Three Dimensional Modelling of Customer Satisfaction, Retention and Loyalty for Measuring Quality of Service

A thesis submitted for the degree of Doctor of Philosophy by

By

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PhD Abstract

The aim of this thesis is to propose a model that explains the relationship between customer satisfaction, retention and loyalty based on service quality attributes. The three elements of satisfaction, retention and loyalty towards products represent ongoing challenges for the corporate financial performance. Customer behaviour analysis (known as business intelligence or customer relationship management or customer experience management) has become a major factor in the corporate decision making and strategic planning processes. Prevailing logic dictates that by improving service attributes one should expect better customer satisfaction levels. Consequently, improved satisfaction levels should increase the probability of customer retention and degree of loyalty.

Substantial research work has been dedicated to explain the importance of customer behaviour measurement for industry. However, there is little evidence that there has been an overall integrating empirical research that relates the three elements of satisfaction, retention and loyalty with respect to service quality attributes.

Empirical data collected from the UK mobile telecommunication for this research shows that such an objective model that is capable of capturing this three dimensional relationship will contribute towards more robust decision making and better strategic planning. The proposed thesis extracts the data about key service attributes from a combination of literature review, surveys, and interviews from the UK mobile telecommunication industry. Responses were analysed using multiple regression, regression analysis with dummy variables, logistic regression, logistic regression with dummy variables and structural equation modelling (SEM) to test variables and their interrelationships.

This study makes a step forward and contributes to the body of knowledge as it: (a) highlights the role of service attribute performance towards customer satisfaction, consequently identifies attributes that affect satisfaction and dissatisfaction of customers, (b) maps the relationship between attribute importance and attribute performance, (c) optimise resource allocation process using importance-performance analysis (IPA), (d) classifies customers with respect to the role and length of relationship they have with the

company (switching probability), and (e) describes the interrelationship between customer satisfaction, retention and loyalty. The novelty of the research lies in: (a) establishment of a framework that links service attribute performance to customer satisfaction and then to customer future intentions (customer retention and customer loyalty), and (b) provision of a model that could assist key decision makers in prudent usage of resources for maximum profitability. This dissertation presents a novel approach methodology and modelling construct for customer behaviour analysis. For proof of concept it presents a case study in the mobile telecommunication industry.

It is worth noting that in this research work Customer Retention is interpreted as probability of switching between service providers. Customer Loyalty is interpreted as referral (word-of-mouth) activity by existing customers.

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Declaration

This dissertation gives an account of the research undertaken by Vahid Pezeshki. Some of the material displayed herein has already been published or is under review in the form of the following publications:

Journal Paper   **Published**

[1] <u>Pezeshki, V.</u> and Mousavi, A. and Grant, S. (2009), "*Importance-performance of service attributes and its impact on decision making in the mobile telecommunication industry*", Journal of Measuring Business Excellence, Vol. 13, No. 1, pp. 82-92..

[2] <u>Pezeshki, V.</u> and Mousavi, A. (2009), "Measuring the *importance of product features and its implication in resource allocation*", International Journal of Advanced Manufacturing Technology (IJAMT), accepted.

Conference Papers   **Published or Accepted for Publication**

[1] <u>Pezeshki, V.</u>, Mousavi, A. and Rakowski, R. (2005), "*Profitability through Customer Relationship Marketing*", International Computer and Industrial Management (ICIM), Bangkok, Thailand.

[2] <u>Pezeshki, V.</u> and Mousavi, A. (2006), "*Exploring Sources of Profitability in Customer Relationship Management (service industry)*", 2nd International Conference on Business Management and Economics, Cesme, Turkey.

[3] <u>Pezeshki, V.</u> and Mousavi, A. (2008), "*Service attribute importance and strategic planning: An empirical study*", 6th International Conference on Manufacturing Research (ICMR08), London, UK.

