

## 飯店業服務品質風險之評估：以台灣為例

### Evaluation of Service Quality Risk for Hotel Industry in Taiwan

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#### Abstract

This study attempts to incorporate the concept of risk management into the service quality of the hotel industry, and proposes an assessment model, service quality risk (SQR). The paper proposes to use this method in searching higher quality risks and service attributes that require priorities for improvement. In this study, several hotels in Taiwan are used as examples to explore the quality risk in hotel services. By using this quantitative method, managers can improve the quality of risk management and hotel services. It would be helpful for managerial implications of hoteliers, and will give them a reference in their decision making process.

**Keywords:** Hotel, Service Quality, Quality Risk Management, Kano Model, Failure Mode and Effects Analysis.

#### 1. INTRODUCTION

With overwhelming increased visitors, today hotel management is influenced so much more than before, causing a keen competition in the industry. The issue of how customers choose an accommodation during travel has long been a valued research topic related to the Taiwan. Extensive literature reviews have shown that the quality of hotel services is the key for building brand loyalty in customers, yet while reports state the power of service quality, previous researches mostly inspect on a positive position exploring and evaluating the quality attributes and service quality of a hotel. However, when service quality do not meet with expectations of the customers, people will be dissatisfied and would therefore be influenced to choose another accommodation the next time around. This will create losses to the hoteliers and is regarded as a negative influence, which is why it becomes important to discuss the service quality of hotels. Indeed, we can regard the implement of service quality as a managerial method to control risks.

In the past, the scope of most studies regarding risk management do not leave financial

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risks, engineering risks, security risks and project risks management. Among these researches, the failure mode and effects analysis (FMEA) is an analytical tool frequently used in risk management. FMEA focuses on exploring all possible mistakes in the system: it analyzes the factors searching for error types, the probability of failures, the severity of the faults and the degree of hazard. This is a technology commonly used to alternate managing policies by preventing the faulted outcomes. In recent years, a new application has also been brought out in the field of risk management. Named quality risk management (QRM) (Claycamp, 2007), this systematic procedure puts in the concepts of “quality”, and ensures the quality of a product within its life cycle. There are four main procedures in the QRM: risk assessment, risk control, risk communication and risk review (Mire-Sluis et al., 2010). The application of FMEA on quality service aims to determine the various service failures by measuring risk factors, so that it can foretell the probabilities of service failures occurrence (Shahin, 2004). In addition, establishing an improvement method via FMEA for the service process may also contribute to an elimination of potential errors (Ookalkar et al., 2009).

The SERVQUAL scale in hotel management is also used commonly in previous studies on service quality to evaluate its attributes and to measure the gap between the actual outcomes and the expectations. Some studies combine the SERVQUAL scale together with the IPA to perform better analyses. Still, sometimes the quality attributes and customer satisfaction do not always form a one-dimensional linear relationship. Kano et al. (1984) proposed a two-dimensional view of quality model (generally referred to as the Kano model), indicating that customer satisfaction and quality attributes are not completely linear. In his theory, he classifies these attributes into five categories according to functional and dysfunctional conditions, and calculates the degree of satisfaction on these features (Kano, Seraku, Takahashi, & Tsuji, 1984; Matzler, Hinterhuber, Bailom, & Sauerwein, 1996). The model has been contributed to identify the categories of several elements in service quality, and it provides meaningful information for strategy development in hope of improving the quality of service. In recent years, this Kano model has been widely applied in different fields of studies. Yang et al. (2011), for one, combined the Kano model and the IPA to measure the service quality of hotels. Later on, Hu and Lee (2011) also proposed new indicators to integrate the Kano model and the IPA (Hu & Lee, 2011; Yang, Jou, & Cheng, 2011). We can see how these effective tools aforementioned assess the service quality of hotel industry. Nevertheless, hotel industry still seems to be limited in scopes of management, as it neglects to put in concepts of risks.

