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## Applying Kansei Engineering, the Kano model and QFD to services

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**Abstract:** This paper aims to present an integrative framework of Kansei Engineering (KE), the Kano model and quality function deployment (QFD) applied to services. An empirical study involving Indonesian and Singaporean tourists was conducted to showcase the framework's applicability. The study utilises a sample of 100 Indonesian and 125 Singaporean tourists who stayed in luxury hotels and covers only services in luxury hotels. Interviews and face-to-face questionnaire surveys were carried out. Using stepwise linear regression analysis, this research models the effect of perceived hotel service performance on customer emotional needs (Kansei). House of quality (HOQ) is then used to formulate managerial strategies. We present the fruitfulness of integrating the Kano model, KE and QFD. Perceived attractive qualities have a direct significant impact on Kansei response. There is no analysis of the impact of cultural differences on Kansei. We provide insight on which service attributes deserve more attention with regard to their significant impact on customer emotions. It may guide service managers to provide and implement improvement strategies in satisfying customer emotional needs. The study proposes a unique methodology of integrative three concepts commonly used in manufacturing and service quality research to measure and model customer emotional needs.

**Keywords:** Kansei Engineering; the Kano model; quality function deployment; QFD; emotions; services; economics; management.

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## 1 Introduction

Apart from cognitive evaluation and functionality aspects, customer emotion plays a big role in product experience and service encounter. During user-product interaction, three levels of brain processes are involved (Norman, 2004), i.e., visceral, behavioural and reflective. Visceral and behavioural processes cover the initial impact of product appearance and usability with no interpretation/consciousness. Reflective process deals with past experiences. Likewise, Jordan (2002) describes three levels of abstraction in human-system interaction, i.e., usability and functionality, user experience and social

factors. Inherently, emotional design and social status achievement are required to satisfy customer (Khalid and Helander, 2006).

In human factors and ergonomics, a term for emotions is known as 'hedonomics' (Khalid and Helander, 2006) and 'Kansei' (Nagamachi, 1995). Product development process involving customer emotions was initially introduced by Nagamachi in the 1970s. He introduced Kansei Engineering (KE) as a powerful product development tool. This method has been successfully adopted by Mazda Motor Corporation to design 'Miyata' model. This phenomenal car symbolises 'human-machine unity'.

During service encounter and product experience, customer delight is positively linearly correlated with the performance of products and services. In some cases, however, this relationship is no longer applied (Kano et al., 1984; Chen and Chuang, 2008). Surprisingly, only a little performance and innovation might lead to significant effect on customer delight. In other words, a little provision of unexpected needs might produce significant satisfaction. The Kano model has the potential to fill out unspoken and latent needs (known as attractive quality), the satisfaction of which might lead to customer delight (Hartono and Tan, 2011b).

In dealing with customer emotional needs in services, this study presents an integrative framework of KE, the Kano model and quality function deployment (QFD). This integrative framework begins with a structured methodology to capture and measure customer Kansei. It is then followed by the Kano categorisation and proposed managerial strategies using QFD.

This paper is organised as follows. Following the introduction, a brief review of the Kano model, KE and QFD is presented. Thereafter, a proposed integrative framework and an empirical study on luxury hotel services are discussed. It is then followed by conclusion and further research recommendations.

## **2 Literature review**

### *2.1 The Kano model*

Kano et al. (1984) categorised customer attributes into three different types, i.e., Must-be (M), One-dimensional (O) and Attractive (A). A must-be (M) attribute refers to needs not mentioned explicitly by customers. Its presence will not lead to customer delight. A lack of it, however, will result in dissatisfaction. A friendly receptionist in a hotel is a common example. A one-dimensional (O) attribute explains the spoken needs of customer. The more it is fulfilled, the more customers are satisfied. An example of it is that express check-in process in hotels. It then comes to attractive attribute (A). This attractive category goes beyond customer expectation and desire, which only a little fulfilment can cause a significant increase of satisfaction. Creativity and innovation are expected in this Kano's quality. An example of this attractive attribute is free ultra-speed wireless internet in airport.

In order to determine which Kano category a particular service item falls under, the Kano questionnaire is used (Kano et al., 1984). A subject is faced with either of the following two Kano situations:

- 1 the provision of the service attribute
- 2 the absence of the service attribute.

In either situation, the subject must choose one of the responses as shown in Table 1 to express his feeling of satisfaction (Kano et al., 1984; Chen and Chuang, 2008). By compiling these two responses, the service attribute can be identified as A, O, M, I, R or Q.