Table of contents

List of Figures

List of Tables

ABBREVIATIONS

Notation	Explanation
B2B	Business-to-Business
CEM	Customer experience management
CFA	Confirmatory Factor Analysis
CIT	Critical Incident Technique
CL	Customer Loyalty
CLV	Customer Lifetime Value
CR	Customer Retention
CRM	Customer Relationship Management
CS	Customer Satisfaction
IPA	Importance-Performance Analysis
KPIs	Key Performance Indicators
LNP	Local Number Probability
LTV	Lifetime Value
MI	Marketing Intelligence
ML	Maximum Likelihood
MR	Multiple Regression
NPV	Net Present Value
RADV	Regression Analysis with Dummy Variables
ROI	Return on Investment
SEM	Structural Equation Modeling
SOW	Share-of-wallet
SPSS	Statistical Package for the Social Sciences
VIF	Variance Influence Factor
WOM	Word-of-mouth

1

CHAPTER 1

INTRODUCTION

1. Research Background

The aim of this thesis is to propose a mathematical model that explains the relationship between customer satisfaction, retention and loyalty based on service attribute performance in service industry. A case study in the UK mobile telecommunication is presented for proof of concept. Having a good understanding of the three elements of customer satisfaction, retention and loyalty towards service/product performance represent ongoing challenges for the corporate financial gains and losses. Firms consider enhanced customer relationships as a valuable asset to their core operation.

There has been considerable discussion about the impact of customer behaviour on business performance in the marketing literature (Heskett *et al.*, 1994; Nelson *et al.*, 1992; Rust and Zahorik, 1991; Storbacka *et al.*, 1994), however, there has been little empirical work that relates the three elements of customer satisfaction, retention and loyalty based on service quality attributes. Reichheld and Sasser (1990) propose the concept of service profit chain (SPC) which links service quality, customer behaviours and profitability. The SPC concept argues that customer satisfaction is influenced by the value of service quality, which in turn influences customer retention (repurchase and cross-selling) and customer loyalty (word-of-mouth or referral). Consequently, profitability is stimulated by customer retention and loyalty. The concept of service quality would be well established in the marketing literature and several frameworks have been developed (Parasuraman *et al.*, 1988).

Previous research found that there is a strong and positive relationship between service quality attributes and customer satisfaction (Rust and Oliver, 1994; Fornel *et al.* 1996). However, there is also little consensus among experts to explain the relationship between service quality attributes and customer satisfaction.

Finding the critical service attributes that determine customer satisfaction and customer dissatisfaction can lead firms to seek comprehensive strategies for achieving lasting competitive advantage (Matzler *et al.*, 2004). Moreover, customer satisfaction plays as mediating attitude between service quality attributes and customer behaviours (retention and loyalty). A typical customer behaviour model is shown in Figure 1.1. Customer satisfaction may increase the retention of customers through repeated and increased purchase (long-term relationship). Customer satisfaction may also positively affect customer loyalty (word-of-mouth). The combination of improved customer retention and loyalty may in turn increase profitability (Manrodt and Davis, 1993; Emerson and Grimm, 1998).

Figure 1.1: A typical customer behaviour model

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┌─────────────┐     ┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│ Service     │ ──▶ │ Customer    │ ──▶ │ Customer    │ ──▶ │ Customer    │
│ quality     │     │ satisfaction│     │ retention   │     │ loyalty     │
│ attributes  │     │             │     │             │     │             │
└─────────────┘     └─────────────┘     └─────────────┘     └─────────────┘
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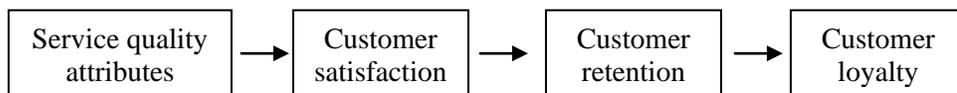
The marketing literature on customer relationship or behaviour outlines potential benefits available to customers and suppliers for their strategic management and business performance. The literature calls for establishing relationships in order to build trust and loyalty, develop long-term strategies, and to be pro-active to customer needs (Fornell and Lehman, 1994; Anderson *et al.*, 1999). Some of the existing empirical studies seem to lack the necessary theoretical and analytical rigour, and this is seen as a pressing requirement for future customer behaviour analysis (Matzler and Sauerwein, 2002).