In conclusion, accurate evaluating the quality risk is a crucial part of the work, as is the first step of QRM. However, there is less research to propose appropriate assessment approach for risk quality in the hotel industry. This study attempts to incorporate the concept of risk management into the service quality of the hotel industry, and proposes an assessment model,

service quality risk (SQR), which intends to integrate the Kano model, the IPA and the FMEA quality risk assessment model. The paper proposes to use this method in searching higher quality risks and service attributes that require priorities for improvement. In this study, several hotels in Taiwan are used as examples to explore the quality risk in hotel services. By using this quantitative method, managers can improve the quality of risk management and hotel services. It would be helpful for managerial implications of hoteliers, and will give them a reference in their decision making process.

## 2. METHOD

### 2.1 Quality Risk Evaluation Model

This study attempts to develop a new analysis method to integrate the Kano model, the IPA and the FMEA quality risk assessment model to measure the quality risk of the hotel service. The main conceptual framework of this study has shown in Figure 1.

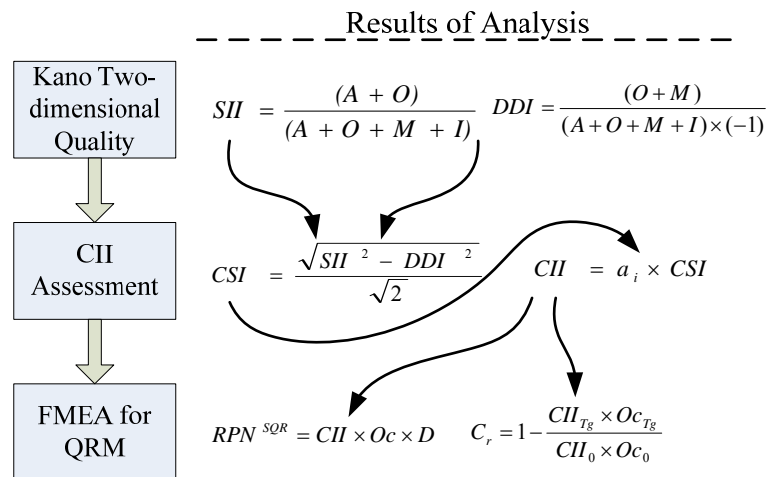


Figure 1 Conceptual Framework of Service Quality Risk Model

#### 2.1.1 Stage 1: Kano two-dimensional quality model

According to the definition of Kano's model, the service quality was divided into attractive quality elements (A), one-dimension quality elements (O), must-be quality elements (M), indifferent quality elements (I), reverse quality elements (R) (Kano et al., 1984). Then Berger et al. (1993) introduced the customer satisfaction coefficient to analyze whether satisfaction can be increased by meeting a customer requirement, or whether fulfilling this requirement merely prevents the customer from being dissatisfied (Berger et al., 1993). The customer satisfaction coefficient includes two indices:

$$\text{Satisfaction increment index (SII)} = (A + O) / (A + O + M + I)$$

$$\text{Dissatisfaction decrement index (DDI)} = (O + M) / (A + O + M + I) \times (-1)$$

### 2.1.2 Stage 2: Contributory improvement index (CII)

#### Step 2-1: Development of Composite Satisfaction Index (CSI)

This study tries to use a vector concept to measure the composite effect from a specific attribute. Employing the customer's satisfaction coefficient matrix proposed by Berger et al. (1993), where the SII and the DDI are indicated on the x-axis and y-axis, respectively. Each attribute can be plotted in the satisfaction coefficient matrix such as the point A (ASII, ADDI) as shown in the Figure 2.

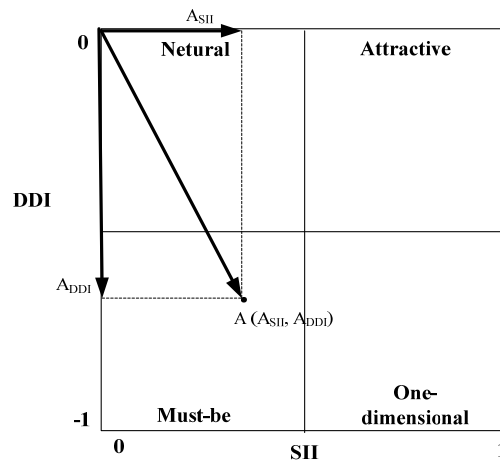


Figure 2 An example of the point A in customer satisfaction coefficient matrix

The distance from the point A to the original point can be seen as the composite effect of the SII and the DDI, which includes both of increasing satisfaction and decreasing dissatisfaction. One can easily use a vector analysis to calculate this distance. Moreover, in order to present the relative merits among all quality attributes, normalization should be applied. Thus this study proposed a new index named Composite Satisfaction Index (CSI). The Composite Satisfaction Index (CSI) can be expressed by the following equation:

