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Emerald Article: Importance-performance analysis of service attributes and its impact on decision making in the mobile telecommunication industry

Vahid Pezeshki, Alireza Mousavi, Susan Grant

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Vahid Pezeshki, Alireza Mousavi and Susan Grant are all based at the School of Engineering and Design, Brunel University, Middlesex, UK.

Summary

Purpose – *Customer relationship management (CRM) strategies rely heavily on the importance and performance of the attributes that define a service. The aim of this paper is first to investigate the asymmetric relationship between performance of service attributes and customer satisfaction, and second, through a case study in the mobile telecommunication industry to prove that the importance of a service attribute is a function of the performance of that attribute.*

Design/methodology/approach – *An empirical study using questionnaires with a focus on service enquiring about the performance of service key attributes and overall customer satisfaction was conducted. The data were fed into the Kano customer satisfaction model and the importance-performance analysis (IPA) method for analysis and comparison.*

Findings – *The results indicate that there is a dynamic relationship between service attributes and overall customer satisfaction. Service attributes have a different impact on customer satisfaction regardless of their classification. The importance of service attributes can be derived from their performance and this can be proved in the Mobile Telecommunication sector. Also this research concludes that the major weaknesses in the Mobile Telecommunication industry that cause the highest customer dissatisfaction are the range of phones, the accuracy of billing and payment, and the service plans, whereas the major strengths as a source of customer satisfaction are customer service quality, value for money and network performance.*

Research limitations/implications – *The Kano model of customer satisfaction needs to be extended to other customer behaviour variables such as customer retention (e.g. purchase intention) and customer loyalty (e.g. word-of-mouth, feedback) for improved decision analysis. The paper does not include customer retention and loyalty factors.*

Practical implications – *The methodology employed here can be easily applied by marketers for evaluating customer behaviours and service quality performance for improved decision making and resource allocation.*

Originality/value – *There is little evidence that extensive work has been dedicated to studying the relationship between service attributes and customer satisfaction through Kano's model. The paper specifically investigates the applicability of the model and the key factors in the mobile telecommunication industry.*

Keywords *Decision making, Customer satisfaction, Resource management, Mobile communication systems*

Paper type *Research paper*

1. Introduction

Lack of practical tools and methodologies, which ensure managers a better understanding of the customer needs and expectations can waste scarce available resources. As a result, customer relationship management (CRM) systems and customer experience management (CEM) have become a must-have set of tools and techniques in the past decade. The CRM concept designs services and products with attributes that would maximise customer

behaviour (i.e. customer satisfaction and loyalty) and profitability. Evidence from previous research work shows there is a positive relationship between service quality and customer behaviour (Anderson and Mittal, 2000; Brady *et al.*, 2002). Thus, service quality can be considered as the main antecedent of customer behavioural variables such as satisfaction and loyalty (Anderson and Sullivan, 1993).

One of the key issues within customer behaviour modelling is that some practitioners have not considered the potential relationship between the two key characteristics of service quality attributes namely:

1. performance; and
2. importance.

These two elements seem to be the key factors in customer behaviour and decision analysis. Each service attribute may have different values of importance and performance that lead to variations in customer satisfaction, retention and loyalty. In other words, depending on the type of an attribute, the relationship between attribute performance and customer satisfaction becomes asymmetric and non-linear (Kano *et al.*, 1984; Cadotte and Turgeon, 1988; Berger *et al.*, 1993; Johnston, 1995; Matzler *et al.*, 1996 and 2004; Lee and Newcomb, 1997; Vavra, 1997; Mittal *et al.*, 1998). Service attributes with different levels of importance have different impact on satisfying customer expectations. As a result, it is essential for companies to understand the effect of the quality of service attribute on customer satisfaction.

Several studies argue that importance of attributes is an antecedent of performance (Cronin and Taylor, 1994; Oh and Parks, 1997; Tse and Wilton, 1988; Matzler *et al.*, 2004), though this relationship is more complex and the validity of this assumption has been questioned by others. For instance, some service attributes, despite good performance may not significantly affect the rate of increase in customer satisfaction, but underperformance of the same attributes may lead to large rate in decreasing levels of customer satisfaction. By understanding the relationship between performance of service attributes and their importance to the customer, marketers would then be able to concentrate resources on the right attributes to increase customer satisfaction-level.