**Table 1** The Kano evaluation table

Service criteria/attributes	Dysfunctional				
	Satisfied	It should be that way	I am indifferent	I can live with it	Dissatisfied
Satisfied	Q*	A	A	A	O
It should be that way	R	I	I	I	M
Functional					
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: \*A = Attractive, O = One-dimensional, M = Must-be, I = Indifferent, R = Reverse, Q = Questionable

Source: Kano et al. (1984)

The Kano model is useful in several regards. It can be used as a prioritisation tool if a trade-off needs to be made. According to Matzler and Hinterhuber (1998), it is not very beneficial to invest in improving must-be qualifications (M), which have already achieved a satisfactory level. Must-be (M) and one-dimensional (O) qualities are less sensitive and satisfaction-driving attributes (Yang, 2011). As a consequence, they are less contributed to strong emotions (Hartono and Tan, 2011b). Given limited resources, therefore, it is recommended to prioritise attractive quality attributes.

## 2.2 Kansei Engineering (KE) in services

KE is a technological methodology that unites customer Kansei (feelings and emotions) with the engineering discipline (Nagamachi and Lokman, 2011). This method has a strong ability to capture and translate customer emotions into concrete design parameters (Nagamachi and Imada, 1995; Nagamachi, 2002; Nagamachi et al., 2009; Schütte et al., 2004). In addition, KE is able to optimise product properties that are not directly visible, such as the atmosphere of a concert hall (Schütte et al., 2008).

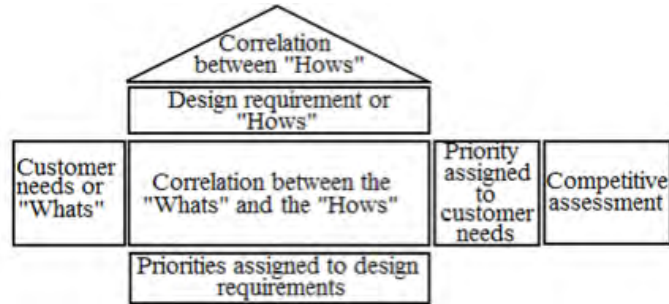
Traditional KE focuses on physical products. In today's complex environments, however, KE has to be capable of conducting examinations of both physical products and services in a single study (Schütte et al., 2004). For instance, in a luxury restaurant, customer emotions might be influenced not only by the cleanliness of dishes and cutleries, but also by the friendliness of staffs and accuracy of bills.

## 2.3 Quality function deployment (QFD)

QFD is a quality tool to improve customer satisfaction by translating their requirements into appropriate technical measures (Sullivan, 1986; Akao and Mazur, 2003). Not only does this increase customer satisfaction, QFD also delights customers through innovation

(Lee et al., 2000). The critical part in QFD is to construct a house of quality (HOQ). It is where customer requirements meet with technical measures. HOQ serves as a product-planning matrix that consists of customer requirements, technical measures, target values and competitive analyses (see Figure 1). In short, HOQ provides useful information of target setting and improvement priority (Pawitra and Tan, 2003).

**Figure 1** Elements of HOQ

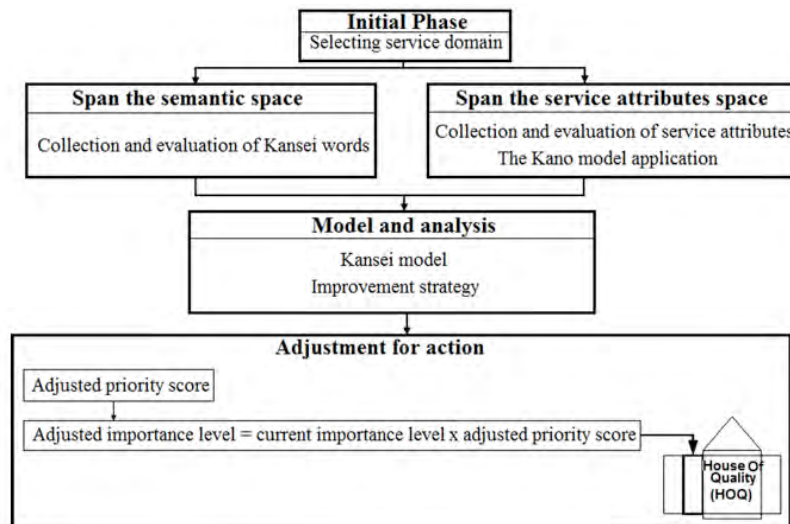


Source: Hauser and Clausing (1988)

### 3 An integrative framework and empirical study

The idea of integrating Kano’s model into KE was discussed by Lanzotti and Tarantino (2008) and Llinares and Page (2011). However, there has been no research that analysed the relationship between service quality performance and Kansei. This research gap has been bridged by Hartono and Tan (2011b) by proposing an integrative framework of Kano’s model contribution to KE methodology. Essentially, this current study extends the work by Hartono and Tan (2011a, 2011b). It proposes an integrative framework explaining the impact of attractive service attributes on customer Kansei. It then proceeds to determine managerial actions priorities using HOQ (see Figure 2).