$$\begin{aligned} \text{CSI} &= \sqrt{\text{SII}^2 + \text{DDI}^2} / \sqrt{2} = \sqrt{\left(\frac{(A + O)}{(A + O + M + I)}\right)^2 + \left(\frac{(O + M)}{(A + O + M + I)}\right)^2} / 2 \\ &= \sqrt{\frac{(A + O)^2 + (O + M)^2}{2(A + O + M + I)^2}} \end{aligned}$$

## Step 2-2: Combination of the IPA and the CSI

On the other hand, according to the "Quality attribute ranking" proposed by Wasserman (1993), the quality attributes' weight ( $a_i$ ) which is used to prioritize the attributes for being improved can be calculated by integrating importance and satisfaction of IPA. The equation is  $a_i = w_i / \max(w_i)$ . In order to obtain the comprehensive information of standardized weight and the CSI, this study integrates the results of these two results into a synthetic index called contributory improvement index (CII). It can be expressed by the following equation:

$$CII = a_i \times CSI$$

The CII is equal to multiply standardized weight that comes from the method of quality attribute ranking by the CSI from the Kano's model. The attribute with higher CII has more correspondence with the customer's demand and more contribution to satisfaction. Moreover, the CII ranges from 0 to 1 since standardized weight and the CSI have been both normalized.

### 2.1.3 Stage 3: Combination of the CII and the FMEA

FMEA suggests using risk priority number (RPN) to analyzing the damage of failure, evaluating the result of failure and handling the risk of failure. The risk priority number (RPN) is calculated by multiplying the severity (S), occurrence (Oc) and detection (D). The equation can be described as  $RPN = S \times Oc \times D$ . Then, Shahin (2004) congregated the above result into the "correction ratio (Cr)". The formula is as follows:

$$C_r = 1 - \frac{RPN_{Tg}}{RPN_0} = 1 - \frac{D_{Tg}^2 Oc_{Tg}^{k+1}}{D_0^2 Oc_0^{k+1}}$$

Where the subscript Tg represents "goal quality", and the subscript 0 stands for "current quality".

This study thus propose "Risk priority number of service quality risk ( $RPN^{SQR}$ )". This study replaces S with CII. Then  $RPN^{SQR}$  can be defined as  $RPN^{SQR} = CII \times Oc \times D$ . Furthermore, the formula of Cr value of quality attribute is as follows:

$$Cr = 1 - \frac{RPN_{Tg}^{SQR}}{RPN_0^{SQR}} = 1 - \frac{CII_{Tg} \times Oc_{Tg} \times D_{Tg}}{CII_0 \times Oc_0 \times D_0}$$

Assume that the detection (D) is constant, which means  $D_{Tg} = D_0$ , then the equation of Cr value can be simplified as the following equation:

$$Cr = 1 - \frac{CII_{Tg} \times Oc_{Tg}}{CII_0 \times Oc_0}$$

When Cr value is larger, it means the gap is greater. Therefore, Cr value can provide more information of complete service quality improve priority to the managers.

## **2.2 Questionnaire Design and Data Collection**

In this study, the quality attributes of hotel service are referred to and revised from the studies of Saleh and Ryan (1991), Salazar et al. (2010), Yang et al. (2011). The 25 quality attributes related to hotel service were identified within the five dimensions of SERVQUAL respectively tangibles, reliability, responsiveness, assurance and empathy. The questionnaire of this study contains four parts: accommodation information, consumers' attributes preferences of hotel service quality, consumers' importance perception and satisfaction of hotel service, and respondents' basic information (see Table 1).