According to marketing literature, there are several methods for measuring performance and importance of service attributes (Herzberg *et al.*, 1959; Martilla and James, 1977; Kano *et al.*, 1984; Crompton and Duray, 1985; Cadotte and Turgeon, 1988; Brandt, 1988; Venkitaraman and Jaworski, 1993; Vavra, 1997; Brandt and Scharioth, 1998; Liosa, 1997 and 1999). Traditional techniques assume that there is a linear relationship between performance of service attributes and customer satisfaction, which contradicts with the results of other techniques like the Kano *et al.* (1984) model of customer satisfaction. The performance of an attribute is typically measured on a rating scale while attributes' importance is rated either directly by customers (self-stated) using a scale or statistically (indirect method) based on the relationship between performance of attributes and customer satisfaction.

In this article the authors attempt to evaluate the results of Kano's model (three-factor theory) and the importance-performance analysis (IPA), using data from a customer satisfaction survey in the mobile telecommunication sector in the UK. A regression analysis with dummy variables is employed to identify the impact of variations in performance of service attributes on customer satisfaction.

The paper is structured as follows: A brief overview of IPA (section 2) and Kano's model (section 3) is provided. In section 4 and 5 the implementation of the model in the mobile telecommunication sector is discussed followed by the managerial implications of the findings. The conclusions and future work is discussed in the final section.

2. Identification of customer satisfaction attributes using IPA

Importance-performance analysis (IPA) was introduced by Martilla and James (1977). It is a method for measuring customer satisfaction. The IPA method has been adopted in various industries such as tourism and hospitality (Go and Zhang, 1997; Hollenhorst *et al.*, 1986), education (Alberty and Mihalik, 1989), and health care (Dolinsky, 1991; Dolinsky and Caputo, 1991). Despite its advantages a number of studies have highlighted its shortcomings (Oh, 2000; Matzler *et al.*, 2003, 2004; Ting and Cheng, 2002). To overcome some of its

shortcomings additional features have been introduced to the original IPA framework (Dolinsky and Caputo, 1991; Vaske *et al.*, 1996). For instance, Matzler *et al.* (2003) have combined IPA with the Kano's model for improved customer satisfaction evaluation.

The traditional IPA method is based on two primary assumptions; performance and importance of attributes are independent variables (Martilla and James, 1977; Oliver, 1997; Bacon, 2003), and there is a symmetric and linear relationship between attribute performance and customer satisfaction.

Previous studies revealed the positive relationship between performance and the importance levels of attributes using the IPA grid (Mittal *et al.*, 1998; Sampson and Showalter, 1999; Anderson and Mittal, 2000; Mittal and Katrichis, 2000; Mittal *et al.*, 2001; Matzler *et al.*, 2003). The grid also describes to the levels of concentration of managerial initiatives in the quadrants (in this case II and IV – see Figure 1). In contrast, a negative association between these two variables shifts the focus onto quadrants I and III. Service or product attributes that are located in Quadrant I are rated high in importance and low in performance. Immediate measures should therefore be taken to increase the product performance levels. Quadrant II represents attributes that are rated high in both performance and importance. In this quadrant the company should continue to maintain the same performance levels to sustain competitive advantages. High performance on low importance attributes demands of reallocation of resources from this quadrant (III) to somewhere else. In quadrant IV, both importance and performance are rated low. As a result, there would be no need for further action to be taken. Some studies reported that companies that invested on service attributes in Quadrant I did not experience an increase in customer satisfaction. (e.g. Mittal *et al.*, 1998; Sampson and Showalter, 1999).