**Figure 2** Integrative framework of KE, the Kano model and QFD in services



### 3.1 Selection of service domain

Luxury hotel was chosen as the service domain. The survey was conducted in luxury 4- and 5-star hotels in Singapore and Indonesia. According to Barsky and Nash (2002), luxury hotels were reported to have greater strength of emotions than any other hotel type.

### 3.2 Collection and selection of Kansei words

Kansei words were collected from interviews with seven tourists who stayed in luxury hotels. One of the interview responses was "...excellent stay, hotel is a little old but it is well maintained. The environment and surrounding are cozy. It is just a walking distance to the shopping downtown Orchard road, and it has an excellent Chinese restaurant..." According to this statement, the Kansei words captured were excellent, cozy and convenient. In order to obtain a broader collection of Kansei words, this process was extended to literature review of journals, magazines and other relevant sources.

There were 40 Kansei words selected. In order to obtain more structured Kansei words, these 40 words were reduced to 16 words using affinity diagram, involving five participants. These structured Kansei words were attached to questionnaire.

### 3.3 Participants

This study utilised face-to-face questionnaire. Pre-test was done involving experienced subjects and a KE expert. Those who stayed in luxury hotels for at least two days were the target. The interviewer explained the study objectives and unfamiliar terminologies and answered queries from the participants. In total, 225 tourists participated in this study (January 2010 – June 2010).

The participants were composed of 100 Indonesians (51 males and 49 females) and 125 Singaporeans (62 males and 63 females). The survey captured a balanced percentage of male and female respondents in each population group (see Table 2). Tourists aged between 31 and 40 were the largest percentage in both groups. In terms of purpose of stay, most Indonesians (43%) and Singaporeans (31.2%) indicated that they were on vacation. The longest amount of time spent was four to seven days (40% for Singaporeans), while most Indonesian tourists spent less than three days (38%).

**Table 2** Profile of participants

Variable	Indonesian		Singaporean	
	Count	% of total	Count	% of total
Hotel category				
4-star hotel	41	41	43	34.4
5-star hotel	59	59	82	65.6
Gender				
Male	51	51	62	49.6
Female	49	49	63	50.4



**Table 2** Profile of participants (continued)

Variable	Indonesian		Singaporean	
	Count	% of total	Count	% of total
Age (years)				
<= 20	3	3	7	5.6
21–30	29	29	34	27.2
31–40	30	30	35	28
41–50	28	28	33	26.4
> 50	10	10	16	12.8
Frequency of travel				
Once a year or less	27	27	29	23.2
Every six month	31	31	42	33.6
Every three month	25	25	29	23.2
Every month	9	9	15	12
>= once a month	8	8	10	8
Purpose				
Vacation	43	43	39	31.2
Business trip	26	26	38	30.4
Conference	19	19	28	22.4
Social visit	12	12	20	16
Amount of time spent (days)				
<= 3	38	38	34	27.2
4–7	34	34	50	40
8–11	28	28	41	32.8
> 11	-	-	-	-
Monthly income				
<= US\$2,000	35	35	37	29.6
US\$2,001–3,000	36	36	42	33.6
US\$3,001–4,000	17	17	31	24.8
> US\$4,000	12	12	15	12
Frequency of stay				
Less than once a year	15	15	13	10.4
Once a year	22	22	36	28.8
Twice a year	22	22	32	25.6
Three times a year	24	24	30	24
Four times a year	13	13	9	7.2
Five times or more a year	4	4	5	4

**Table 2** Profile of participants (continued)

Variable	Indonesian		Singaporean	
	Count	% of total	Count	% of total
Highest education				
Junior high or equivalent	6	6	1	0.8
High school or equivalent	40	40	32	25.6
College or university degree	39	39	57	45.6
Post graduate	15	15	35	28
Occupation				
Clerical/office	4	4	12	9.6
Engineering	6	6	14	11.2
Entrepreneur/self-employed	32	32	25	20
Management	10	10	20	16
Education	13	13	15	12
Finance	18	18	26	20.8
Marketing	14	14	13	10.4
Student	3	3	-	-

### 3.4 Measures of Kansei

The importance and response to the Kansei words were measured using a five-point Likert semantic differential scale (Osgood et al., 1957). In order to reduce bias, relevant emoticons representing each Kansei word were provided in survey form. Emoticons are a valuable addition to communication methods (Huang et al., 2008). This study utilised emoticons adopted from Yahoo! Messenger<sup>®</sup> as mentioned in the study by Huang et al. (2008) and through MSN messenger (Windows Live<sup>™</sup> Messenger).