The data were collected via questionnaires from the consumers who stay in star hotels in Taiwan. In order to obtain the comprehensive result, questionnaires were distributed to the northern, central, southern and eastern part in Taiwan. Deducting the expected of the invalid questionnaires, this study expected to collect 300 copies of questionnaires.

## **3. RESULTS**

### **3.1 Sample**

#### **3.1.1 Effective Questionnaires**

The survey questionnaires were administrated to a random sample of native customers in Taiwan. Participation in this study was entirely voluntary. Total 300 questionnaires were distributed in Taiwan, 300 questionnaires were returned, 205 were completed and usable, showing 68.33% of valid return rate.

#### **3.1.2 Sample Structure**

The frequency distribution of Sample Structure in Taiwan is shown as Table 4-2. 54.6% are male and 45.4% are female. 31.7% are under the age of 25 and 22.0% are 46-55 years old. 24.9% are other (this study speculate that most of them are students) and 21.5% are private enterprise employees. 64.4% of all respondents are travel trips. There are 52.2% of all the respondents who stays hotel 2-3 times per year, 51.7% have stay 2-3 days each time and 47.3% have average spends NT\$ 3000-5999.

#### **3.1.3 Reliability Analysis**

The Cronbach's was used to analyze the reliability of importance and satisfaction. This study analyze the reliability of all dimension of "tangibles", "reliability", "responsiveness",

"assurance" and "empathy" respectively, and then analyzed the reliability of overall service quality. The results of Taiwan are shown as Table2.

The result shows that  $\alpha$  of importance and satisfaction were greater than 0.70 in five dimensions and the overall  $\alpha$  is greater than 0.90, which means the data used for this paper have acceptable reliability.

Table 1 Hotel Service Quality Scales

Dimensions	Service Quality Attributes
Tangibles	1. Up-to-date equipment
	2. Appropriate attire
	3. Cleanliness and comfortability of rooms
	4. Free Internet service
	5. Provision of personal hygiene products (e.g. toothpaste, toothbrushes, soap)
	6. Provision of free beverage (e.g. bottled water, hot water, tea bags, coffee bags, drinks)
	7. Completeness of leisure facilities (e.g. swimming pool and gym)
	8. Provision of business facilities (e.g. international direct dial telephone, fax machine, business center)
	9. Well catering service (e.g. restaurant, bar, cafe)
Reliability	10. Promptness in correcting errors/negligence
	11. Reasonable and proper billing
	12. Promptness and accurateness in promised services
Responsiveness	13. Fast customer service (e.g. room service and room cleaning)
	14. Profession in consultancy and provision of clear answers
	15. The reach for individual concerns
	16. The convenience of reservations
Assurance	17. Ability to make guests comfortable and relieved
	18. Staff's politeness and friendliness
	19. Trained and experienced staff
	20. Provision of safety facilities (e.g. fire extinguishers, safety deposit box)
Empathy	21. An understanding in customer needs
	22. Activeness in serving guests
	23. Provision of transport services (e.g. valet parking, car rental, free airport/station transfer)
	24. Provision of other services (e.g. travel information, laundry, shoeshine)
	25. Willingness to help guests

Table 2 The Reliability of Importance and Satisfaction

Dimensions	Cronbach $\alpha$	
	Importance	Satisfaction
Tangibles	0.779	0.862
Reliability	0.731	0.721
Responsiveness	0.758	0.752
Assurance	0.762	0.771
Empathy	0.791	0.829
Total	0.926	0.943

### 3.2 Classification of Hotel Service Attributes

The result of Kano model is shown as Table 3. By summing the 25 quality attributes, there is none which can be sorted as attractive quality (A) or reverse quality (R). Meanwhile, there are 12 quality attributes under the category of “must-be”, 4 quality attributes are under the category of “indifference”, and 9 quality attributes are under the category of “one-dimensional”.

The result of this study shows that there is no attributes that are classified as attractive quality (A). This shows that since there have been numerous star hotels in Taiwan, and most of the hotel’s service quality has reached a certain level. Meanwhile, this study also found that there are 12 attributes classified as must-be quality (M). Most of these were identified within the dimensions of reliability, responsiveness and assurance. In another words, consumers expect certain level of services to be provided by star hotel. As a result, the customers may become dissatisfied easily when the performance of a service criterion is low or the service’s attribute is absent, and this is when the hotel faces high risks.