3. Kano's model of customer satisfaction

There are significant difference between the key drivers of customer satisfaction and dissatisfaction (Shiba *et al.*, 1993; Dutka, 1993; Gale, 1994; Oliver, 1997). In other words, the bad experience that creates dissatisfaction is not the same as the good experience that creates satisfaction. According to Kano *et al.* (1984) service quality attributes can be classified into three groups: basic, performance, and excitement (Anderson and Mittal, 2000; Matzler *et al.*, 2004; Oliver, 1997) (see Figure 2):

1. *Basic attributes or dissatisfiers* are the minimum required features that customers naturally expect from a service or product. These attributes are not able to elicit satisfaction but they produce dissatisfaction when not fulfilled (Solomon and Corbit, 1974; Solomon, 1980; Kano *et al.*, 1984). For example, punctuality and safety of airline are considered as basic attributes.
2. *Performance or one-dimensional attributes* produce both satisfaction and dissatisfaction depending on performance levels. For example, petrol consumption of a car is considered to be a performance attribute. Lower consumption leads to higher customer satisfaction.

Figure 1 Traditional importance-performance analysis (IPA) grid

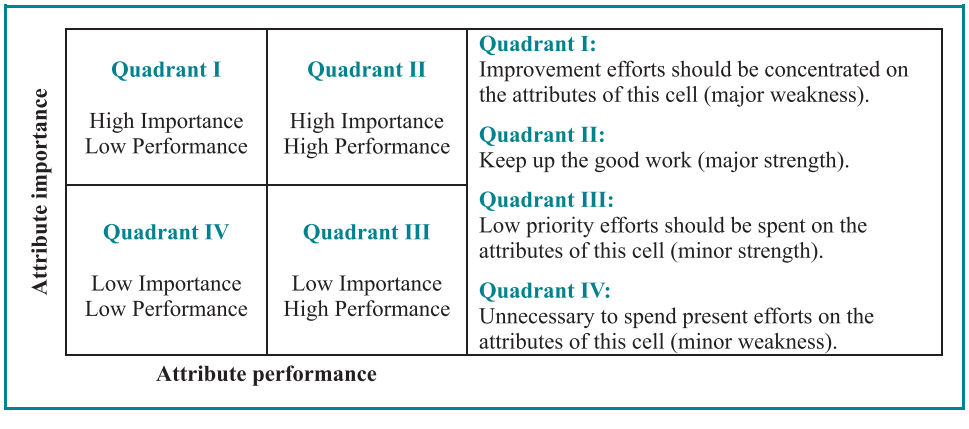
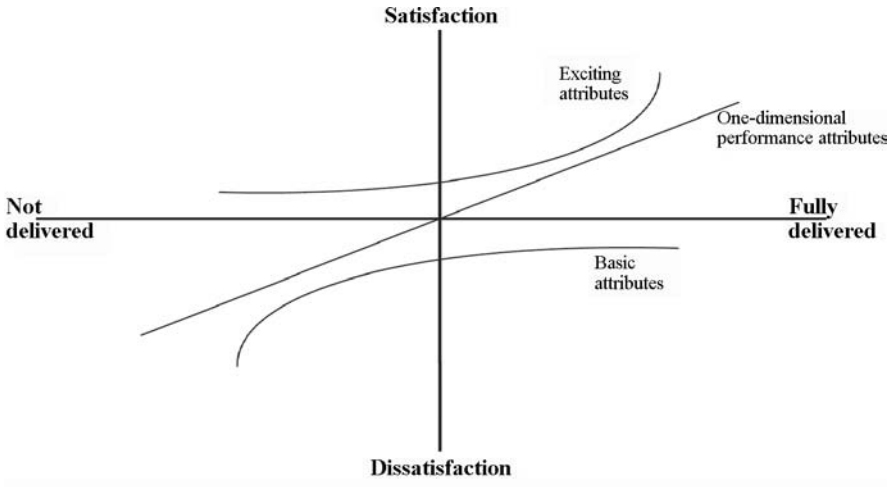


Figure 2 Three-factor theory (*Source:* Busacca and Padula, 2005)



Source: Busacca and Padula (2005)

3. *Exciting attributes or satisfiers* are the attributes that increase satisfaction levels when delivered but cause no dissatisfaction if not delivered. High performance on these attributes has a greater impact on overall satisfaction rather than low performance. For instance, promotional offers (e.g. buy one get one free) can be considered as an exciting factor for some customers.