Table 3 presents a comparison of the mean-values of Kansei importance and response. The independent t-test (SPSS<sup>®</sup> 13.0 for Windows) was used to test for a difference between two independent groups (Indonesian and Singaporean) on the means of Kansei importance and response scores. This study found that Indonesian and Singaporean tourists had statistically significant difference on the importance of Kansei 'passion' and 'relief'. Both Singaporean and Indonesian tourists had no difference on Kansei response.

**Table 3** Mean-values of Kansei words

<i>Kansei word</i>	<i>Importance</i>			<i>Response</i>		
	<i>Indonesian</i>	<i>Singaporean</i>	<i>p</i>	<i>Indonesian</i>	<i>Singaporean</i>	<i>p</i>
Convenience	4.16	4.22	0.714	2.74	3.00	0.282
Attractiveness	4.00	4.18	0.273	2.90	2.80	0.675
Cleanliness	4.08	3.96	0.472	2.86	2.72	0.605
Welcomeness	4.10	3.98	0.478	3.08	2.90	0.414
Confidence	4.02	4.02	1.000	2.80	3.10	0.229
Happiness	4.22	3.98	0.139	2.60	2.94	0.151
Relaxedness	4.10	3.86	0.117	2.94	2.96	0.933
Peacefulness	4.04	3.80	0.115	3.06	2.92	0.546
Passion	4.22	3.84	0.024*	2.70	2.98	0.192
Satisfaction	4.28	4.02	0.119	2.68	2.90	0.396
Spaciousness	4.14	4.30	0.327	2.94	2.82	0.620
Elegance	4.10	3.96	0.375	3.00	2.86	0.529
Friendliness	4.18	4.02	0.302	3.06	2.90	0.478
Modernisation	4.16	3.92	0.130	2.96	2.68	0.232
Relief	4.16	3.82	0.038*	2.70	2.76	0.817
Quietness	4.12	3.92	0.200	3.28	3.16	0.577
<i>Grand mean</i>	4.13	3.99		2.89	2.90	

Note: \*Significant at  $p < 0.05$

### 3.5 Collection and evaluation of service attributes

Service attributes in luxury hotels were collected as the source of external stimuli. These service attributes referred to the SERVQUAL model (Parasuraman et al., 1988) with some modifications (Ladhari, 2009). In total, there were 39 service attributes categorised into five dimensions (Tangible, Reliability, Responsiveness, Assurance and Empathy). The result shows that up to 30% of the service attributes were categorised as Kano's attractive quality (A), i.e., 13 out of 39 in Indonesian group and 11 out of 39 in Singaporean group. This study focused on Kano's attractive (A) attributes. According to Yang (2011), attractive attributes provide competitive values, such as:

- 1 it produces little damage if there is any discrepancy
- 2 it serves as source of differentiation
- 3 it drives customer loyalty and total satisfaction.

Strong attractive attributes are potentially further developed for innovation (Tan and Pawitra, 2001).

### 3.6 Construct validity and reliability

The proposed properties of constructs (i.e., 'Kansei' and 'perceived service quality') were tested using confirmatory factor analysis (CFA). This is to verify the factor structure of a set of observed measures (Suhr, 2006). Smart-Partial Least Square (Smart-PLS) 2.0 M3 (Ringle et al., 2005) was used. PLS makes few demands on any distributional form of measured variables and deals with small sample sizes (Chin, 1998). Three tests were reported, i.e., convergent validity, discriminant validity and reliability (see Table 4).

In terms of convergent validity, there are three criteria recommended by Fornell and Larcker (1981):

- 1 all item factor loadings should exceed 0.7
- 2 construct reliabilities should exceed 0.7
- 3 average variance extracted (AVE) of construct should exceed 0.5.

According to Chin (1998) and Hulland (1999), a loading of 0.5 can be used as a cut-off point. Based on the PLS output, all items of 'Kansei' construct had loadings above 0.5 except for the item 'Passion' (0.226) in Indonesian sample. As a consequence, this item was deleted. All items of 'perceived service quality' construct had loadings above 0.5 for both population groups. Overall, these two constructs had acceptable composite reliability and AVE values.

Regarding discriminant validity, two options are recommended (Gefen and Straub, 2005):

- 1 the square root of AVE for a particular construct must be greater than its corresponding inter-construct correlation coefficient
- 2 the loadings for the within-construct must exceed the inter-construct cross loadings by at least 0.1.

In both population groups, the constructs 'Kansei' and 'perceived service quality' showed acceptable discriminant validity.