2. The Research Problem

There are four research questions that this thesis tries to answer.

1. How service quality attributes influence customer satisfaction?

2. What is the relationship between service attribute importance and service attribute performance?

3. What role does customer satisfaction play between service quality attributes and customer behaviours (retention and loyalty)?

4. How does the length of relationship affect customer future intentions such as retention (switching probability) and loyalty (word-of-mouth)?

3. The Context of the Study

The framework of this research work is based on two elements; service quality attributes (SQA) and customer behaviour (CB). The conceptualise model is shown in Figure 1.2. The model evaluates service quality attributes from two perspectives: attribute performance and attribute importance. Thus, it suggests that there is a dynamic (asymmetric and non-linear) relationship between attribute performance and attribute

Figure 1.2: The behavioural consequences of service quality
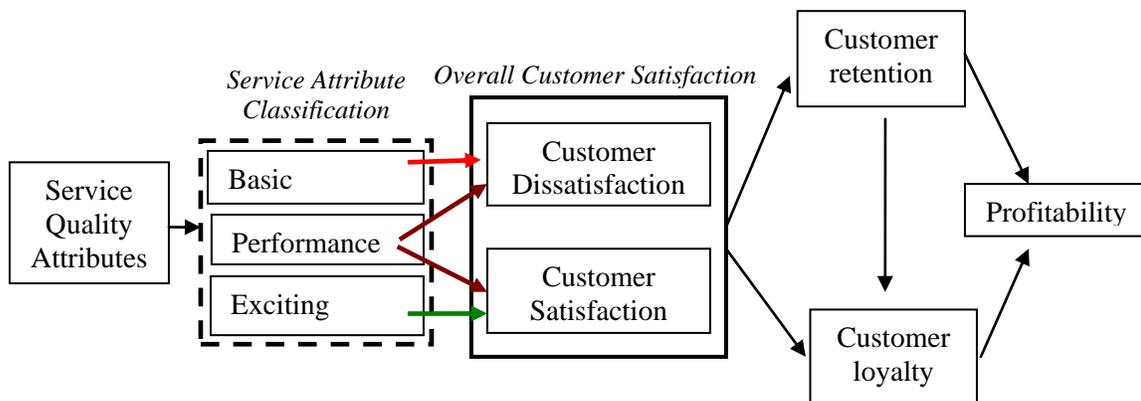
importance. In other words, attribute importance is the function of attribute performance. In the next step, a measure of the relationship between service quality attributes and

customer satisfaction is proposed. The study also suggests a mechanism to clarify service attributes based on their impact on customer satisfaction.

The research work attempts to prove that the relationship between service quality attributes and overall customer satisfaction is non-linear and asymmetric. Finally, the study estimates the relationship between customer satisfaction, retention and loyalty. Such an approach to customer behaviour may help service providers to maximise profitability more effectively and efficiently.

4. Research Aim and Objectives

4.1 Aim

To create a framework that estimates the relationship between service quality attributes, customer satisfaction, retention and loyalty. To conduct customer segmentation in order to identify the role and length of relationship in customer future intentions (word-of-mouth and switching probability).

4.2 Objectives

In order to meet the aim of this research work, the following objectives are pursued:

Objective 1:   To understand the notion of quality of service (QOS) and customer satisfaction.

Objective 2:   To understand the relationship between service attribute importance and performance and their impact on resource allocation.

Objective 3:   To establish a framework that links service attribute performance to customer satisfaction and then to customer future intentions (customer retention and customer loyalty).