4. Measuring the importance of service attributes

The main shortcoming of many customer behaviour models is that they tend to formulate the relationship between service attributes and customer behaviour (e.g. customer satisfaction) without considering the relationship between performance and importance. Measuring the importance of service attributes therefore cannot be simply ignored when analysing customer behaviour. The nature and magnitude of the relationship between the importance of service attributes and customer satisfaction may change with performance (Kano *et al.*, 1984; Mittal *et al.*, 1998; Matzler *et al.*, 2003 and 2004; Bacon, 2003). Understanding and projecting the relationship between performance and importance and their impact on customer satisfaction is critical during the process of product or service design.

There are two methods to estimate the importance of service attributes:

1. customers' self-stated (explicit); and
2. statistically inferred importance (implicit).

Techniques such as multiple regression analysis, structural equation modelling (SEM) or partial correlation (Danaher and Mattsson, 1994; Wittink and Bayer, 1994; Taylor, 1997; Vavra, 1997) are normally used for statistically inferred importance ratings.

In the self-stated importance method, through surveys customers are directly asked to rate the importance of service or product attributes based on their preferences (e.g. rating scales, constant sum scales, etc.). The importance of attributes that represent the basic functions are normally ranked the highest compared with other attributes, since they are expected to exist as the minimum requirement. While exciting attributes receive lower rates compared to basic attributes as customers are not expecting them. The performance attributes, however, are rated somewhere between basic and exciting attributes.

In the statistically inferred attribute importance rating, the importance of product attributes are inferred based on the results of customer satisfaction or product performance surveys. The data is then fed into multiple regression analysis, structural equation modelling, normalised pair wise estimation and partial least squares models to obtain importance levels.

The results from both methods are different, since the self-stated method does not consider the relationship between attribute importance and overall satisfaction (Kano *et al.*, 1984; Matzler and Sauerwein, 2002). However, multicolinearity can be one of possible disadvantage of implicitly derived importance (Matzler and Sauerwein, 2002).

In this paper, the multiple regression with dummy variables (statistically inferred) method is adopted for mobile telecommunication service attributes ranking. A linear multiple regression equation is adjusted between each attributes' performance (independent variables) and overall satisfaction (dependent variable). According to this method, attributes with higher regression coefficients would be considered more important to customers than attributes with lower regression coefficients.

5. Research methodology

A test was designed to assess the applicability of Kano's model in the mobile telecommunication industry. The main attributes of services within this sector were extracted from existing literature. The survey was conducted with a random sample of 270 students of a University. Questionnaires were completed and returned either via email or were collected in face-to-face interviews. From this sample, 74.4 per cent of the respondents were under 27 years old.

The questionnaire comprises of five parts. In the first part respondents were asked to provide information about their network brand. Then, performance-level with the single service attributes as well as overall satisfaction with the service were measured using a seven-point Likert scale (scaling performance level from ''1 = poor'' to ''7 = excellent and scaling overall satisfaction from ''1 = strongly dissatisfied'' to ''7 = strongly satisfied'').

The data of the survey were used to test the following two hypotheses:

H1. Attribute performance and attribute importance are dependent, therefore, attribute importance can be interpreted as a function of attribute performance.

H2. The relationship between attribute performance and customer satisfaction is asymmetric and non-linear.

5.1. IPA method

In order to construct the API grid, the mean performance ratings of each attribute was calculated. Then the importance of an attribute was measured using a multiple regression with attribute performance to be independent and the overall customer satisfaction to be dependent variables. The results are shown in Table I.