Also, 4 attributes which are provision of leisure, business, transport facilities and other services are classified as indifference quality (I). The availability of these indifferent services can neither increase nor decrease dissatisfaction of the customer. However, this result does not indicate that it is not necessary for hotel to provide these services, but proposed that hotel should focus more on improving other important services while continuing to provide these services. The rest of 9 quality attributes are one-dimensional. Most of these service attributes were identified within the dimensions of tangibles and empathy. Due to the features of these attributes, hotel will face potential risk when it provides less of these nine attributes which results in lower customer satisfaction level.

Besides, according to the formula proposed by Berger et al. (1993) and Matzler and Hinterhuber (1998), this study can obtained the customer satisfaction coefficient indexes (SII and DDI) as shown at the last two columns in Table 3. This study found that the hotel can



improve satisfaction level of customers by "provision of free beverage (6)", "an understanding in customer needs (21)", and "activeness in serving guests (22)", etc. As to reducing the dissatisfaction, the result shows that the hotel should improve the following attributes: "reasonable and proper billing (11)", "promptness and accurateness in promised services (12)", and "staff's politeness and friendliness (18)", etc.

### 3.3 CII Assessment

In order to offer the information of quality improvement strategy based on Kano's model and IPA, this study proposes a new index called contributory improvement index (CII). The CII is integrating the standardized weight that comes from the method of quality attribute ranking and the CSI from the Kano's model. The attribute with higher CII has more correspondence with the customer's demand and more contribution to satisfaction.

According to the results of the CSI in Table 4, the attribute "cleanliness and comfortability of rooms (3)" has the largest contribution toward satisfaction where its CSI value is 0.63 being highest among 25 attributes. The second highest attribute is "staff's politeness and friendliness (18)". The CSI reflects how an attribute can contribute to improving total satisfaction. The larger CSI an attribute has, the more influence on the total satisfaction by the attribute after quality improvement. The results show that, the hotel provides clean and comfortable rooms, and the employees are polite and friendly to customers can increasing satisfaction and reducing dissatisfaction mostly. On the other hand, the attribute "provision of business facilities (8)" has less contribution toward satisfaction. This result responds to the former result of Kano's model that this attribute belongs to "indifferent attribute" which can neither increase satisfaction nor decrease dissatisfaction.

Furthermore, this study applied the CII to explore which attributes should be improved before others; meanwhile they have more amelioration on satisfaction. The result shows that, the CII of "cleanliness and comfortability of rooms (3)", "reasonable and proper billing (11)", "promptness and accurateness in promised services (12)", "fast customer service (13)", and "activeness in serving guests (22)" are all higher than 0.5. These top five service attributes mainly came from dimensions of the tangibles, reliability, responsiveness and empathy. Among them, attribute "promptness and accurateness in promised services (12)" has the highest CII, a result of CSI: 0.60 which is the second highest of all and 4<sup>th</sup> and 16<sup>th</sup> rank in consumer perception of "importance" and "satisfaction" respectively. As for attribute "reasonable and proper billing (11)" has the second highest CII, a result of CSI: 0.61 which is the highest of all and 5<sup>th</sup> and 16<sup>th</sup> rank in consumer perception of "importance" and "satisfaction" respectively. These two attributes are both from dimension of reliability and classified as the "must-be" attribute in the Kano model. They topped the highest and second highest CII, both with very

high CSI, considerably high ranking in “importance” and low ranking in “satisfaction”. Other attributes need to be improved priority have either a huge gap between consumers’ perception of satisfaction and importance or the improvement effect is huge. This will resulting high CII and implied a higher risk. As a result, these service attributes are most needed and worth to be improves. The hotel should pay more attention to these service attributes and improve them immediately.

### **3.4 Service Quality Risk Analysis**

Cr value is used to understanding the gap between the current quality and goal quality. The greater the Cr value is, the larger the gap between the goal quality. Moreover, because the Cr value is integrated by the perceptual importance, the perceptual satisfaction, CSI of all service qualities that calculated by Kano model, CII value and the perceptual occurrence, all of these factors may affect the correction ratios of each service quality, which can reflect the results of the service quality risk. Therefore, Cr value can help the hoteliers to searching higher quality risks and service attributes that require priorities for improvement.

