

# Classifying Quality Attributes Using Service Gaps and Kano's Method

Mal-Kong Sia<sup>1+</sup> and Kanesan Muthusamy<sup>2</sup>

<sup>1</sup> Division of Building, School of Technology, Kolej Tunku Abdul Rahman, Kuala Lumpur

<sup>2</sup> Institute of Quality, Research & Innovation, Open University Malaysia, Kuala Lumpur

**Abstract.** This paper attempts to compare the classification of quality attributes using Kano's method and the service gaps method proposed by Kong and Muthusamy (2011). Expectation and perception data from 80 articles were systematically reviewed. Only two articles with classification of quality attributes by Kano's method were identified. Four service quality factors were apparent from this study, and eight of the quality attributes were found to be the same by both methods. Service gaps could indeed be used to classify quality attributes, besides for evaluation of service quality and customer satisfaction.

**Keywords:** expectations, Kano's model, perceptions, quality attributes, service gaps, SERVQUAL

## 1. Introduction

Due to different perspectives, quality has acquired multiple meanings. As a result of different interpretations of quality, a few quality models have been developed to define and measure quality [1] and the impact of individual quality attribute of a product or service on overall satisfaction of a customer [2], namely the Kano's model [3], the total service quality model [4], the SERVQUAL or Gap model [5], and the expectancy-disconfirmation model [6]. Kano's model is based on the assumption of existence of nonlinear and asymmetric relationships between attribute-level performance of product/service and overall customer satisfaction. A few methods have been developed to determine quality attributes in Kano's model [7], including the Kano's method, penalty-reward-contrast analysis, importance grid analysis, qualitative data methods such as critical incident (CI) technique and analysis of complaints and compliments, and direct classification method (by respondents).

It was claimed that the Kano questionnaire and the direct classification method are the only approaches that are capable of classifying quality attributes in the design stage of a product or service [7]. The use of CI technique and analysis of complaints and compliments have drawbacks in identifying the types of quality factors and tracking their changes over time [8]. Moreover, CI technique and analysis of complaints and compliments have questionable reliability [7], even though they are valid for Kano's model.

A more sensitive monitoring and feedback mechanisms in terms of service quality was suggested in [8] to help companies to achieve the best perceived outcome from their quality improvement activities. The performance-perception model was developed and four types of quality factors were derived to explain the relationship between service performance and customer perceptions of that service performance [8]. This model was adapted by [9] where service performance was replaced with service gaps from the modified SERVQUAL instrument, and service gaps were used to classify quality attributes and show the apparent presence of the four quality factors in this model. Three additional examples from literature were presented in [10] to support the presence of four quality factors in the performance-perception model.

In this paper, systematic review methodology was employed to trawl articles with expectation and perception data, and two articles were identified [11, 12] with classification of quality attributes by Kano's method. An example was then presented using the data taken from [11] to compare the classification of quality attributes using service gaps method and Kano's method.

---

<sup>+</sup> Corresponding author. Tel.: + 6016-6399755.  
E-mail address: siamk@mail.tarc.edu.my.

## 2. Conceptual Background

The performance-perception model was developed based on the existence of four types of performance-perception relationships showing the four service quality factors, namely satisfiers, dissatisfiers, criticals and neutrals [8]. In developing the four relationships between performance and perception, the simple relationship between service performance and customers' perception of that performance was first explored. From an initially linear relationship between performance and perception, the relationship was extended to include the three main outcomes of service quality, namely satisfaction, delight and dissatisfaction. Due to the existence of the zone of tolerance in the relationship between performance and perception and the sensitivity of these quality factors close to the origin, the performance-perception model shown in Figure 1 was developed to incorporate the four relationships.

