumed to be linear and symmetric (Deng, 2007). These assumptions, however, are erroneous in the real world, with the relationship between attribute-level performance and overall CS being asymmetrical and the relationship between attribute performance and attribute importance being causal (Matzler et al., 2004).

In addition, there are many cases where great fulfilment in some quality attributes does not necessarily lead to higher CS. Kano et al. (1984) developed a model that distinguishes between different quality attribute types. The model divides them into five distinct categories, i.e., attractive, one-dimensional, must-be, indifferent, and reverse quality attributes. Each of these categories influences CS differently.

Application of IPA was originally meant to identify key drivers of satisfaction and to formulate improvement priorities. However, IPA alone cannot distinguish between different quality attribute types; that is, whether certain attributes are considered must-be, attractive, or indifferent by customers. Further, high fulfilment of these attributes may not actually increase CS. Therefore, adoption of IPA in combination with the Kano model can ameliorate the short-comings of only using IPA.

In a service industry such as housing service management there is a need to understand perceived quality in order to retain customers, as key services are the criteria which differentiate one organisation from another. While many studies have discussed service quality in a variety of fields, scant research has been conducted in the field of housing service management. Combining the Kano model with that of IPA assists in the further discussion of the attributes/criteria of service quality satisfaction. The combined model avoids the limitation of the Kano model which neglects attribute performance and importance, and eliminates the weakness of the IPA model which considers only one-dimensional qualities. The combined model enables managers to accurately grasp user perceptions of a quality attribute and corresponding coping strategies. By applying the combined IPA-Kano model, the appropriate action strategy for each service quality attribute can be acquired in any service encounter, and thereby enables service industry managers to improve service quality and to achieve a competitive advantage. This combination model thereby contributes new insights in the

field of service quality analysis by providing a straightforward and easily understood model.

Following this introduction, Section 2 of this paper presents a review of the literature on service quality, IPA, and Kano model analysis. Section 3 then presents details of the methods used in the empirical study in order to better understand service quality attributes perceived by customers in housing service management. The results and some of their managerial implications are highlighted in Section 4. Section 5 concludes this study.

## **2 Related literature**

Service providers need business models that accurately account for the effects of customer and service-provider choices in creating and delivering service encounters. In this respect, the development of a meaningful classification schemes for services focusing on service quality fundamentals is important to the management literature (Prakash and Mohanty, 2013).

According to the literature review, it can be said that SERVQUAL was the most used model when measuring service quality. Due to criticisms of SERVQUAL, other models were derived from SERVQUAL [DINESERV (Stevens et al., 1995), INTSERVQUAL (Frost and Kumar, 2000) and SERVPERF (SQUAL) (Karatepe et al., 2005; Brady et al., 2002)] which have been used extensively in service quality research (Yarimoglu, 2014).

These approaches have prompted some researchers to question their efficacy. As Prakash and Mohanty (2013) note this debate continues today, as is evident from the ongoing and largely failed attempts either to integrate the SERVQUAL/SERVPERF conceptualisation into new or atypical service fields. In the current paper, we utilise these concepts to a limited degree, but then extend the inquiry with our combined IPA-Kano configuration.

Various other classification schemes or positioning matrices for services have been formulated (Collier and Meyer, 1998; Schmenner, 2004); however, none of these is truly satisfactory to define the relationship between the service and the service delivery process (Prakash and Mohanty, 2013).

Many psychometrically driven survey instruments have also been developed for measuring CS in various settings – see, for example, retail (Oliver, 1981), overseas students (Romm et al., 1994), business-to business professionals (Patterson and Spreng, 1997), information technology (Thong et al., 2006) and e-service purchasing (Liao et al., 2007). Primarily, such studies use Likert scales to measure scores for perceptions relative to expectations and then determine the difference to get a satisfaction score (Forsythe, 2016).

Such perceived value relates to the experience of different types of services, together with imagined experiences, that effect present and future value-in-context experiences of customers (Jalilvand et al., 2017). Consequently, with house buyers becoming more sophisticated and discerning (Lee, 2006), developers who focus on luxury residential property have no choice but understand how potential purchasers' expectations on their products can be examined, modified and fulfilled (Chuon et al., 2017).

By comparing service performance with competitors, managers can establish adequate strategies to enhance their relative position in the market and achieve

competitive advantages. As an alternative to the methods described above, IPA has become a recognised approach to managing CS (Matzler et al., 2003) that serves to prioritise improvement opportunities and to guide strategic planning efforts (Deng et al., 2008).

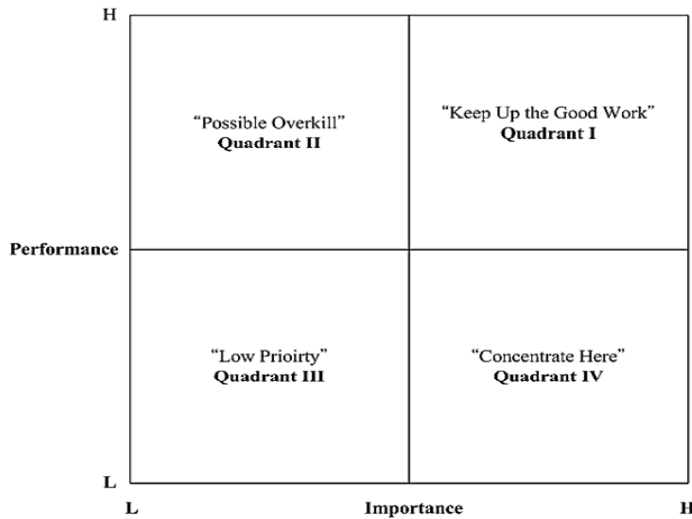
In a comprehensive review of the literature, Martín et al. (2018) cited the IPA scheme as having been used in many different industries like health (Abalo et al., 2007; Dolinsky, 1991), education (Alberty and Mihalik, 1989; Ford et al., 1999; O'Neill and Palmer, 2004), food (Aigbedo and Parameswaran, 2004; Sampson and Showalter, 1999; Tontini and Silveira, 2007), banking (Matzler et al., 2003; Yeo, 2003), sport centres (Rial et al., 2008), e-business (Levenburg and Magal, 2004; Skok et al., 2001), tourism (Deng, 2007; Enright and Newton, 2004), and hotels (Chu and Choi, 2000; Deng et al., 2008; Weber, 2000).