Reliability is used to evaluate the internal consistency of a construct. Cronbach's alpha and composite reliability are used (Gorla et al., 2010). A Cronbach's alpha of 0.6 is deemed to be acceptable value of reliability (Nunnally, 1978; Churchill, 1979). These constructs 'Kansei' and 'perceived service quality' showed acceptable reliability.

Since the three tests were satisfied, the 'Kansei' and 'perceived service quality' constructs were assumed to be valid and reliable.

**Table 4** Measurement of constructs

Construct	Indonesian group			Singaporean group		
	AVE*	Composite reliability	Cronbach's alpha	AVE	Composite reliability	Cronbach's alpha
Kansei	0.498	0.937	0.928	0.492	0.911	0.897
Perceived service quality	0.510	0.971	0.970	0.494	0.946	0.941

Note: \*Average variance extracted

### 3.7 Model fitting: link and evaluation

The perceived service quality with 'A' category and the Kansei response were linked and modelled using stepwise linear regression (Efroymson, 1960). In each model, a five-point Likert score to each Kansei word and perceived service attribute, were used as dependent and independent variables, respectively (see Table 5). There was no significant model (N/A) for Kansei 'Passion' at Indonesian group since this 'Passion' item was deleted due to poor factor loadings ( $< 0.5$ ).

**Table 5** Significant Kansei model

Kansei word	Indonesian	Singaporean
	Linear model*	Linear model*
Convenience (K <sub>1</sub> )	$K_1 = 1.15 + 0.462A_{13}$	$K_1 = 1.285 + 0.261C_4 + 0.25A_1$
Attractiveness (K <sub>2</sub> )	$K_2 = -0.029 + 0.468B_3 + 0.353E_3$	$K_2 = 1.791 + 0.296D_3$
Cleanliness (K <sub>3</sub> )	$K_3 = 0.599 + 0.677C_4$	$K_3 = 0.762 + 0.348A_9 + 0.241E_3$
Welcomeness (K <sub>4</sub> )	$K_4 = 1.356 + 0.501A_{13}$	$K_4 = 1.868 + 0.285C_3$
Confidence (K <sub>5</sub> )	$K_5 = 0.853 + 0.566A_{13}$	$K_5 = 1.887 + 0.353D_3$
Happiness (K <sub>6</sub> )	$K_6 = 0.193 + 0.721C_4$	$K_6 = 2.034 + 0.272C_4$
Relaxedness (K <sub>7</sub> )	$K_7 = -0.146 + 0.53C_4 + 0.394E_6$	$K_7 = 1.176 + 0.32C_2 + 0.201C_4$
Peacefulness (K <sub>8</sub> )	$K_8 = 0.823 + 0.67C_4$	$K_8 = 1.821 + 0.325A_9$
Passion (K <sub>9</sub> )	N/A	**K <sub>9</sub> = 0.767 + 0.244C <sub>4</sub> + 0.214A <sub>9</sub> + 0.192C <sub>2</sub>
Satisfaction (K <sub>10</sub> )	**K <sub>10</sub> = -0.562 + 0.439B <sub>5</sub> + 0.456C <sub>4</sub>	$K_{10} = 0.95 + 0.312C_2 + 0.277D_1$
Spaciousness (K <sub>11</sub> )	$K_{11} = 1.124 + 0.544C_4$	$K_{11} = 1.47 + 0.239D_1 + 0.196E_2$
Elegance (K <sub>12</sub> )	$K_{12} = 0.525 + 0.415E_3 + 0.294B_4$	$K_{12} = 2.113 + 0.216A_9$
Friendliness (K <sub>13</sub> )	$K_{13} = 1.045 + 0.586A_{13}$	$K_{13} = 1.409 + 0.224D_1 + 0.201A_1$
Modernisation (K <sub>14</sub> )	$K_{14} = 1.398 + 0.446E_3$	$K_{14} = 1.676 + 0.301A_9$
Relief (K <sub>15</sub> )	$K_{15} = -0.155 + 0.439B_4 + 0.398C_4$	$K_{15} = 0.999 + 0.303E_2 + 0.258C_4$
Quietness (K <sub>16</sub> )	$K_{16} = 1.235 + 0.612E_6$	$K_{16} = 2.2 + 0.3C_2$

Notes: \*Significant at  $p < 0.05$ . The names of service attribute are shown in Table 6.

\*\*The most significant model.

The most significant models were Kansei words 'Satisfaction' ( $p$ -value  $\leq 0.01$ ,  $R^2 = 0.426$ ) and 'Passion' ( $p$ -value  $\leq 0.01$ ,  $R^2 = 0.28$ ) for the Indonesian and Singaporean groups, respectively. Both models show that the service attribute 'Response to customer's request' (C<sub>4</sub>) had a slightly greater significant effect on Kansei. In other words, this result reports that this service attribute (C<sub>4</sub>) was a more important predictor of Kansei 'Satisfaction' (in Indonesian group) and 'Passion' (in Singaporean group) respectively than was the other service attributes.