The service quality risk analysis results of hotel industry in Taiwan are shown as Table 5. Overall, most of the service quality is relatively high in Cr values, shows that the overall service qualities still needs to be improved. Among them, the service quality “activeness in serving guests (22)” has the highest Cr value, which shows that this service quality has the highest service quality risk in the current. Analysis this service quality can found that, the value of CII is relatively high and the service failure occurs frequently. Therefore, this service quality has to be greatly improved. However, if the hoteliers can improve this service, the improvement effect will be significant.

Followed, the Cr value of service qualities which is greater than 0.97 are “well catering service (9)”, “reasonable and proper billing (11)”, “promptness and accurateness in promised services (12)”, “fast customer service (13)”, and “willingness to help guests (25)”. This result shows that the main service quality risk comes from the hotel catering service and employee’s performance, especially their attitude, enthusiasm and correctness. Additionally, these five service qualities have either a relatively high service failure occurrence (Oc) or a higher contributory improvement index (CII). Therefore, hoteliers can improve its catering service and enhance staff training to reduce their service quality risk and improve customer satisfaction.

Table 3 Kano Service Quality Attributes Classification

Service Quality Attributes		Result	SII	DDI
Tangibles	1. Up-to-date equipment	O	0.49	-0.60
	2. Appropriate attire	M	0.44	-0.72
	3. Cleanliness and comfortability of rooms	O	0.49	-0.75
	4. Free Internet service	O	0.47	-0.54
	5. Provision of personal hygiene products (e.g. toothpaste, toothbrushes, soap)	O	0.48	-0.55
	6. Provision of free beverage (e.g. bottled water, hot water, tea bags, coffee bags, drinks)	O	0.51	-0.56
	7. Completeness of leisure facilities (e.g. swimming pool and gym)	I	0.43	-0.48
	8. Provision of business facilities (e.g. international direct dial telephone, fax machine, business center)	I	0.37	-0.51
	9. Well catering service (e.g. restaurant, bar, cafe)	M	0.41	-0.65
Reliability	10. Promptness in correcting errors/negligence	M	0.40	-0.70
	11. Reasonable and proper billing	M	0.40	-0.77
	12. Promptness and accurateness in promised services	M	0.38	-0.76
Responsiveness	13. Fast customer service (e.g. room service and room cleaning)	O	0.41	-0.69
	14. Profession in consultancy and provision of clear answers	M	0.40	-0.68
	15. The reach for individual concerns	M	0.41	-0.59
	16. The convenience of reservations	M	0.41	-0.68
Assurance	17. Ability to make guests comfortable and relieved	M	0.44	-0.71
	18. Staff's politeness and friendliness	M	0.45	-0.77
	19. Trained and experienced staff	M	0.43	-0.67
	20. Provision of safety facilities (e.g. fire extinguishers, safety deposit box)	M	0.42	-0.71
Empathy	21. An understanding in customer needs	O	0.50	-0.63
	22. Activeness in serving guests	O	0.50	-0.66
	23. Provision of transport services (e.g. valet parking, car rental, free airport/ station transfer)	I	0.43	-0.50
	24. Provision of other services (e.g. travel information, laundry, shoeshine)	I	0.40	-0.50
	25. Willingness to help guests	O	0.47	-0.73

Note: attractive quality (A); one-dimensional quality (O); must-be quality (M); indifference quality (I); reverse quality (R); inefficient (Q)