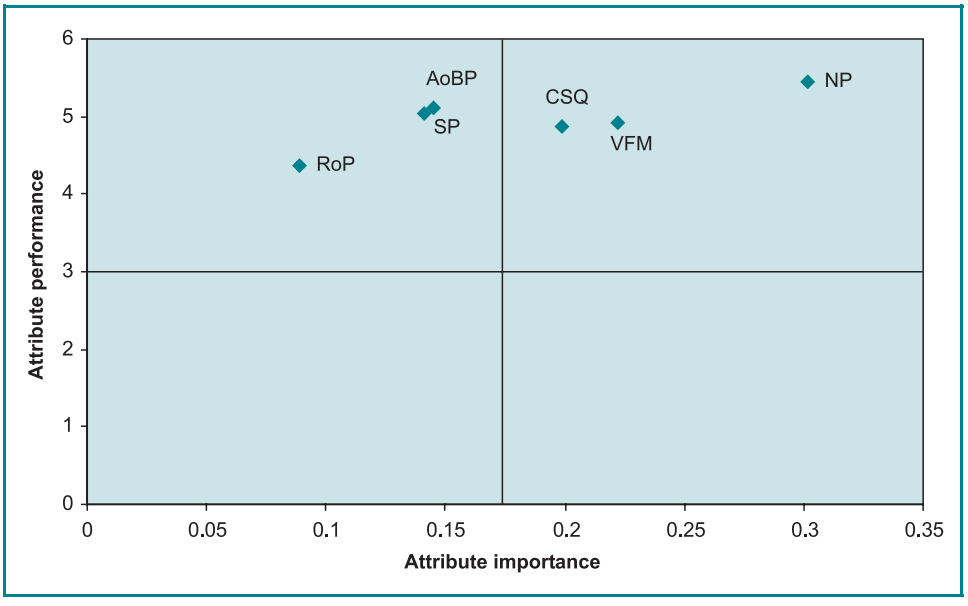
Figure 3 illustrates the IPA grid where mean values were used to split the axes. The results suggest that within the mobile telecommunication industry range of phones (RoP), Accuracy of billing and payment (AoBP) and service plans (SP) are sources of major weakness and require improvement (quadrant I). And the attributes, customer service quality (CSM), value for money (VFM) and network performance (NP) (quadrant II) are the major strengths of the industry that lead to higher levels of customer satisfaction.

Table I Importance-performance measurement

Attribute	*Regression coefficient*	*Attribute performance*	*S.D.*
Network performance (NP)	0.302***	5.44	1.43
Customer service quality (CSQ)	0.199***	4.88	1.36
Service plans (SP)	0.141*	5.05	1.43
Range of phones (RoP)	−0.089*	4.36	1.63
Accuracy of billing and payment (AoBP)	0.145**	5.11	1.49
Value for money (VFM)	0.222**	4.92	1.51

Notes: R^2=0.480, *F*-value = 34.936; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, ns = not significant

Figure 3 IPA grid



5.2. The Kano model analysis

In order to identify the asymmetric impact of attributes' performance on customer satisfaction, as proposed in H2, a regression analysis with dummy variables was used (Anderson and Mittal, 2000; Brandt, 1998; Matzler and Sauerwein, 2002). Accordingly, two sets of dummy variables; the first dummy variables quantify basic attributes, and the second ones quantify exciting attributes are set. The attribute-level performance ratings are recoded as (0.1) for low ratings, (0.0) for average ratings, and (1.0) for high ratings. As a result, two regression coefficients are obtained (see Table II and Figure 4):

$$Sat_{total} = \alpha_0 + \alpha_{1Att.1} \times dummy_{1Att.1} + \alpha_{2Att.1} \times dummy_{2Att.1} + ...+ \alpha_{1n} \times dummy_{1Att.n} + \alpha_{2n} \times dummy_{2Att.n}$$

Sat_{total} is the overall customer satisfaction, and n is the number of quality attributes ($n = 7$), $dummy_1$ indicates lowest customer satisfaction level, $dummy_2$ indicates highest customer satisfaction levels, α_1 the incremental decline in overall satisfaction associated with low satisfaction levels, and α_2 the incremental increase in overall satisfaction associated with high satisfaction level.