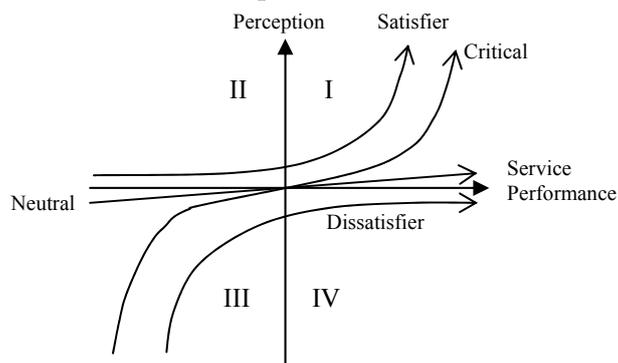


Fig. 1: Four Relationships on Performance and Perception [8]

From the empirical research which demonstrated that the service performance gap (Gap 3) has an implied direct association with and significant effects on the service quality gap (Gap 5) [13], it was concluded that service performance is directly correlated to service quality [14]. Service performance on the horizontal axis was replaced with service gap [9, 10] to map the four quality factors and to classify the quality attributes by using service gaps.

## 3. Research Methodology

A critical review of the techniques used for classifying quality attributes in the Kano's model did not mention the use of service gaps [7]. In the review on the application of Kano's model in marketing research from 1984 to 2006 [2], the service gap method was not included either. A review of twenty years of research on SERVQUAL (from 1988 to 2008) [15] did not reveal the use of service gaps for classifying quality attributes. In the review of service research literature since 1993 [16], only the application of SERVQUAL for measuring service quality and customer satisfaction was mentioned. A scoping review therefore revealed a dearth of literature on the further use of service gaps for classifying quality attributes, despite an abundance of literature on service quality, SERVQUAL, and Kano's model.

The purpose of this paper is to combine the information from existing literature on service quality, SERVQUAL and Kano's model to furnish additional data on service gaps for empirical evidence of the relationship between service performance and customers' perception of that performance. The research methodology was therefore designed to take into consideration the following objectives of this study. By using secondary empirical data on service gaps, to: (a) map the four service quality factors; (b) categorise the service quality attributes; and (c) compare the categorisation of service attributes obtained by Kano's method and the method using service gaps. For this purpose, the data required were perception scores and service gaps. Therefore, literature on service quality with both expectation and perception data were trawled from online resources and databases.

A comprehensive search was undertaken of the online databases Emerald Management Plus and SpringerLink from 16<sup>th</sup> to 30<sup>th</sup> September 2011. Since much of the useful knowledge in business, management and social science is found in non-academic, non-peer-reviewed journals, and academic electronic databases do not pick them up, scholarly grey literatures which have been uploaded online were obtained by using the search engine Google Scholar.

The keywords used for searching full-text articles/literature written in English and published between 1990 and 2011 were expectation, perception, service gap, SERVQUAL, and Kano. This timeframe was adopted since SERVQUAL was first published in 1988, and articles on the application of SERVQUAL were first published somewhere around 1990 [15]. The initial articles identified from each online database, as given in Table 1, were quickly browsed through for expectation and perception data. A total of 111 full-text articles were downloaded and saved.

Table 1: Documenting Progress

| Databases   | Google Scholar   |  | Emerald Management Plus |  | SpringerLink                            |
|---|--|--|-------------------------|--|---|
| Keywords/ Search terms                                      | SERVQUAL, and Kano   | Expectation, perception, and service gap | SERVQUAL, and Kano      | Expectations, perceptions, and SERVQUAL                                  | Expectations, perceptions, and SERVQUAL |
| Date searches conducted                                     | 16 <sup>th</sup> to 30 <sup>th</sup> September 2011                                |  |                         |  |   |
| Years covered   | 1990 - 2011  |  |                         |  |   |
| Restrictions  | Downloadable full-text articles written in English                                 |  |                         |  |   |
| Initial hits  | 386  | 702                                      | 69                      | 1443   | 156                                     |
| In scope after browsing for expectation and perception data | 5  | 44                                       | 9                       | 45<br>(from the first 700 hits which are arranged in terms of relevance) | 8                                       |
| Inclusion criteria  | Full-text articles with expectation and perception data for each quality attribute |  |                         |  |   |
| In scope after scanning for data                            | 3  | 26                                       | 3                       | 44   | 4                                       |