Thus, IPA is a valuable tool for developing marketing strategies by prioritising improvements to service quality attributes; however, although it is simple and easy to interpret, IPA is not free from criticism. As such, in the following sections, we will describe its format and usage, and then proceed to detail in combination with the Kano model. In so doing, we provide a newly configured approach to service quality satisfaction.

### *2.1 Importance-performance analysis*

IPA was originally applied by Martilla and James (1977) to identify which product/service attributes an organisation should focus on to enhance CS. The IPA is a graphical tool that makes it easy to measure importance and performance attributes using a two-dimensional grid with four quadrants, as shown in Figure 1. The X-axis shows the perceived importance of attributes, while the Y-axis reports the product/service performance of attributes. Since the introduction of IPA, it has been used as an aid in a wide variety of research including the areas of healthcare, the hospitality industry, education, and a variety of business settings such as logistics, retail shopping satisfaction, and the mobile telecommunications industry (Sethna, 1982; Hawes and Rao, 1985; Cunningham and Gaeth, 1989; Dolinsky, 1991; Martilla and James, 1977; Alexitch et al., 2004; Kitcharoen, 2004; Go and Zhang, 2008; Silva and Fernandes, 2010; Vahid et al., 2009).

With the use of IPA, the strengths and weaknesses of an organisation can be identified to provide management with insights or guide planning schemes (Deng, 2007; Wu and Hsieh, 2012). The IPA is divided into four quadrants, namely 'keep up the good work' (quadrant I), 'possible overkill' (quadrant II), 'low priority' (quadrant III), and 'concentrate here' (quadrant IV). Attributes with both high importance and performance are placed in quadrant I, indicating that these can be considered as major strengths by the organisation. Attributes located in quadrant II have low importance, but relatively high performance. The resources and efforts dedicated to these attributes may thus be excessive, and should be deployed elsewhere. Quadrant III includes those attributes with both low importance and performance, and which are classified as having a low priority for improvement. Finally, those attributes in quadrant IV are perceived to be very important, but with low performance. These attributes are thus major weaknesses and threats to competitiveness, and more resources should be invested at a high priority in order to improve them (Martilla and James, 1977; Chu and Choi, 2000; Wu and Hsieh, 2012; Lee et al., 2014).

**Figure 1** Importance-performance analysis

## 2.2 Kano model analysis

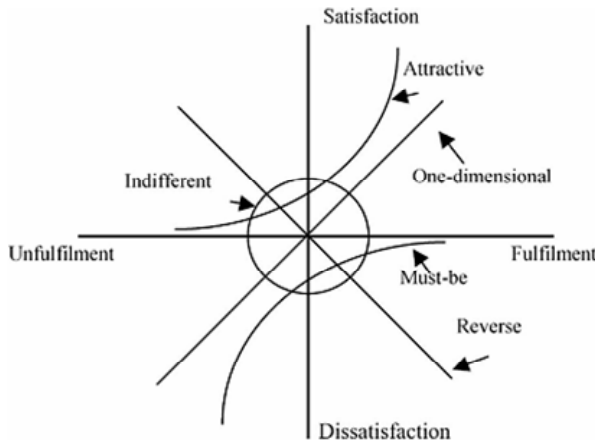
Traditionally, CS has been regarded as one-dimensional; that is, the higher the perceived product/service quality, the higher the customer's satisfaction, and vice versa (Matzler and Hinterhuber, 1998; Chen and Chung, 2008). However, customer expectations and demands can change quickly, and thus satisfaction should be seen as multidimensional. Continuous improvements in product/service criteria without considering what customers actually want may not be sufficient to meet their demands, and thus achieve satisfaction. As a result, several studies have suggested that multi-criteria decision making is required to further explain how consumers prioritise their desires (Chen and Chung, 2008).

Kano et al. (1984) developed a two-dimensional model to clarify the relationship between product/service criteria performance and CS. As shown in Figure 2, there are three types of product elements which influence CS in different ways when met. The 'must-be' quality elements describe when customers take these elements for granted – their fulfilment will not increase their satisfaction. On the other hand, if these elements are not fulfilled, customers will be dissatisfied. With regard to 'one-dimensional' elements, the higher the level of fulfilment, the higher the CS. The 'attractive' elements mean that if attractive elements are fulfilled, this will have a positive effect on satisfaction. However, if these elements are not met, there is no feeling of dissatisfaction. In addition to these three factors, two further aspects of quality can be identified, namely 'indifference' and 'reversal' quality. Indifference quality elements indicate that the performance of the related product/service criteria has no impact on CS. With regard to the reversal quality elements, customers will feel dissatisfied if the product/services criteria are present, and vice versa (Matzler and Hinterhuber, 1998; Yang, 2005; Chen and Chung, 2008).