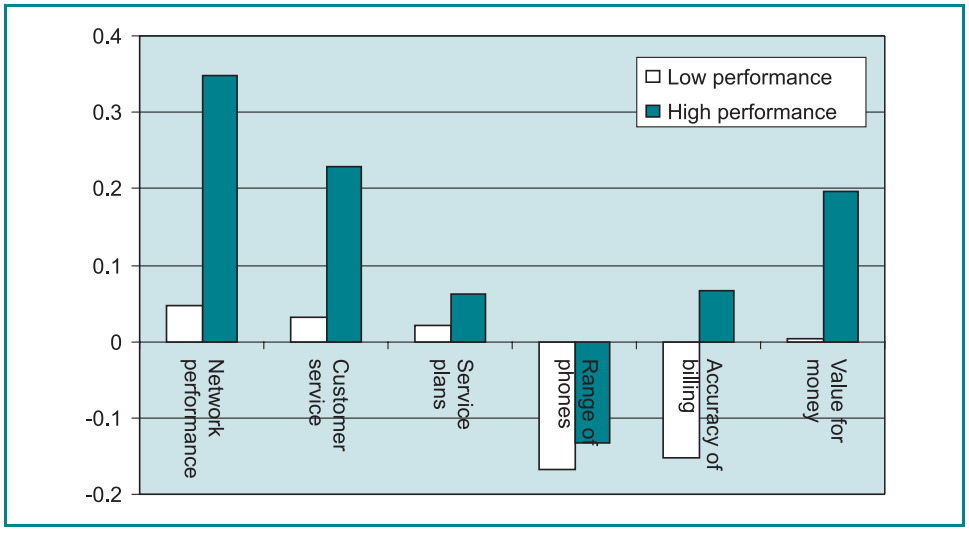
The results indicate that accuracy of billing and payment and Range of phones can be classified as basic attributes. Their impact on customer satisfaction is high when performance-level is ranked low, while they do not significantly affect customer satisfaction when performance-level is high. Customer service quality, network performance, and value

Table II The asymmetric impact of attribute-level performance on overall satisfaction

Dependent variable: overall satisfaction	*Dummy-variable regression coefficient* *Low performance*	*High performance*
Network performance	0.048 (ns)	0.366***
Customer service quality	−0.001 (ns)	0.221***
Service plans	−0.009 (ns)	0.068 (ns)
Range of phones	−0.130**	−0.114*
Accuracy of billing and payment	−0.115*	0.064 (ns)
Value for money	−0.012 (ns)	0.202***

Notes: R^2=0.469; F-value = 15.338; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; ns = not significant

Figure 4 Quality attributes impact on overall satisfaction



for money can be viewed as excitement attributes. However, network performance has a higher impact on overall customer satisfaction when performance is high. Results show that the service plans is a neutral attribute, as it does not affect satisfaction or dissatisfaction. In this particular study no performance attribute was identified. The results confirm that the service attributes have dynamic characteristic (asymmetric and non-linear). Therefore *H1* can be confirmed the first hypothesis. Note that the classification of quality attributes may differ based on customer expectations and type of industry (Matzler and Renzl, 2007).

Figure 5 shows the asymmetric relationship between performance of attributes and their importance as it was proposed in *H2*. For basic attributes, the importance-levels decrease as performance-levels increase (range of phones and accuracy of billing and payment), while in the case of exciting attributes importance-levels increase with increases in performance-levels (network performance, customer service quality, and value for money).

The application of the traditional IPA matrix for two groups of satisfied and dissatisfied customers (Figures 6 and 7) show that managerial implementation derived from traditional IPA method could be misleading. For example, in the case of dissatisfied customers, the importance-level of attribute AoBP is high whilst its performance is low. Therefore company's priority should be to improve the performance of that attribute. The results also imply that fewer resources should be allocated to network performance, service plans, and value for money as their importance-level is lower than their performance-level.

By applying the multiple regression with dummy variables technique (shown in Table II), the attribute value for money and network performance becomes an excitement attributes. Consequently, the increase in performance-levels increases the importance-levels. Accordingly, the accuracy of billing and payment becomes a basic attribute. So it might be to the competitive advantage of the company to keep the performance-level high, though its importance will not increase as shown in Figure 5.

Figure 7 shows a similar case for satisfied customers.