These articles were then screened in their entirety to scan for expectation and perception data so that the service gap for each quality attribute could be computed. Only two articles with categorization of quality attributes by Kano’s method were identified. The following steps were followed to obtain the relationships between perception and service gap:

- Determine the service gap from the difference between expectation and perception scores for each attribute by using Microsoft Excel spreadsheet.
- Calculate the overall mean perception and overall mean service gap.
- Plot the perception and service gap scores of each quality attribute.
- Plot the horizontal ( $x$ -) and vertical ( $y$ -) axes using the overall mean perception and overall mean service gap respectively. The graph is divided into four quadrants: I, II, III and IV.
- Draw the curves for the four service quality factors to fit the points plotted. Only satisfiers are found in quadrant II. Neutrals, critical and dissatisfiers are found in quadrant III, and only dissatisfiers are found in quadrant IV.

#### 4. Data Analysis and Results

The perception and expectation data in [11] were reproduced in Table 2 to illustrate the steps outlined above. The service gap for each quality attribute was first computed. Next, the overall mean perception and overall mean service gap scores were determined. The perception score and its service gap for each quality attribute were then plotted. To plot the relationship, the overall mean perception score was taken as the horizontal axis and the overall mean service gap was taken as the vertical axis. Finally the four curves for service quality factors were drawn to fit the points plotted and the quality attributes were categorised.

Figure 2 shows the relationships between perception and service gap for the empirical data extracted from [11]. Four service quality factors are apparent in the performance-perception model. Based on the relationships between perception and service gap and the location of the quality attributes in the four quadrants in Figure 2, the 27 service quality attributes extracted from [11] were recategorised by using the service gaps method proposed in [9] and [10] into “satisfier”, “critical”, “dissatisfier” and “neutral”. As shown in Table 2, the categorisation for eight of the quality attributes were found to be the same. Seven of the ten quality attributes categorised as “attractive” in [11] were found to be “critical”. Four of the quality attributes were found to be “dissatisfier”, even though no quality attributes were categorised as “must-be”.

Table 2: Categorisation of Quality Attributes Using Service Gaps and Kano's Method

| Quality Attributes | Perception (P) | Expectation (E) | Service Gap (P - E) | Categorisation Using Service Gaps |              | Categorisation by Kano's Method [11] |
|--------------------|----------------|-----------------|---------------------|-----------------------------------|--------------|--------------------------------------|
|                    |                |                 |                     | Location                          | Type         |                                      |
| 1                  | 3.99           | 4.59            | -0.60               | III                               | Neutral      | Indifferent                          |
| 2                  | 4.09           | 4.63            | -0.54               | I                                 | Satisfier    | One-dimensional                      |
| 3                  | 3.83           | 4.39            | -0.56               | IV                                | Dissatisfier | Indifferent                          |
| 4                  | 4.24           | 4.60            | -0.36               | I                                 | Critical     | One-dimensional                      |
| 5                  | 4.06           | 4.56            | -0.50               | I                                 | Critical     | One-dimensional                      |
| 6                  | 3.99           | 4.53            | -0.54               | IV                                | Dissatisfier | Indifferent                          |
| 7                  | 4.22           | 4.64            | -0.42               | I                                 | Critical     | One-dimensional                      |
| 8                  | 4.20           | 4.76            | -0.56               | I                                 | Satisfier    | One-dimensional                      |
| 9                  | 4.25           | 4.71            | -0.46               | I                                 | Satisfier    | One-dimensional                      |
| 10                 | 4.05           | 4.64            | -0.59               | II                                | Satisfier/   | One-dimensional                      |
| 11                 | 3.98           | 4.60            | -0.62               | III                               | Critical     | One-dimensional                      |
| 12                 | 4.09           | 4.63            | -0.54               | I                                 | Satisfier    | One-dimensional                      |
| 13                 | 4.09           | 4.40            | -0.31               | I                                 | Critical     | Attractive                           |
| 14                 | 3.73           | 4.39            | -0.66               | III                               | Dissatisfier | Attractive                           |
| 15                 | 4.17           | 4.66            | -0.49               | I                                 | Satisfier    | One-dimensional                      |
| 16                 | 4.11           | 4.63            | -0.52               | I                                 | Satisfier    | One-dimensional                      |
| 17                 | 4.07           | 4.60            | -0.53               | I                                 | Satisfier    | Attractive                           |
| 18                 | 3.97           | 4.50            | -0.53               | IV                                | Dissatisfier | Attractive                           |
| 19                 | 4.30           | 4.70            | -0.40               | I                                 | Critical     | One-dimensional                      |
| 20                 | 4.03           | 4.66            | -0.63               | II                                | Satisfier    | One-dimensional                      |
| 21                 | 4.03           | 4.53            | -0.50               | I                                 | Critical     | Attractive                           |
| 22                 | 3.98           | 4.53            | -0.55               | IV                                | Dissatisfier | One-dimensional                      |
| 23                 | 3.90           | 4.60            | -0.70               | III                               | Critical     | Attractive                           |
| 24                 | 4.03           | 4.53            | -0.50               | I                                 | Critical     | Attractive                           |
| 25                 | 3.09           | 4.32            | -1.23               | III                               | Critical     | Attractive                           |
| 26                 | 3.76           | 4.59            | -0.83               | III                               | Critical     | Attractive                           |
| 27                 | 3.60           | 4.53            | -0.93               | III                               | Critical     | Attractive                           |
| Overall Mean       | 3.994          | 4.572           | -0.578              |                                   |              |                                      |