Table 4 CII Assessment of Hotel Industry

	Question	Imp orta nce	Satis facti on	a <sub>i</sub>	CSI	CII	CII Ran king
Tangibles	1. Up-to-date equipment	4.24	4.16	0.32	0.55	0.18	18
	2. Appropriate attire	4.25	4.18	0.16	0.60	0.10	21
	3. Cleanliness and comfortability of rooms	4.42	4.19	0.80	0.63	0.51	5
	4. Free Internet service	4.07	4.04	0.36	0.51	0.18	17
	5. Provision of personal hygiene products (e.g. toothpaste, toothbrushes, soap)	4.10	4.17	0.04	0.52	0.02	25
	6. Provision of free beverage (e.g. bottled water, hot water, tea bags, coffee bags, drinks)	4.11	4.14	0.16	0.54	0.09	22
	7. Completeness of leisure facilities (e.g. swimming pool and gym)	3.88	3.95	0.48	0.46	0.22	12
	8. Provision of business facilities (e.g. international direct dial telephone, fax machine, business center)	3.85	3.91	0.48	0.44	0.21	14
	9. Well catering service (e.g. restaurant, bar, cafe)	4.09	4.02	0.64	0.54	0.35	9
Reliability	10. Promptness in correcting errors/negligence	4.21	4.14	0.36	0.57	0.20	15
	11. Reasonable and proper billing	4.32	4.12	0.96	0.61	0.59	2
	12. Promptness and accurateness in promised services	4.34	4.12	1.00	0.60	0.60	1
Responsiveness	13. Fast customer service (e.g. room service and room cleaning)	4.28	4.13	0.92	0.57	0.52	3
	14. Profession in consultancy and provision of clear answers	4.24	4.18	0.08	0.56	0.04	24
	15. The reach for individual concerns	4.17	4.08	0.76	0.51	0.39	7
	16. The convenience of reservations	4.21	4.16	0.12	0.56	0.07	23
Assurance	17. Ability to make guests comfortable and relieved	4.32	4.24	0.24	0.59	0.14	19
	18. Staff's politeness and friendliness	4.38	4.20	0.48	0.63	0.30	10
	19. Trained and experienced staff	4.32	4.20	0.36	0.56	0.20	16
	20. Provision of safety facilities (e.g. fire extinguishers, safety deposit box)	4.35	4.19	0.64	0.58	0.37	8
Empathy	21. An understanding in customer needs	4.26	4.18	0.24	0.57	0.14	20
	22. Activeness in serving guests	4.25	4.11	0.88	0.59	0.52	4
	23. Provision of transport services (e.g. valet parking, car rental, free airport/ station transfer)	4.09	4.02	0.64	0.46	0.30	11
	24. Provision of other services (e.g. travel information, laundry, shoeshine)	3.96	3.97	0.48	0.45	0.22	13
	25. Willingness to help guests	4.27	4.15	0.80	0.61	0.49	6

Furthermore, the service quality "provision of personal hygiene products (5)" has the lowest Cr value. This service quality has the lowest CII and the failure occurrence is relatively low, which indicates that the improvement effect of this service is the lowest and the service failure occurs infrequently. One possible explanation to this result might be that some customers will rather prepare their own toiletries. In addition, currently most of the star hotels provide well-known brands of toiletries to customers. Therefore, hotel businesses have no need to improve this quality factor, as long as the current level of quality is maintained. Moreover, the Cr value of "profession in consultancy and provision of clear answers (14)" and "the convenience of reservations (16)" are relatively low. The results of service quality risk are relatively low because the service failure not often occur, the effect of increasing satisfaction is not obvious or respondents regard the qualities of these service are not bad.

#### **4. CONCLUSION AND SUGGESTION**

This study attempts to incorporate the concept of risk management into the service quality of the hotel industry, and proposes an assessment model, service quality risk (SQR), which intends to integrate the Kano model, the IPA and the FMEA quality risk assessment model. The paper tries to integrate these models in searching higher quality risks and service attributes that require priorities for improvement. In this study, several hotels in Taiwan are used as examples to explore the quality risk in hotel services.

The main contribution of this study is to propose a quality risk assessment model to evaluate the service quality risk of hotel industry. In terms of academic contribution, this new proposal of "vector" concept could be used to measure contribution to satisfaction from a specific attribute. The new method from this study could evaluate service quality risk effectively. It is easy to conduct and academically meaningful. On top of academic contribution, this research also contributed in practical. In this study, several hotels in Taiwan are used as examples to explore the quality risk in hotel services. Thus, we can understand the practical situation of hotel industry in Taiwan. In addition, hotel managers can use this method in pinpointing higher quality risks and service attributes that require priorities for improvement. By using this quantitative method, the management team could allocate resources more effectively in their decision making process and thus improve the quality of risk management and hotel services. In this empirical study, the results show that "promptness and accurateness in promised services", "fast customer service", "activeness in serving guests", "reasonable and proper billing", and "well catering service" have highest quality risk and should be greatly improved and the quality deficiency occurs frequently.