6. Conclusions

This paper evaluates the importance and performance of the main attributes in the mobile telecommunication industry for the purpose of customer satisfaction improvement. Practitioners need to consider that the relationship between performance of attributes and customer satisfaction depends on the classification of attributes. This paper analysed two methods of IPA and the Kano model for customer satisfaction improvement. As a result, it is confirmed that there is an asymmetric relationship between performance of attributes and overall customer satisfaction. The study also confirms that attribute importance can be seen as a function of attribute performance.

Figure 5 Relationship between importance and performance

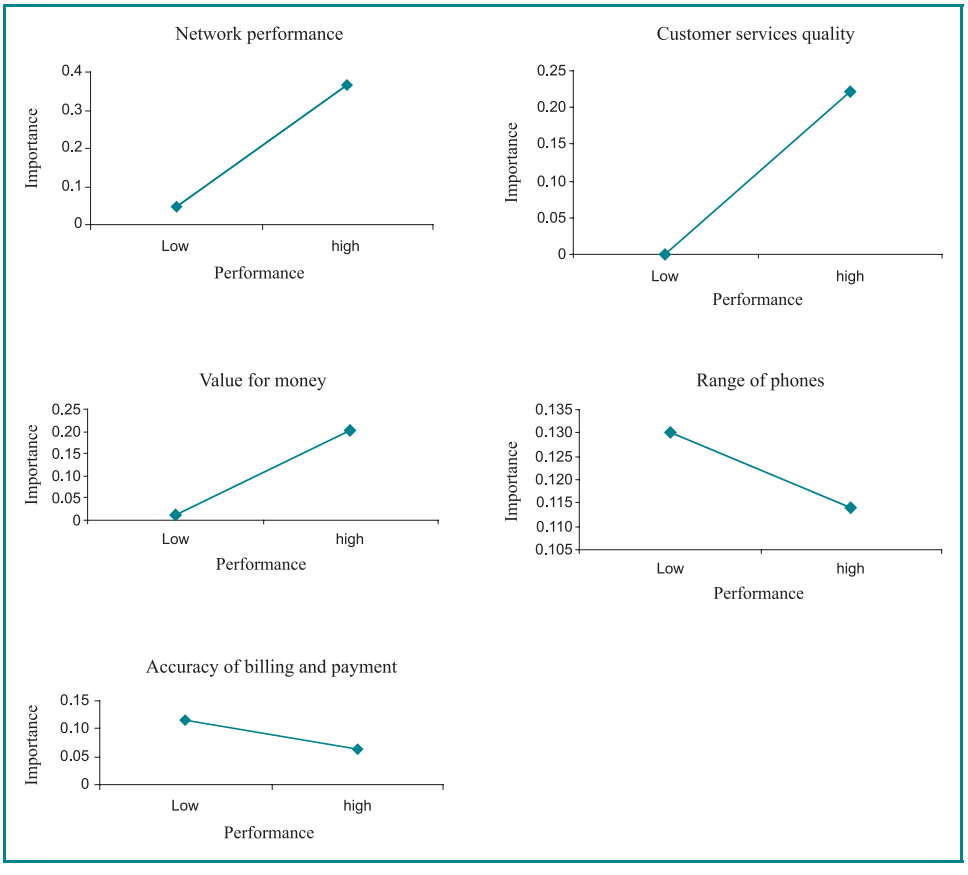
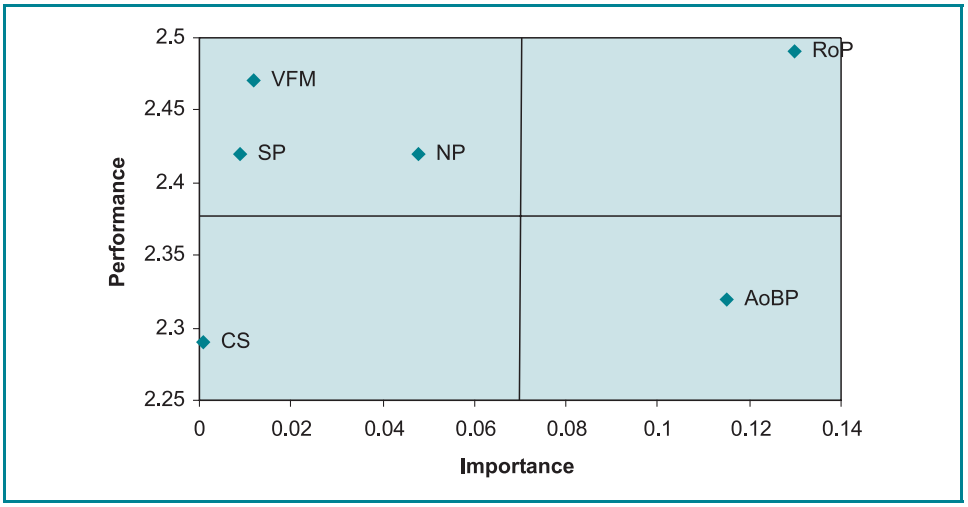