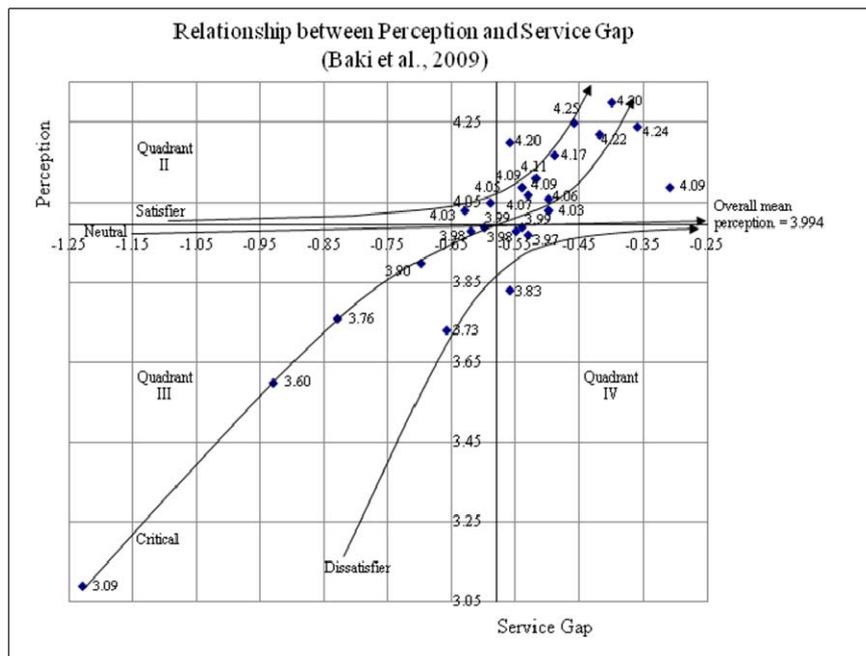


Fig. 2: Relationships between Perception and Service Gap

## 5. Conclusion

Literature on service quality has hitherto focused primarily on the determination of service gaps for evaluation of service quality and customer satisfaction, which have not been further utilised except for discussions on the need to overcome the service shortfalls. The effects of service quality on customer satisfaction have been found to depend on customers' perceptions of the service performance, which were found to be non-linear, asymmetric and multi-dimensional. The results provide strong evidence to the potential application of using service gaps to categorise quality attributes.