Objective 4:   To understand the impact of length of relationship on customer future intention.

5. Research Methodology

The research is descriptive and explanatory regarding the variables and constructs of service quality, customer satisfaction, retention and loyalty. In order to achieve objective 1, the thesis reviews the marketing and management literature to understand the role of customer behaviour in business environment. To achieve objective 2, the study focuses on the growing body of theoretical and empirical knowledge of the relationships among customer satisfaction, customer retention, customer loyalty and profitability. Objective 3 is achieved by extracting the data about key service attributes from a combination of literature review, surveys and interviews through a case study. Questionnaires are administered for data collection. Respondent data was analysed using different statistical methods: multiple regression, regression analysis with dummy variables, logistic regression, logistic regression with dummy variables and structural equation modelling (SEM) to test variables and constructs. The study investigates these factors using mobile telecommunication industry as an example. Finally, to achieve objective 4, prove-disapproves analysis on the conceptual model is conducted through hypothesis testing.

6. Thesis Outline

The thesis is divided into two parts. In the first part an appraisal of existing literature is conducted (Chapters 2 and 3). In the second part the proposed models are presented (Chapters 4 to 6). In Chapter 7 conclusions of the thesis and its contributions are discussed.

Chapter 2: Literature Review

In Chapter 2 the reviewed literature of analytical customer relationship management (CRM) is discussed for the following purposes:

1. Decision making relating service quality attributes (business development)
2. Decision making relating customer future intentions based on service quality attributes (switching intention and word-of-mouth)

Chapter 3: Foundation of Model Development

In Chapter 3 the concept of customer behaviour modelling is introduced. This chapter highlights the fact that there is no universal consensus about the relationship between service quality attributes and customer behaviour.

Chapter 4: Research Methodology

Chapter 4 discusses the research approach and methods undertaken in this thesis. In this chapter the details of main study that compromise the primary research components of this thesis including research instruments, analytical tools, research samples and data collection are discussed. As a result, various modelling techniques are proposed such as multiple regression analysis, regression with dummy variables, logistic regression and structural equation modelling (SEM) are selected to present the cause-effect interrelationship between the factors of customer behaviour model.

Chapter 5: Data Validity and Reliability

Chapter 5 examines the empirical studies conducted to extract the key service quality attributes, customer satisfaction, retention and loyalty in the UK telecommunication industry. The study provides the framework and the evidence that relates service quality attributes to customer satisfaction, customer retention and customer loyalty.

Chapter 6: Data Analysis

Chapter 6 provides data validation for the statistical methods employed in Chapter 5. This chapter contains factors analysis and reliability analysis. Findings confirm the validity and reliability of the proposed conceptualised model, and provide set of results.

Chapter 7: Conclusions and Recommendations for Further Research

This chapter presents a summary of the research conducted in this Thesis. The novel contribution, as well as the conclusions derived from the findings will also be reported in

this chapter. It highlights the limitations of this work, and discusses the potential for further investigation.

7. Chapter Conclusion

This chapter provided a background to the outline of this thesis. It presented the research context and set out the research questions. The outline of the thesis is presented in Figure 1.3.