### 3.8 Analysis of action

This refers to the reverse of the significant models. The objective is to see the extent to which service attributes influence particular Kansei. By referring to the significant models, the reversed models were performed (see Table 6).

By taking into account the attractive service attributes (A) and the service gap scores; the next step was to decide appropriate action of continuous improvement and maintenance (see Hartono and Tan, 2011b). Since these service gaps were negative for both population groups, the actions were directed to the prioritised continuous improvement (see the 'Priority' column in Table 6). Both population groups shared the same significant service attribute for their first prioritised continuous improvement, i.e., 'Response to customer's request' (C<sub>4</sub>). This service item was dominant to customer Kansei. Happiness, relaxedness and relief tended to be the common Kansei for both population groups.

**Table 6** Reversed significant Kansei model together with prioritised continuous improvement

	<i>Significant service attribute with [A] category</i>	<i>Significant Kansei word</i>	<i>Gap*</i>	<i>Priority</i>
<i>Indonesian sample</i>				
A <sub>13</sub>	The scent in hotel's room and lobby	Convenience, welcomeness, confidence, friendliness	-0.82	2
B <sub>3</sub>	Charged bills	Attractiveness	-0.68	7
B <sub>4</sub>	All size of servings	Elegance, relief	-0.76	5
B <sub>5</sub>	The employee's problem solving skill	Satisfaction	-1.00	6
C <sub>4</sub>	Response to customer's request	Cleanliness, happiness, relaxedness, peacefulness, satisfaction, spaciousness, relief	-0.92	1
E <sub>3</sub>	Personal attention	Attractiveness, elegance, modernisation	-0.68	3
E <sub>6</sub>	Operating hours	Relaxedness, quietness	-0.92	4
<i>Singaporean sample</i>				
A <sub>1</sub>	Receptionist and information desk	Convenience, friendliness	-0.91	5
A <sub>9</sub>	Bedroom and bathroom	Cleanliness, peacefulness, passion, elegance, modernisation	-0.72	2
C <sub>2</sub>	Prompt service	Relaxedness, passion, satisfaction, quietness	-0.93	3
C <sub>3</sub>	Willingness to help	Welcomeness	-0.77	9
C <sub>4</sub>	Response to customer's request	Convenience, happiness, relaxedness, passion, relief	-0.88	1
D <sub>1</sub>	Knowledge for enquiries	Satisfaction, spaciousness, friendliness	-0.96	4
D <sub>3</sub>	Knowledge about local places of interest	Attractiveness, confidence	-0.71	7
E <sub>2</sub>	Individual full attention	Spaciousness, relief	-0.73	6
E <sub>3</sub>	Personal attention	Cleanliness	-0.89	8

Note: \* Gap = perception – expectation

The subsequent step was to design action plans. It aimed to close the gaps between customers' expectations and perceptions (Pawitra and Tan, 2003). An HOQ was established to develop action plans to continuously improve the weak attractive service attributes. The 'Whats' referred to the prioritised attractive attributes. The 'Hows' adopted the standards of luxury hotel services by Chang and Chen (2011).

**Table 7** Adjusted importance level of 'Whats'

<i>Significant service attribute</i>	<i>Priority</i>	<i>Score</i>	<i>Adjusted priority score*</i>	<i>Importance score</i>	<i>Adjusted importance level**</i>
<i>Indonesian sample</i>					
A <sub>13</sub> The scent in hotel's room and lobby	2	6	0.21	3.89	0.83
B <sub>3</sub> Charged bills	7	1	0.04	4.08	0.15
B <sub>4</sub> All size of servings	5	3	0.11	3.89	0.42
B <sub>5</sub> The employee's problem solving skill	6	2	0.07	4.23	0.30
C <sub>4</sub> Response to customer's request	1	7	0.25	4.08	1.02
E <sub>3</sub> Personal attention	3	5	0.18	4.23	0.76
E <sub>6</sub> Operating hours	4	4	0.14	4.11	0.59
<i>Singaporean sample</i>					
A <sub>1</sub> Receptionist and information desk	5	5	0.11	4.03	0.45
A <sub>9</sub> Bedroom and bathroom	2	8	0.18	4.04	0.72
C <sub>2</sub> Prompt service	3	7	0.16	3.93	0.61
C <sub>3</sub> Willingness to help	9	1	0.02	3.97	0.09
C <sub>4</sub> Response to customer's request	1	9	0.20	4.07	0.81
D <sub>1</sub> Knowledge for enquiries	4	6	0.13	3.99	0.53
D <sub>3</sub> Knowledge about local places of interest	7	3	0.07	4.03	0.27
E <sub>2</sub> Individual full attention	6	4	0.09	4.17	0.37
E <sub>3</sub> Personal attention	8	2	0.04	3.95	0.18