Kano et al. (1984) also developed a so-called Kano questionnaire to identify the five different qualities mentioned above. In this questionnaire, consumers select their responses (based on five possible reactions, ranging from dissatisfied to satisfied) to a

pair of situations: when a certain quality (criterion) is sufficient and when a certain quality (criterion) is insufficient. As presented in Table 1, the product/service criteria can be divided into five categories by combining the responses regarding the above two questions. Additionally, Berger et al. (1993) further suggested that the CS coefficient could show whether satisfaction can be increased by meeting a product/service criterion, or whether fulfilling this product/service criterion only prevents the customer from being dissatisfied.

**Figure 2** Kano model of quality attributes



**Table 1** Kano evaluation table

Product/service criteria		Insufficiency				
		Satisfied	It should be that way	I am indifferent	I can live with it	Dissatisfied
Sufficiency	Satisfied	Q	A	A	A	O
	It should be that way	R	I	I	I	M
	I am indifferent	R	I	I	I	M
	I can live with it	R	I	I	I	M
	Dissatisfied	R	R	R	R	Q

Notes: M: must-be quality attribute; O: one-dimensional quality attribute; A: attractive quality attribute; I: Indifference quality attribute; R: reversal quality attribute and Q: questionable.

As with IPA, the Kano model has been utilised in various fields, including: the food and beverage industry, the telecom industry, the airline industry, and the real estate industry. (Shahin and Zairi, 2009; Llinares and Page, 2011; Chen, 2012; Lubinski and Oppitz, 2012).

To avoid categorisation errors made by the IPA or Kano model when used alone, this study combines the IPA and Kano model and integrates both instruments, for categorising quality attributes and providing specific improvement strategies for each category. This combined model can enhance the accuracy of the Kano model in classifying quality attributes, make up for the drawback of IPA in considering only



one-dimensional quality, and provide more appropriate quality strategies, especially for the housing service management business under study. As noted in the foregoing passages, little research has been

### **3 Methodology**

This study examines the service quality attributes of a housing service management company. The questionnaire is designed based on the SERVAQUAL scale, developed by Parasuraman et al. (1988) including the dimensions of tangibility, reliability, responsiveness, assurance, and empathy, with 22 service quality measuring items (Table 2) included that refer to the service quality attributes in the housing service management industry and the service demands of luxury apartments householders/tenants. Tangibility refers to the physical indication; reliability represents the consistency and dependability; responsiveness is the willingness of how employees react to customers' demand; assurance represents knowledge and courtesy; and empathy denotes to the caring of firms to their customers.

A group of experts including academic professionals and managers from several housing service management companies were invited to review and revise the questions. To ensure the suitability of the questions, the instrument was pretested with both executives of the housing service management company under study and luxury apartment residents, before the formal survey was carried out.

Based on the requirements of the Kano model, the questionnaire examines sufficient quality attributes, insufficient quality attributes, and the satisfaction of luxury apartment residents with the service quality of the housing service management company. For each item, the respondents selected a response using a five-point Likert scale as shown in Table 1. As to the measurement of the satisfaction with the service quality of the housing service management company, a five-point Likert scale is used, ranging from 5, 'extremely satisfied' to 1, 'extremely dissatisfied'.

Furthermore, a five-point Likert scale is also used for measuring the perceived importance of residents with regard to the service quality (Table 2), ranging from 5, 'extremely important', 'very important', 'slightly important', 'not very important', to 1, 'not important'.

By integrating the Kano model with IPA, and referring to the improvement effort index (IEI) developed by Hu et al. (2009), this study aims to discuss quality attribute ranking (QAR) for the housing service management company under study. The quality attribute weights are calculated according to QAR (Wasserman, 1993). The first step is to normalise importance and satisfaction scores and obtain the rankings separately. Divergent indicators are then calculated by an importance minus satisfaction ranking, with a smaller divergent indicator representing a higher priority. With the same value of divergent indicator, a better satisfaction score has a higher ranking. Hu et al. (2009) pointed out that QAR is similar to the concept of importance in IPA, as both can be used to rank the priority of attributes. However, the standardised weights calculated with QAR measure customer perceived satisfaction and cognitive importance, thus providing a more comprehensive form of improvement ranking.

**Table 2** Property management service quality questions

<i>Dimension</i>		<i>Service item</i>
Tangibility	1	Overall extrinsic quality and visual image of service staff.
	2	Service staff responds appropriately and keeps smiling.
	3	Community asset value increases after property management companies take over.
	4	Property management companies provide a club management scheme and professional services.
Reliability	5	Access control is firmly practiced and security is strict.
	6	Audit of patrol car and night check by property management companies.
	7	Recruited property management staff has no criminal record.
	8	Property management company provides orientation and in-service training.
	9	Property management company often conducts disaster prevention and emergency response drills.
	10	Emphasis on confidentiality norms for service staff to ensure resident privacy.
Responsiveness	11	Have a standard workflow to deal with owner problems.
	12	Clearly respond to owner questions.
	13	Patiently deal with resident complaints.
	14	Rapidly address service failures.
Assurance	15	Emphasise corporate image and service performance of property management company before entering and stationing.
	16	Corporate logistics support is able to cope with emergency situations.
	17	Welfare system and remuneration policies of property management company.
	18	Executives of property management company often inspect and manage the sites.
Empathy	19	Service staff actively assist in personal service demands.
	20	Service staff remember all residents' names and license plate numbers of vehicles.
	21	Provide staff attention to members of my family.
	22	Community promotion activities are organised to ensure a harmonious neighbourhood.