It was found that [11] and [12] were possibly the only literature with secondary empirical data on perception, expectation and service gap, as well as the categorisations of quality attributes. Using Kano's method, Baki *et al.* [11] has categorised five of the ten quality attributes as 'attractive' even though these attributes have among the highest service gaps and found in quadrant III. These attributes were found to be criticals and dissatisfiers using the service gaps method. The service gaps method seemed more realistic and sensitive as compared to Kano's method in categorising quality attributes. It is suggested, therefore, that the results from service gaps method could probably be better than Kano's method for designing new services or products, as well as service development when integrated with QFD. Additional future research should be carried out to further compare the categorisations of quality attributes using these two methods. Due to the dynamic characteristics of quality attributes, the categorisations of quality attributes using service gaps obtained from cross-sectional surveys were time-dependent as customers' perceptions of service performance changed over time. In addition, it also depends on the accurate determination of overall mean perception and service gap.

## 6. References

- [1] L.-J. Hwang, A. Eves, and T. Desombre. Gap analysis of patient meal service perceptions. *International Journal of Health Care Quality Assurance*. 2003, **16** (3): 143-153.
- [2] J. Mikulić, and D. Prebežac. The Kano model - A review of its application in marketing research from 1984 to 2006. In: *Proceedings of the 1<sup>st</sup> International Conference Marketing Theory Challenges in Transitional Countries*. University of Maribor. 2007, pp. 87-96.
- [3] N. Kano, K. Seraku, F. Takahashi, S. Tsuji. Attractive quality and must-be quality. *Hinshitsu (Quality, The Journal of the Japanese Society for Quality Control)*. 1984, **14** (2): 39-48.
- [4] C. Grönroos. A service quality model and its marketing implications. *European Journal of Marketing*. 1984, **18** (4): 36-44.
- [5] A. Parasuraman, L.L. Berry, and V.A. Zeithaml. SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*. 1988, **64** (1): 12-40.
- [6] R. Oliver. A conceptual model of service quality and service satisfaction: Compatible goals, different concepts. *Advances in Services Marketing and Management*. 1993, **2**: 65-85.
- [7] J. Mikulić, and D. Prebežac. A critical review of techniques for classifying quality attributes in the Kano model. *Managing Service Quality*. 2011, **21** (1): 46-66.
- [8] R. Johnston, and J. Heineke. Exploring the relationship between perception and performance: Priorities for action. *The Service Industries Journal*. 1998, **18** (1): 101-112.
- [9] S.M. Kong, and K. Muthusamy. Using service gaps to classify quality attributes. *The TQM Journal*. 2011, **23** (2): 145-163.
- [10] M.-K. Sia. Relationship between service gap and perception for mapping of quality attributes into four service quality factors. *International Journal of Services, Economics and Management*. 2011, **3** (1): 36-61.
- [11] B. Baki, C.S. Basfirinci, Z. Cilingir, and I. Murad AR. An application of integrating SERVQUAL and Kano's model into QFD for logistics services. *Asia Pacific Journal of Marketing and Logistics*. 2009, **21** (1): 106-126.
- [12] H. Kim, and J.R. Morrison. Experiments on education as a service. In: *8<sup>th</sup> International Conference on Service Systems and Service Management (ICSSSM'11)*. Tianjin, China. 2011, pp. 166-172.
- [13] V.A. Zeithaml, A. Parasuraman, and L.L. Berry. *Delivering quality service: Balancing customer perceptions and expectations*. Free Press, 1990.

- [14] P. Chenet, C. Tynan, and A. Money. The service performance gap: testing the redeveloped causal model. *European Journal of Marketing*. 2000, **34** (3/4): 472-495.
- [15] R. Ladhari. A review of twenty years of SERVQUAL research. *International Journal of Quality and Service Sciences*. 2009, **1** (2): 172-198.
- [16] S. Moussa, and M. Touzani. A literature review of service research since 1993. *Journal of Service Science*. 2010, **2**: 173-212.