Table 5 FMEA Analysis of Hotel Industry

Service Quality Attributes		$CI_{I_0}$	$O_{C_0}$	$\frac{CI_{T_g} \times O_{C_{T_g}}}{CI_{I_0} \times O_{C_0}}$	$Cr$	Cr Ranking
Tangibles	1. Up-to-date equipment	0.18	0.19	0.077	0.923	18
	2. Appropriate attire	0.10	0.16	0.164	0.836	22
	3. Cleanliness and comfortability of rooms	0.51	0.15	0.033	0.967	9
	4. Free Internet service	0.18	0.25	0.056	0.944	14
	5. Provision of personal hygiene products (e.g. toothpaste, toothbrushes, soap)	0.02 <sup>a</sup>	0.18	0.676	0.324	25
	6. Provision of free beverage (e.g. bottled water, hot water, tea bags, coffee bags, drinks)	0.09	0.20	0.146	0.854	21
	7. Completeness of leisure facilities (e.g. swimming pool and gym)	0.22	0.31	0.037	0.963	11
	8. Provision of business facilities (e.g. international direct dial telephone, fax machine, business center)	0.21	0.34	0.035	0.965	10
	9. Well catering service (e.g. restaurant, bar, cafe)	0.35	0.26	0.027	0.973	5
Reliability	10. Promptness in correcting errors/negligence	0.20	0.17	0.074	0.926	17
	11. Reasonable and proper billing	0.59	0.16	0.027	0.973	4
	12. Promptness and accurateness in promised services	0.60	0.16	0.026	0.974	3
Responsiveness	13. Fast customer service (e.g. room service and room cleaning)	0.52	0.19	0.025	0.975	2
	14. Profession in consultancy and provision of clear answers	0.04	0.19	0.297	0.703	24
	15. The reach for individual concerns	0.39	0.21	0.031	0.969	7
	16. The convenience of reservations	0.07	0.19	0.197	0.803	23
Assurance	17. Ability to make guests comfortable and relieved	0.14	0.16	0.114	0.886	20
	18. Staff's politeness and friendliness	0.30	0.12 <sup>b</sup>	0.068	0.932	16
	19. Trained and experienced staff	0.20	0.20	0.064	0.936	15
	20. Provision of safety facilities (e.g. fire extinguishers, safety deposit box)	0.37	0.18	0.038	0.962	13
Empathy	21. An understanding in customer needs	0.14	0.18	0.102	0.898	19
	22. Activeness in serving guests	0.52	0.22	0.022	0.978	1
	23. Provision of transport services (e.g. valet parking, car rental, free airport/ station transfer)	0.30	0.26	0.032	0.968	8
	24. Provision of other services (e.g. travel information, laundry, shoeshine)	0.22	0.31	0.038	0.962	12
	25. Willingness to help guests	0.49	0.18	0.028	0.972	6

Note: "a" represents the lowest  $CI_{T_g}$ ; "b" represents the lowest  $O_{C_g}$ .

There still are some research limitations in this study. Due to the constraints of research budgets and time limitations, this study was unable to exercise greater control over the collected subjects and samples. The data were collected via questionnaires from the consumers who stay in star hotels in Taiwan. Although 300 distributed questionnaires were accordant with the t-test large sample theory, the doubt of representative problems still exists. Thus, this research suggests that increasing collective data numbers of further research may enhance the result of this study. In addition, specific investigation or comparison towards certain regions and city can also be conducted to improve the understanding of hotel industries. Further research can also modify the service attributes in this study to make it more suitable for the respondents. In addition, adding other service quality attributes to increase the completeness of the questionnaire can also be considered. Moreover, future research can apply the proposed method in this study to explore and compare the service quality to other industries.

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