In the Kano model, Berger et al. (1993) proposed adding a satisfaction increment index (SII) to the CS coefficient index, and claimed that satisfaction could be enhanced and the dissatisfaction decrement index (DDI) reduced after certain service attributes were satisfied. The difference between the two indicators could therefore represent the change in satisfaction after certain service attributes have been satisfied, and this is called the satisfaction contribution index (SCI) (Hu et al., 2009). SCI can also be used to derive the improvement ranking weights. The SII and DDI of the service quality attributes are calculated with the following equations [equations (1) and (2)]:

$$SII = \frac{(A+O)}{(A+O+M+I)} \quad (1)$$

$$DDI = \frac{(O+M)}{(A+O+M+I) \times (-1)} \quad (2)$$

where  $A$  is attractive,  $O$  is one-dimensional,  $M$  is must-be, and  $I$  is indifferent. The definition of these four attributes has been discussed in the precious section.

The SCI, which compares the total contribution of the satisfaction with a certain service attribute to the satisfaction with a related improvement, is further calculated to normalise the index, using the following equation [equation (3)]:

$$SCI = \frac{SII - DDI}{\max(SII - DDI)} \quad (3)$$

The IEI, is further applied to summarise the SCI and standardised weight, using the following equations [equations (4) and (5)]. That is,  $a_i$ , calculated by the QAR, is multiplied by the SCI, with a higher value meaning that the attribute better conforms to customer demands, and thus makes a greater contribution to the overall satisfaction. The equation is shown below:

$$IEI = a_i * SCI \quad (4)$$

$$a_i = \frac{w_i}{\max(w_i)} \quad (5)$$

where  $a_i$  is the  $i^{\text{th}}$  standardised weight and  $w_i$  is the  $i^{\text{th}}$  original weight.

Finally, instead of the partial correlation coefficient used in Deng (2007), this study adopts the regression coefficient from the regression equation [equation (6)]. The regression coefficient can be regarded as the relative importance of an attribute to the overall/mean satisfaction. Furthermore, the regression coefficients are standardised so that the importance of a certain service attribute appears in the range of 0–1.

$$\text{Importance standardisation } (b_i) = \frac{I_i}{\max(I_i)} \quad (6)$$

where  $b_i$  is the  $i^{\text{th}}$  standardised importance and  $I_i$  is the  $i^{\text{th}}$  original importance.

#### 4 The present research inquiry

With a focus on the major city in Taiwan, Taipei, a survey questionnaire was used to collect data, and these were distributed to 19 luxury apartments managed by the housing service management company under study in February of 2013. Removing 14 incomplete copies from the total of 322 returned questionnaires left a total of 308 usable samples. Factor analysis using principal components analysis with ‘varimax’ rotation was conducted on both the importance and performance (satisfaction) responses. Items that did not have significant factor loadings on any factor (<0.5), those with low communalities (<0.5), and those with significant factor loadings on two or more factors

were considered for deletion. Cronbach  $\alpha$  was used to analyse the reliability of the questionnaire. The results showed that the Cronbach  $\alpha$  of all dimensions was above 0.7, and thus the reliability of the questionnaire was acceptable. The validity was also assessed based on the practical experience of senior executives from several housing service management companies.

Table 3 gives the demographic information of the samples. Most participants were male (57.8%) and the largest group of residents was aged 40–49 (32.5%), followed by those aged 50–59 (29.2%), showing that people aged 40–59 are most likely to live in luxury apartments. Regardless of the ‘other’ category, the top four occupations of the participants were freelance (15.6%), followed by workers in the financial industry (11.0%), service industry (10.4%), and technology industry (10.1%). With regard to job position, the largest group belonged to a classification that is not clearly identified, ‘other’ (31.5%), followed by business owner (18.5%) and executive (15.3%). Most of the participants (81.1%) had an educational background of college and graduate school or above, and most residents were apartment owners (82.8%), while the rest were tenants 17.2%. Note that the participant samples can be divided into two groups, in which group 1 (61.7%) was composed of participants with a property price of US\$20,000–33,000 dollars per 36 square feet, while group 2 (38.3%) was composed of participants with a property price of over US\$33,000 dollars per 36 square feet.

**Table 3** Demographic information of customers

<i>Classification</i>	<i>No. of times</i>	<i>%</i>
Gender		
Male	178	57.8
Female	130	42.2
Age		
Below 30	23	7.5
30–39	56	18.2
40–49	100	32.5
50–59	90	29.2
60–69	32	10.4
Above 70	7	2.3
Identity of resident		
Apartment owner	255	82.8
Tenant	53	17.2
House price (per 36 square feet)		
Above US\$33,000	118	38.3
US\$20,000~33,000	190	61.7
Education		
Below junior high school	9	2.9
Senior high school	49	15.9
College	172	55.8
Graduate school or above	78	25.3

**Table 3** Demographic information of customers (continued)

<i>Classification</i>	<i>No. of times</i>	<i>%</i>
<b>Occupation</b>		
Health and medicine industry	12	3.9
Technology industry	31	10.1
Consultant industry	19	6.2
Publication industry	4	1.3
Cultural and creativity industry	6	1.9
Performance and art industry	3	1
Catering industry	8	2.6
Trading industry	13	4.2
Service industry	32	10.4
Financial industry	34	11
Traditional manufacturing	29	9.4
Freelance	49	15.6
Agriculture, forestry, fishing, and animal husbandry	4	1.3
Construction and real estate industry	16	5.2
Military, public and teaching personnel	13	4.2
Other	35	11.4
<b>Position</b>		
Business owner	57	18.5
Executive	47	15.3
Middle manager	39	12.7
Technician	34	11
Senior clerk	15	4.9
Primary supervisor	19	6.2
Other	97	31.5

#### 4.1 Importance and satisfaction analysis

##### 4.1.1 Importance analysis

The importance of various service quality attributes and the levels of satisfaction of residents were further analysed. The details of this analysis are presented below.