Figure 6 IPA for dissatisfied customers



Finally we suggest a simplified diagram, which shows the relationship between service attributes and customer behaviour (see Figure 8). There is a need for more research in to the nature of attributes' classification and other behavioural variables (e.g. retention and loyalty) in relation to the practical implications this has on the way that customer profitability is conducted.

Figure 7 IPA for satisfied customers

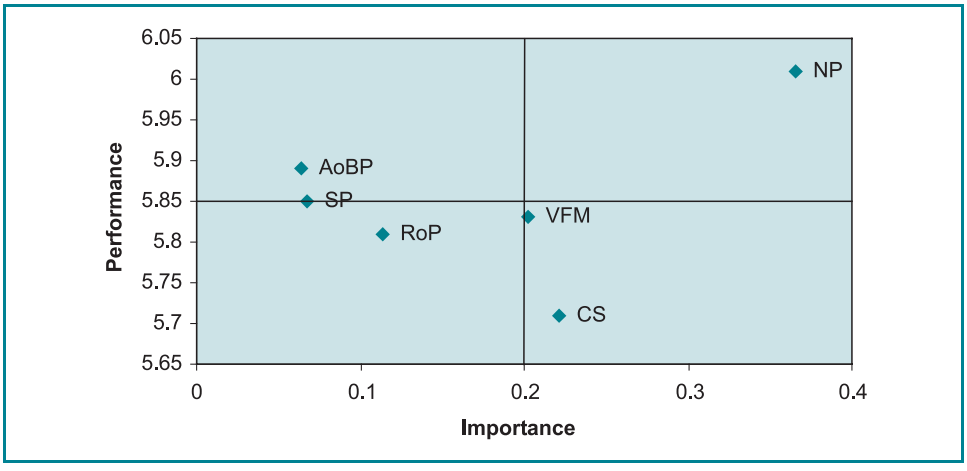
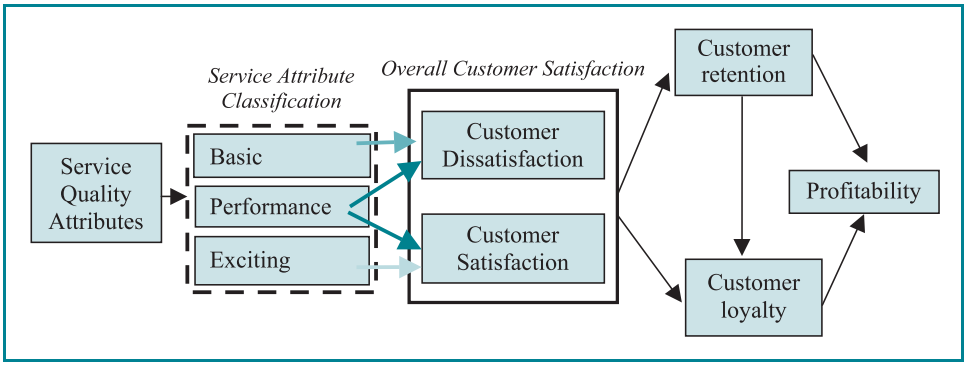


Figure 8 The behavioural consequences of service quality



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Corresponding author

Vahid Pezeshki can be contacted at: vahid.pezeshki@brunel.ac.uk