Figure 1.3: Dissertation Outline
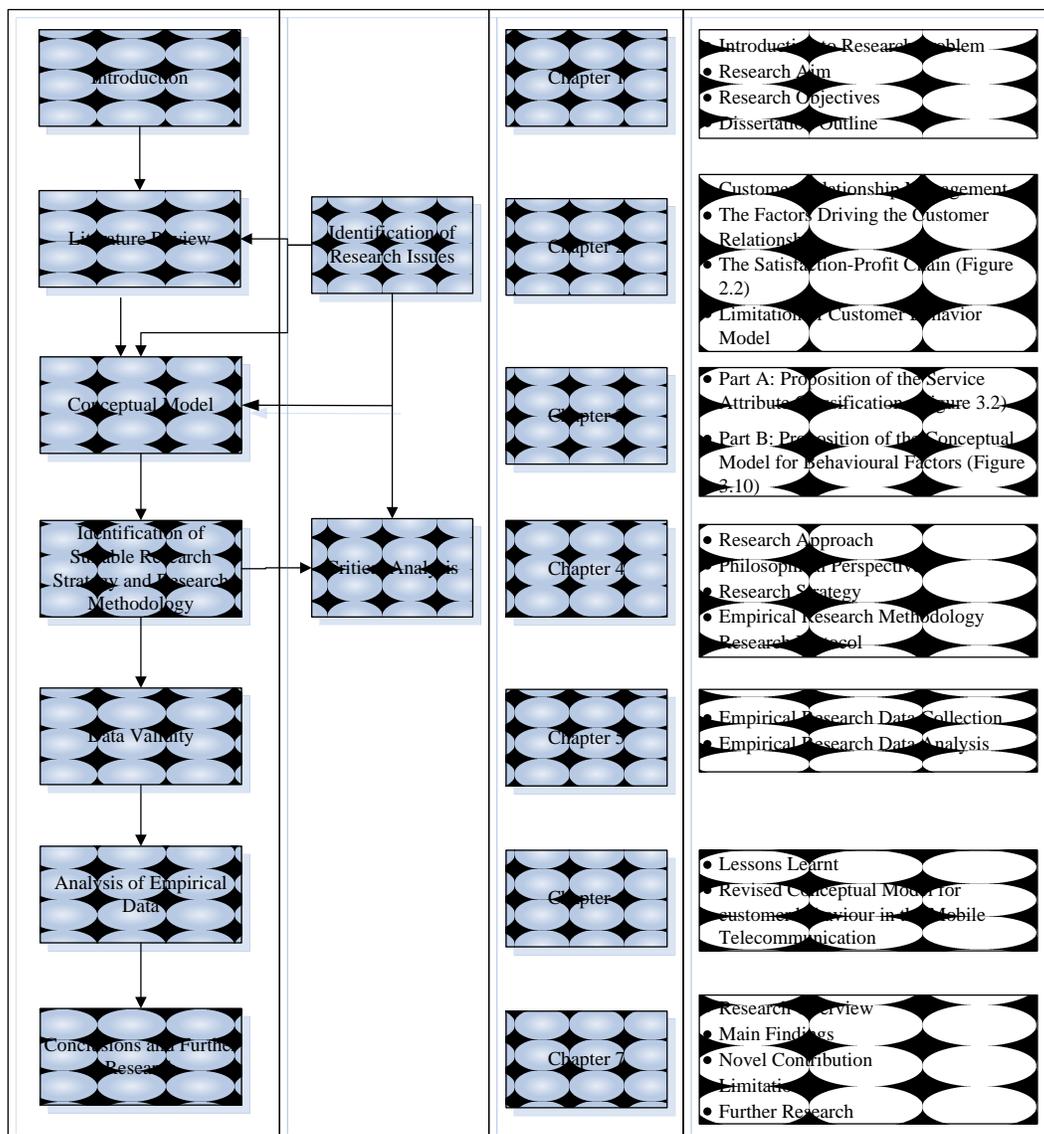
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2

CHAPTER 2

LITERATURE REVIEW

This chapter is a review and appraisal of the literature supporting the research objectives. It examines the search dedicated to service quality and customer behaviours as a major factor in the corporate decision making and strategic planning processes. The material in this chapter focuses on relationship marketing and management science.

This chapter is organised into two sections. The first section deals with the history and development of the concept of customer relationship. In the second section the customer behavioral factors are discussed. Lastly, conclusions to this chapter are drawn.