The grand mean of perceived importance of 22 property service quality attributes to luxury apartment residents (Table 4) was 4.41, with item 20 ('service staff remember all residents' names and license plate numbers of vehicles') having the highest mean importance (mean = 4.58) and item 22 ('community promotion activities are organised to ensure a harmonious neighbourhood') the lowest (mean = 4.09). The items with more than average importance (4.41) were 20, 2, 21, 5, 19, 1, 12, 13, 8, and 14, in descending order. For residents of group 2, item 2 ('service staff responds appropriately and keeps smiling') had the highest mean perceived importance (mean = 4.64), while item 20 had the highest mean (mean = 4.58) for residents of group 1, and item 22 had the lowest mean

perceived importance for both groups. For residents of group 2, the overall mean of importance of 22 property service quality attributes was 4.48, which is slightly higher than that of 4.37 for residents of group 1.

**Table 4** Service quality importance to luxury apartment residents

<i>Item</i>	<i>Importance</i>					
	<i>All</i>		<i>Group 2</i>		<i>Group 1</i>	
	<i>Average</i>	<i>Order</i>	<i>Average</i>	<i>Order</i>	<i>Average</i>	<i>Order</i>
1	4.51	5	4.63	3	4.44	8
2	4.56	2	4.64	1	4.52	4
3	4.37	14	4.59	5	4.23	18
4	4.32	17	4.48	13	4.23	18
5	4.51	5	4.55	7	4.48	5
6	4.28	20	4.36	19	4.23	18
7	4.47	9	4.51	10	4.44	8
8	4.45	11	4.49	12	4.43	11
9	4.36	15	4.42	16	4.33	14
10	4.52	3	4.52	9	4.53	2
11	4.38	13	4.43	15	4.35	13
12	4.50	8	4.53	8	4.48	5
13	4.47	9	4.64	2	4.36	12
14	4.44	12	4.40	18	4.46	7
15	4.32	17	4.46	14	4.24	17
16	4.35	16	4.42	17	4.32	15
17	4.25	21	4.31	21	4.21	21
18	4.29	19	4.36	20	4.25	16
19	4.51	5	4.62	4	4.44	8
20	4.58	1	4.58	6	4.58	1
21	4.52	3	4.50	11	4.53	2
22	4.09	22	4.20	22	4.03	22
<i>Average</i>	4.41		4.48		4.37	

#### 4.1.2 Satisfaction analysis

The overall sample of luxury apartment residents had the highest service satisfaction on item 7 ('recruited housing service management staff has no criminal record') (mean = 4.05) and the lowest with item 22 ('community promotion activities are organised to ensure a harmonious neighbourhood') (mean = 3.48) (Table 5). The items with satisfaction higher than the average of 3.76 were 7, 20, 2, 10, 5, 19, 21, 1, 8, and 13, in descending order. Note that all 21 items, except item 7 (which achieved a satisfaction level of 4.05), had levels of satisfaction under 4.0, and thus should be improved. For residents of group 2, the aggregate mean of perceived satisfaction was 3.95, which was higher than that of 3.63 for residents of group 1. Item 7 had the highest mean perceived

satisfaction for both groups, while item 22 had the lowest mean among residents of group 2, and item 17 ('welfare system and remuneration policies of housing service management company') had the lowest mean among residents of group 1.

**Table 5** Service quality performance (satisfaction) to luxury apartment residents

Item	Satisfaction					
	All		Group 2		Group 1	
	Average	Order	Average	Order	Average	Order
1	3.83	8	4.09	7	3.67	8
2	3.95	3	4.18	2	3.82	3
3	3.70	14	3.91	13	3.58	13
4	3.56	20	3.76	18	3.43	20
5	3.90	5	4.18	2	3.72	7
6	3.60	18	3.78	17	3.48	19
7	4.05	1	4.20	1	3.95	1
8	3.78	9	4.03	9	3.62	11
9	3.62	17	3.75	19	3.55	16
10	3.91	4	4.12	5	3.78	4
11	3.71	12	3.96	11	3.55	16
12	3.68	11	3.85	15	3.58	13
13	3.77	7	3.99	10	3.63	9
14	3.72	8	3.86	14	3.63	9
15	3.71	12	3.92	12	3.59	12
16	3.66	16	3.82	16	3.56	15
17	3.50	21	3.75	19	3.35	22
18	3.59	19	3.67	21	3.54	18
19	3.87	6	4.07	8	3.74	5
20	3.98	2	4.17	4	3.86	2
21	3.87	6	4.10	6	3.73	6
22	3.48	22	3.63	22	3.39	21
Average	3.76		3.95		3.63	

#### 4.2 Kano analysis

In the Kano classification of the overall samples (Table 6), 15 of the 22 questions were one-dimensional qualities, including items 1, 2, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 19, 20, and 21; item 3 ('community asset value increases after housing service management companies take over') was classified as an attractive quality, and thus the service could be reinforced; while items 5 ('access control is firmly practiced and security is strict') and 10 ('emphasis on confidentiality norms for service staff to ensure resident privacy') were must-be qualities, which are essential conditions for good housing service management service quality, and are related to security and privacy. Items 4, 6, 18, and 22 were classified as indifferent qualities, to which customers did not pay much attention,

possibly because of their indirect relationships with residents. Finally, no reverse quality items were found in the results. The above findings again confirm that service attributes are not always one-dimensional, as was traditionally assumed.