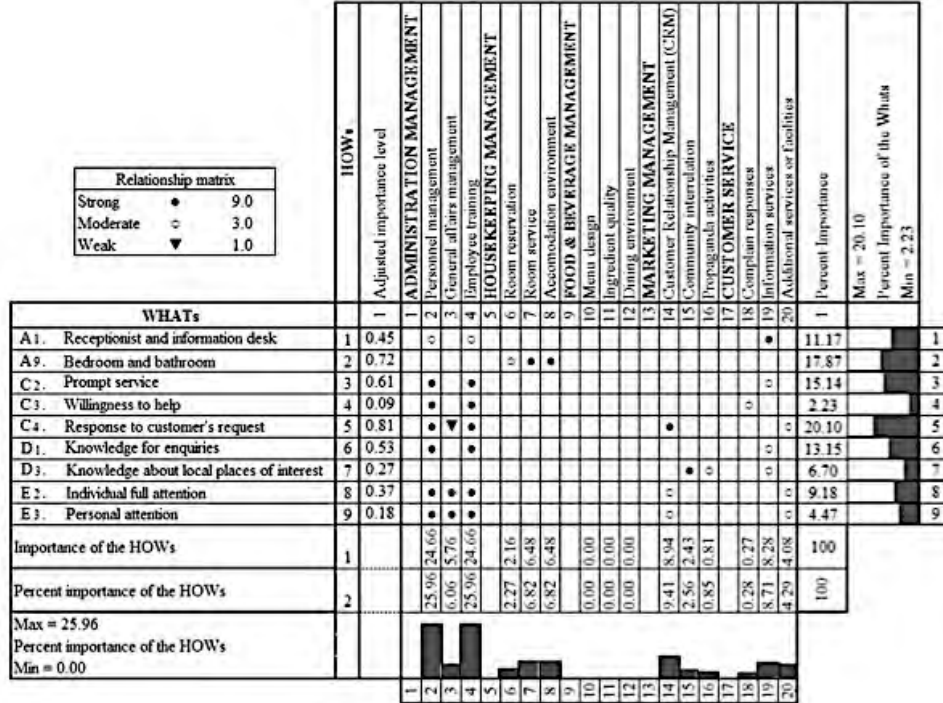
Notes: \*adjusted priority score attribute-i = score of attribute-i / (sum of all scores);

\*\*adjusted importance level of attribute-i = adjusted priority score of attribute-i × importance score of attribute – i.





Figure 4 HOQ using the integrated approach (Singaporean group)



4 Discussion

KE was invented in the 1970s when there was the necessity for a methodology capturing hidden emotions about products and services. It is called latent needs of customer. KE methodology is based on the semantic differentials and enhanced by adding different mathematical and service quality tools. This combined service quality tools in KE is important to deal with cases in many different purposes and contexts. This current study evaluated the existing services instead of a new service design. A focus on attractive attributes gives a deeper understanding on how to capture customers' emotions/feelings and always to delight the customers through continuous improvements.

Affective process/affect/Kansei is the function of external stimuli (Nagamachi, 1995; Schütte et al., 2004, 2008). This study shows that perceived service quality is found to have a direct relationship with Kansei. Lin (2004) argues that when customers evaluate a servicescape, their individual perception serves a cognitive experience and stimulates their emotional responses (e.g., pleasure, arousal and dominance).

The Kano model with a focus on attractive category (delighter) is used in this study. The Kano's attractive category is of interest to fulfil customer emotional needs/Kansei and to maximise customer overall satisfaction. According to Yang (2011), this attractive attribute provides several benefits, such as no risk if there is any discrepancy and as a source of differentiation and customer loyalty driver.

During hotel service encounters, customer experience both physical and non-physical elements of services. Physical forms of services (known as 'servicescape') include

building, garden, lobby and its decorations and bedroom and bathroom. Non-physical elements of services refer to process and interaction between employees and customers, such as bill accuracy, prompt service and personal attention of staffs.

This study shows that intensive regular trainings about character building, leaderships, communication skills and focus on customers are necessary. Hotel management should assure sufficient number of staffs equipped with relevant knowledge and professionalism. To reinforce customer-delight consciousness, a campaign slogan (such as ‘Always there for customer’) might be adopted. The interaction of managerial strategies and their corresponding attractive service attributes is summarised in Table 8.