1. The Evolution of Marketing

During the industrialisation era of the 1920s, the marketing theory pointed particularly to mass marketing because of the nature of mass manufacturing and inception of mass marketing use (radio). The concept continued to expand through the 40s and 50s. It gave corporations an opportunity to approach a wide customer with different needs into buying the same product. Mass manufacturing created a gap between firms and customers. From the firm's perspective, customisation was not economically viable and did not promise greater profits. In addition, individual customer data was not available and there was often very little to almost no interaction between the customer and the firm. Moreover, firms were not open to customer-feedback. Therefore, there was a lack of understanding about the customer service or their needs from the product apart from functionality and durability.

Services marketing pioneers proposed the concept of relationship marketing as means to narrow the gap between companies and their customers. Leonard Berry was the first

scholar in services marketing who coined the phrase "relationship marketing" (Berry, 1983). However, the concept had been oriented towards how to acquire customers (Storbacka *et al.,* 1994). As a result, such relationships are not necessarily long term relationships where profitability is the main goal of the relationship. The phrase became popular in the late 1980s and early 1990s due to the shift of focus from **customer acquisition** to **customer retention** (Morgan and Hunt, 1994; Sheth and Kellstadt, 2002). By comparing relationship marketing (RM) with the traditional transaction marketing, the following can be derived:

- In RM the focus is not on service encounters or transactions.

- RM is focused on retaining customers and enhancing the relationship with the customers.

Figure 2.1 shows a historical timeline of the marketing evolution. There are also other accounts for the emergence of RM, such as the economics of customer retention, the ineffectiveness of the mass media, and higher expectations from customers (Reichheld and Sesser, 1990; Shani and Chalasni; 1992). Furthermore, Sheth and Kellstadt (2002) categorise the main reasons for the emergence of RM:

1. The energy crises of the 1970s and economic inflation
2. Emerging of service marketing
3. Supplier partnering

Later, they also mentioned three other factors that influenced the course and definition of RM, as:

1. Impact of internet and information technology (IT)
2. Selective and targeted relationship (customer segmentation and customisation)

In the past thirty years, there has been a significant number of research and practices in the marketing that have focused on the importance of relationships, networks and interactions. As a result, theories have emerged that contribute to the traditional marketing management. Service marketing and the network approach to business-to-business (B2B) had relatively more than impact on marketing development rather other

theories. There were also influences from non-marketing areas such as total quality management (TQM), lean production, customer value chain, balanced scorecard, intellectual capital and organisation theory that further enriched RM.

Figure 2.1: Marketing changes through the last decades
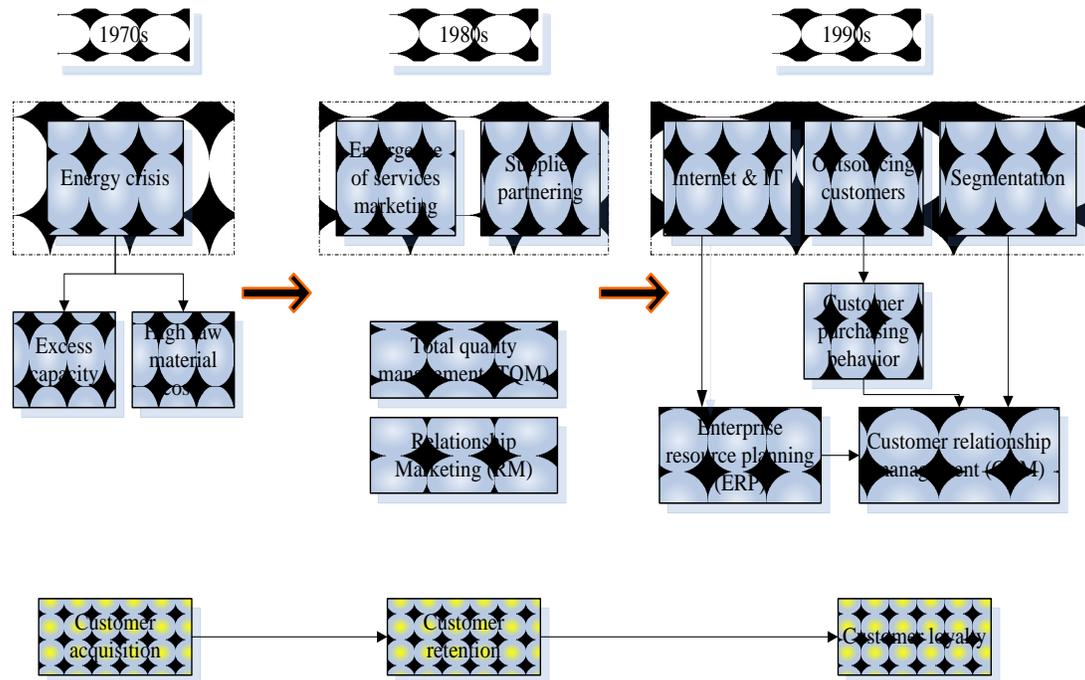
(Source: Sheth and Kellstadt, 2002)