**Table 6** Quality attributes in the Kano model of participants

<i>Item</i>	<i>Percentage</i>						<i>Kano attribute</i>	<i>SII</i>	<i>DDI</i>
	<i>A</i>	<i>O</i>	<i>M</i>	<i>I</i>	<i>R</i>	<i>Q</i>			
1	28%	31%	14%	20%	1%	7%	O	0.63	-0.48
2	19%	40%	17%	16%	1%	7%	O	0.63	-0.62
3	33%	23%	19%	22%	2%	1%	A	0.58	-0.43
4	25%	26%	13%	31%	2%	4%	I	0.53	-0.41
5	22%	32%	39%	4%	3%	0%	M	0.56	-0.73
6	16%	25%	19%	36%	1%	3%	I	0.43	-0.46
7	11%	39%	32%	13%	0%	6%	O	0.53	-0.75
8	9%	41%	25%	19%	1%	5%	O	0.53	-0.70
9	10%	31%	28%	25%	2%	4%	O	0.44	-0.63
10	19%	33%	35%	8%	1%	4%	M	0.55	-0.71
11	7%	40%	25%	22%	0%	6%	O	0.50	-0.69
12	14%	40%	23%	18%	1%	5%	O	0.57	-0.66
13	12%	44%	21%	17%	1%	4%	O	0.59	-0.69
14	10%	37%	28%	19%	2%	4%	O	0.50	-0.69
15	12%	33%	21%	29%	1%	5%	O	0.47	-0.57
16	10%	32%	26%	26%	1%	4%	O	0.45	-0.61
17	11%	32%	24%	27%	2%	4%	O	0.40	-0.54
18	11%	29%	20%	34%	1%	5%	I	0.43	-0.52
19	22%	38%	14%	19%	1%	6%	O	0.65	-0.55
20	23%	42%	12%	17%	1%	5%	O	0.69	-0.58
21	14%	44%	22%	15%	2%	4%	O	0.61	-0.70
22	19%	22%	15%	39%	1%	4%	I	0.44	-0.39

In terms of SII, items 20, 19, 1, and 2 could better enhance the satisfaction of luxury apartment residents; they are: ‘service staff remember all residents’ names and license plate numbers of vehicles’, ‘service staff actively assist in personal service demands’, ‘overall extrinsic quality and visual image of service staff’, and ‘service staff responds appropriately and keeps smiling’, respectively; while, with regard to DDI, items 7, 5, and 10 (‘recruited housing service management staff has no criminal record’, ‘access control is firmly practiced and security is strict’, and ‘emphasis on confidentiality norms for service staff to ensure resident privacy’) could reduce the dissatisfaction of luxury apartment residents. Obviously, the above four items that can better enhance satisfaction (SII) are in the category of ‘one-dimensional’ service quality attribute – the higher the level of fulfilment, the higher the CS. Alternatively, the top three items that can reduce the dissatisfaction (DDI) are in the category of ‘must-be’ service quality attribute: their fulfilment will not increase satisfaction; however, if these elements are not fulfilled, customers will be dissatisfied.



**Table 7** Overall divergent indicator and IEI (new)

Item	Importance (1)	Importance ranking (2)	Normalised satisfaction(3)	Satisfaction ranking (4)	Divergent indicator (5) = (2) - (4)	Original priority weight	Original weight	Standardised weight (6)	Satisfaction contribution index (7)	Improvement effort index (8) = (6) * (7)	Improvement effort ranking
1	0.675	15	0.95	8	7	16	7	0.32	0.85	0.27	18
2	0.590	19	0.98	3	16	21	2	0.09	0.96	0.09	21
3	0.783	8	0.91	14	-6	5	18	0.82	0.77	0.63	5
4	0.651	16	0.88	20	-4	8	15	0.68	0.73	0.50	10
5	0.723	12	0.96	5	7	16	7	0.32	0.89	0.28	17
6	0.892	4	0.89	18	-14	3	20	0.91	0.67	0.61	6
7	0.807	7	1.00	1	6	15	8	0.36	0.98	0.36	13
8	0.759	9	0.93	9	0	10	13	0.59	0.93	0.55	9
9	0.651	17	0.89	17	0	10	13	0.59	0.8	0.47	11
10	0.518	21	0.97	4	17	22	1	0.05	0.95	0.04	22
11	0.819	6	0.92	12	-6	5	18	0.82	0.94	0.77	2
12	0.518	22	0.91	15	7	16	7	0.32	0.94	0.30	16
13	0.904	3	0.93	10	-7	4	19	0.86	0.98	0.85	1
14	0.759	10	0.92	11	-1	9	14	0.64	0.94	0.60	7
15	0.723	13	0.92	13	0	10	13	0.59	0.79	0.47	11
16	0.651	18	0.90	16	2	14	9	0.41	0.84	0.34	14
17	1.000	1	0.86	21	-20	1	22	1.00	0.74	0.74	3
18	0.590	20	0.89	19	1	13	10	0.45	0.73	0.33	15
19	0.699	14	0.96	6	8	19	4	0.18	0.93	0.17	19
20	0.735	11	0.98	2	9	20	3	0.14	0.97	0.13	20
21	0.916	2	0.96	7	-5	7	16	0.73	1	0.73	4
22	0.831	5	0.86	22	-17	2	21	0.95	0.62	0.59	8