**Table 8** Summary of interaction between managerial strategies and service attributes

Managerial strategy	Related attractive service attributes	
	Indonesian group	Singaporean group
<i>Administration management</i>		
Personnel management	Charged bills (B <sub>3</sub> ); All size of servings (B <sub>4</sub> ); The employee’s problem solving skill (B <sub>5</sub> ); Response to customer’s request (C <sub>4</sub> ); Personal attention (E <sub>3</sub> ).	Receptionist and information desk (A <sub>1</sub> ); Prompt service (C <sub>2</sub> ); Willingness to help (C <sub>3</sub> ); Response to customer’s request (C <sub>4</sub> ); Knowledge for enquiries (D <sub>1</sub> ); Individual full attention (E <sub>2</sub> ); Personal attention (E <sub>3</sub> ).
General affairs management	All size of servings (B <sub>4</sub> ); Response to customer’s request (C <sub>4</sub> ); Personal attention (E <sub>3</sub> ); Operating hours (E <sub>6</sub> ).	Response to customer’s request (C <sub>4</sub> ); Individual full attention (E <sub>2</sub> ); Personal attention (E <sub>3</sub> ).
Employee training	The employee’s problem solving skill (B <sub>5</sub> ); Response to customer’s request (C <sub>4</sub> ); Personal attention (E <sub>3</sub> ).	Receptionist and information desk (A <sub>1</sub> ); Prompt service (C <sub>2</sub> ); Willingness to help (C <sub>3</sub> ); Response to customer’s request (C <sub>4</sub> ); Knowledge for enquiries (D <sub>1</sub> ); Individual full attention (E <sub>2</sub> ); Personal attention (E <sub>3</sub> ).
<i>Housekeeping management</i>		
Room reservation	-	Bedroom and bathroom (A <sub>9</sub> ).
Room service	The scent in hotel’s room and lobby (A <sub>13</sub> ).	Bedroom and bathroom (A <sub>9</sub> ).
Accommodation environment	-	Bedroom and bathroom (A <sub>9</sub> ).
<i>Marketing management</i>		
Customer relationship management (CRM)	Response to customer’s request (C <sub>4</sub> ); Personal attention (E <sub>3</sub> ); Operating hours (E <sub>6</sub> ).	Response to customer’s request (C <sub>4</sub> ); Individual full attention (E <sub>2</sub> ); Personal attention (E <sub>3</sub> ).
Community interrelation	-	Knowledge about local places of interest (D <sub>3</sub> ).
Propaganda activities	-	Knowledge about local places of interest (D <sub>3</sub> ).

**Table 8** Summary of interaction between managerial strategies and service attributes (continued)

Managerial strategy	Related attractive service attributes	
	Indonesian group	Singaporean group
<i>Customer service</i>		
Complain responses	-	Willingness to help (C <sub>3</sub> ).
Information services	Charged bills (B <sub>3</sub> ).	Receptionist and information desk (A <sub>1</sub> ); Prompt service (C <sub>2</sub> ); Knowledge for enquiries (D <sub>1</sub> ); Knowledge about local places of interest (D <sub>3</sub> ).
Additional services or facilities	Response to customer's request (C <sub>4</sub> ); Personal attention (E <sub>3</sub> ); Operating hours (E <sub>6</sub> ).	Response to customer's request (C <sub>4</sub> ); Individual full attention (E <sub>2</sub> ); Personal attention (E <sub>3</sub> ).

Another finding shows that Indonesian tourists concerned more on reliability, whereas Singaporeans put more attention on responsiveness. In other words, most Indonesian perceived proper and effective services, while Singaporean perceived responsive and prompt services. Both population groups responded more on customer-employee interaction rather than 'servicescape'.

## 5 Conclusions and further research recommendation

The Kano model helps to identify different categories of service performance. The Kano attractive service attributes (A) can fulfil customer Kansei and overall satisfaction. An integrative framework of Kano's model, KE and QFD has been tested through an empirical study on luxury hotel services. The result shows that perceived service attributes impacted on Kansei. The more influence on Kansei words, the more important are service attributes.

This study provides two contributions. As for theoretical and methodological contribution, this study showcases the fruitfulness of integrating Kano's model, KE and QFD in providing in a more structured and formalised methodology. This methodology captures customer emotions and links them to service attributes performance. As for practical contribution, this study helps service designers and managers identify what efforts to be taken for continuous improvement and maintenance.

This research is subject to limitations. The survey covered only luxury hotel services and involved Indonesian and Singaporean tourists. Further research should focus on applying this integrative framework to other prospective service domains (e.g., high-end tourism industries). In addition, it might take into account cultural differences effects on Kansei.

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