Initially, the concept of the relationship marketing (RM) emerged within the fields of services marketing and industrial marketing (Ford, 1980; Christopher *et al.*, 1991; Gummesson, 1991; Lindgreen *et al.*, 2004). The concept emphasises on customer satisfaction and customer retention as the long-term value for the firm (defensive marketing) rather than customer transactions (offensive marketing) (Kotler, 1991; Varva, 1992). In other words, defensive marketing focuses on reducing customer defection (churning) and increase customer loyalty, whereas offensive marketing focuses on obtaining new customers and increase customers' purchase frequency (Fornell and Wernerfelt, 1987). Nowadays, relationship marketing (RM) is considered as a strategy (Berry, 1983; Gummesson, 1993) in which it aims to enhance **customer relationship**

and **profitability** (Grönroos, 1994; Storbacka *et al.*, 1994; Rap and Collins, 1990; Blomqvist *et al.*, 1993). Saren (2007) defines customer relationship (CR) as "the creation, maintenance and reproduction of tastes, dreams, aspirations, needs, identities, desires, morality and hedonism". The concept of RM received considerable criticism, at the beginning, but it is acknowledged that it has made a shift in marketing. According to Gruen (1997):

"… *the introduction of the relation marketing concept focused business on seeing customers as the centre of the universe and the organisation around them … RM reorients the positions of suppliers and customers through a business strategy of bringing them together in co-operative, trusting and mutually beneficial relationships*."

Furthermore a selection of RM definitions is listed in Table 2.1.

Table 2.1: RM definitions

Source	Definition
Berry (1983)	"*Attracting, maintaining and – in multi-service organizations – enhancing customer relationships*" (p. 25)
Lusch and Vargo (2006)	"*Marketing is the process in society and organizations that facilitates country exchange through collaborative relationships that create reciprocal value through the application of complementary resources*".
Grönroos (1990, 1994)	"*Marketing is to establish, maintain, and enhance relationships with customers and other partners, at a profit, so that the objectives of the parties are met. This is achieved by a mutual exchange and fulfillment of promises.*"
Grönroos (2007)	"*… marketing is to identify and establish, maintain and enhance, and when necessary terminate relationships with customers (and other parties) so that the objectives regarding economic and other variables of all parties are met. This is achieved through a mutual exchange and fulfillment of promises.*"
Morgan and Hunt (1994)	"*Relationship marketing refers to all marketing activities directed to establishing, developing and maintaining successful relational exchanges.*"
Porter (1993)	"*Relationship marketing is the process whereby both parties – the buyer and provider – establish an effective, efficient, enjoyable, enthusiastic and ethical relationship: one that is personally, professionally and profitability rewarding to both parties.*"