### 4.3 Results of combined model

The divergent indicator ranking for quality attributes (Wasserman, 1993) and IEI developed by Hu et al. (2009) are used to obtain a reference for improvement of service quality attributes by the housing service management company. The divergent indicator is obtained by comparing the importance ranking with performance ranking of service attributes. A divergent indicator with a negative value indicates that customers perceive this service attribute to be important; however, they may not be satisfied with the current service they are experiencing. The attribute is therefore a priority for improvement. The IEI determines priority for improvement by simultaneously considering the satisfaction increment and dissatisfaction decrement for each service attribute. A larger IEI means that the attribute is able to meet customer demands, and has a high contribution to overall satisfaction.

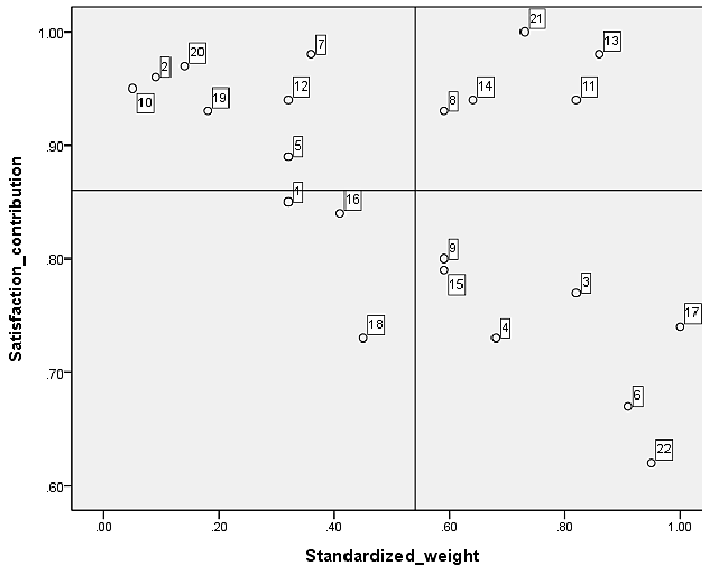
As in Deng (2007), apartment residents in this study were asked about the importance of various service attributes and their satisfaction with them. First, taking mean satisfaction as the dependent variable, the satisfaction values with respect to the 22 service quality attributes were subjected to a logarithmic transformation to become the independent variables, respectively, for a regression equation. The corresponding regression coefficients were then normalised as the importance coefficients appearing in column (1) of Table 7. The results of regression show that all 22 service quality attributes have significant effects on the dependent variable, service satisfaction, with adjusted  $R^2$  value of 0.987. Rankings of these importance coefficients are listed in column (2) of Table 7. The top three important attributes are items 17, 21, and 13, and the least three important attributes are items 12, 10, and 18. Normalised satisfaction and the corresponding rankings are given in columns (3) and (4) of Table 7. The top three ranked satisfaction attributes are items 7, 20, and 2, and the least three ranked satisfaction attributes are items 22, 17, 4. It is noted that items with lower satisfaction ranking do not necessarily have the priority to be improved.

The divergent indicator appearing in column (5) of Table 7 was obtained by subtracting column (4) from column (2). Items 17, 22, and 6 results in the three most negative values; thus, greater weights should thus be allocated to these items. These weights can be obtained by directly reversing the orders of their corresponding priority numbers. For example, item 17 ('welfare system and remuneration policies of property management company') is assigned an original priority weight '1', and the original weight is 22; item 22 ('community promotion activities are organised to ensure a harmonious neighbourhood') is given an original priority weight '2', and the original weight is 21. These weights were then standardised in column (6) to derive the IEI. The SCI for each service attribute was calculated based on the results of a Kano evaluation table (Table 6) and equations (1) to (5), as outlined in Section 3. Multiplication of standardised weight in column (6) and the SCIs in column (7) results in the IEI for each service attribute in column (8). The top five items that can highly contribute to overall satisfaction for luxury apartment residents in this study are items 13, 11, 17, 21, and 3. Two of the attributes (items 11 and 13) are in the dimension, responsiveness. None of the attributes is in the reliability dimension.

Figure 3 is another way of deriving the priorities for improvement, similar to the IPA figure, in which the X-axis shows the standardised weight [column (6) of Table 7] of items, while the Y-axis reports the contribution to satisfaction [column (7) of Table 7] of items. The grand means for standardised weight and contribution to satisfaction (0.54 and

0.74, respectively) were used to place the axes on the grid in Figure 3. Items 13, 11, 21, 14, and 8 with both high weights and contribution to satisfaction are placed in quadrant I, indicating that these items are necessary to keep up the satisfaction. Items 3, 4, 6, 9, 15, 17, and 22 are the other important candidates for tactical improvement. Items 1, 16, and 18 with both low weights and contribution to satisfaction are placed in quadrant III, and these three items should be assigned with the lowest priorities for enhancement.

**Figure 3** Priorities for improvement considering both importance and contribution



#### 4.4 Discussion

The results of the Kano analysis show that only one of the 22 service quality attributes is classified as an attractive quality; 15 are of one-dimensional quality, four are of indifferent quality, two are of must-be quality, and no items are reverse or invalid quality. These results demonstrate that luxury apartment management service quality has two-dimensional quality attributes. Hence IPA alone is inappropriate in categorising quality attributes and providing specific improvement strategies for each category since IPA considers only one-dimensional quality. It is also discovered that different sample characteristics can affect the classification of service attributes. For example, item 1 is a one-dimensional quality for residents of group 2, yet is an attractive quality for residents of group 1; similarly, item 18 is an indifferent quality for residents of group 2, yet is a one-dimensional quality for residents of group 1.

When combining both the Kano and IPA models and conducting the IEI analysis, the top five items that can highly contribute to overall satisfaction for luxury apartment residents in this study are items 13, 11, 17, 21, and 3. Another way of adopting IPA-like figures to derive the priorities for improvement is shown in Figure 3. Items with both high weights and contribution to satisfaction are items 13, 11, 21, 14, and 8, and are considered top priorities for improvement. Three items appeared on both approaches, i.e., items 13, 11, and 21.

#### 4.5 *Managerial implications*

It can be observed that items 13 ('patiently deal with resident complaints'), 11 ('have a standard workflow to deal with owner problems'), and 21 ('provide staff attention to members of my family') are all related to how service personnel on site deal with complaints and requests of the residents.

Due to the long working hours and pressure from work, the turnover rate of housing service management company staff is comparatively high. New staff, not having enough training and professionalism, may not follow standard operating procedures when resolving problems reported by residents. Also note that most of the apartment owners are the elite of society, and as such expect to be treated accordingly. They consider their complaints or requests to be the first priority, and they should be responded to first. When encountering problems, they expect the service personnel to provide immediate and individual/personalised service even though their request might violate the standard operating procedures of the company or the regulations set by the managerial committee of the apartment complex. Often such entreaties are beyond the authority of the staff on site.

In addition, most owners of luxury apartments have a certain socio-economic status and travel a lot. They usually expect the housing service management company to play the role of their 'personal house-keeper' in properly taking care of everything for their families while they are away. However, this is quite impossible in reality and thus may cause complaints from the residents. In addition, providing service with such special attention to individual requests can sometimes lead to violations of personal privacy if not handled properly.

Although challenging for the housing service management company, it should provide continuing education and training to the service personnel on site so that they can resolve problems reported by the residents more flexibly while also following the standard operating procedures to ensure satisfactory service, as well as providing personal privacy. The high turnover rate, insufficient orientation activities, and a lack of in-service training of the service staff also affect the speed and accuracy with which responses to residents' problems are handled. Good human resource management is hence necessary to ensure the promotion of service quality in housing service management companies.

In addition, only one of the 22 service quality attributes in the Kano classification is classified as an attractive quality, revealing the current lack of service quality advantages for luxury apartment residents. This indicates that the housing service management company under study does not have a strong competitive advantage, and thus is a warning sign. For luxury apartments residents, good environmental maintenance, cleaning, personal security, public safety, and ancillary facilities have become essential service qualities. The hotel and club-style management stressed by many housing service management companies has nowadays become an essential service for luxury apartment residents; consequently, housing service management businesses need to consider different strategies when providing services to luxury apartments residents. New and value-added service items related to daily living, business support, asset investment, and management for residents of luxury apartments should be identified and implemented so as to obtain a competitive advantage.

## 5 Conclusions

Because the housing service management business in Taiwan has been extremely competitive in recent years, especially for luxury apartments, it is of interest to better understand how residents perceive the service/product they are offered in this context, as well as their specific demands, so that firms in the highly competitive housing service management market can attract more business.

By using IPA, it is possible to recognise customers' perceptions with regard to a product/service, with the results then being used to enhance CS and loyalty. However, using a one-dimensional approach to explain a relationship between the perceived product/service criteria and consumer satisfaction may thus not be sufficient. The Kano model is also employed to classify the attributes/criteria of a product/service, as well as to identify the satisfaction of customers in different situations. More information regarding how customers prioritise the service/product can be obtained and compared by combining both models to comprehensively provide the managerial insights that contribute to the quality of housing service management.

A real case study was conducted in which 308 usable samples were collected from 19 luxury apartments managed by the housing service management company under study. Both importance and satisfaction analyses were conducted, followed by the Kano analysis, in which some findings confirm that service attributes are not always one-dimensional (one attractive; 15 one-dimensional; four indifferent; two must-be; no reverse), as was traditionally assumed. In the combined model, the divergent indicator ranking for quality attribute and IEI were used to obtain a reference for improvement of service quality attributes by the housing service management company. Another way of deriving the priorities for improvement is given in Figure 3. Three items appeared on both approaches, i.e., items 13, 11, and 21. They are all actually related to how service personnel on site deal with complaints and requests of the residents. Suggestions to the housing service management company include:

- 1 continuously providing education and training to the service personnel so that they can resolve problems reported by the residents more flexibly, while also following standard operating procedures to ensure satisfactory service and personal privacy
- 2 discovering new and value-added service items related to the daily living, business support, asset investment, and management for residents of luxury apartments in order to obtain a competitive advantage.

It is suggested that future research integrate IPA and Kano with the quality function deployment (QFD) technique to explore the issue of housing service management service quality, so that housing service management businesses can better carry out total quality management. What is more, qualitative in-depth interviews could also be used to obtain opinions from both housing service management companies and the residents, so as to better analyse the motivations, beliefs, attitudes, and opinions of the participants.

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