As a result, companies were expecting to gain more market share by shifting to customer orientation from the traditional practices (Bose, 2002; Ahn *et al.*, 2003). More importantly, emergence of the One-to-One and the Customer Relationship Management (CRM) concept highlighted the difference between customers, hence attention needs to be paid to how they perceive added value service attributes (Weitz *et al.*, 1995). RM relies upon the acquisition of customer needs and desires with particular relevance to customer satisfaction which, in turn, leads to long-term relationship. According to Gummeson (2008) "*RM is the overriding concept for a new marketing type of marketing and CRM as techniques to handle customer relationships in practice.*" Moreover, He defines CRM as:

> "*CRM is the values and strategies of RM – with special emphasis on the relationship between a customer and a supplier – turned into practical application and dependent on both human action and information technology.*"

Following, Table 2.2 lists a selection of CRM definitions as follows:

Table 2.2: CRM definitions

Source	Definition
Payne and Frow (2005)	"*CRM is a strategic approach that is concerned with creating improved shareholder value through the development of appropriate relationships with key customers and customer segments. CRM unites the potential relationship marketing strategies and IT to create profitable, long-term relationships with customers and other key stakeholders. CRM provides enhanced opportunities to use data and information to both understand customers and co-create value with them. This requires a cross-functional integration of processes, people, operations, and marketing capabilities that is enabled through information, technology and application.*"
Eggert and Fassot (2001)	"*e-CRM embraces the analysis, planning and management of customer relationships with the aid of electronic media, especially the internet, with the goal of the enterprise to focus on select customers.*"

Despite the advantages that RM offers, practitioners and academics have yet to propose a roadmap to create sustainability and competitive advantages that RM promises to offer (Ganesan, 1994; Morgan and Hunt, 1994). Therefore, it is important to recognise how the competitive advantages can be built through relationship marketing.

2. The Measures Defining Customer Relationship

2.1 The Customer Satisfaction-Retention-Loyalty Chain (SRLC)

The satisfaction-retention-loyalty-chain (SRLC) is a key concept that needs to be understood due to its link to customer relationship management (CRM) and, in turn, profitability (Figure 2.2). The concept has been popular since the early 1990s, when measuring and managing customer satisfaction became important to companies (Heskett *et al.*, 1994). The key point is that improving the performance of service attributes will generate satisfaction (Mousavi *et al.*, 2001). Increased customer satisfaction levels will lead to greater customer retention rate, which is a key determinant for customer loyalty, which may increase the expected profit (Rust and Zahorik, 1993; Anderson and Mittal, 2000). Despite the self-evident nature of these positive links, the empirical evidence of research shows only mixed support (Zeithmal, 2000). There is a lack of research investigating the relationship between perception measures (service attribute quality, customer satisfaction) and action measures (word-of-mouth behaviour, purchase loyalty and long term customer relationship profitability).

Figure 2.2: The service quality-customer behaviours chain

Service performance → Customer satisfaction → Customer retention → Customer loyalty → Profit

(**Source: Heskett *et al.* 1994**)

2.1.1 The Behavioural and Financial Consequences of Service Quality

Provision of a good quality of service is considered as a key to success in today's competitive business environment (Reichheld and Sasser, 1990; Parasuraman *et al.*, 1985; Dawkins and Reichheld, 1990). During the 1980s, the primary emphasis of organisations was focused on improving service quality towards customer expectations (Parasuraman *et al.*, 1985). As a result, several methodologies and management framework were proposed (Zeithaml *et al.*, 1996) such as: total quality management (TQM); quality function deployment (QFD); failure modes and effects analysis (FMEA); six sigma (zero defect); PDCA (plan-do-check-act) or Deming cycle. However, there is no consensus on the way to estimate the impact of service quality on financial performance (Zeithaml *et al.*, 1996; Rust *et al.*, 1995). The relationship between these two variables is neither straightforward nor simple (Zahorik and Rust, 1992). Research on the direct relationship between customer satisfaction and profitability has revealed mixed results ranging from positive to no effect (Christopher *et al.*, 1998; Zeithaml, 2000; Jones and Sasser, 1995). The findings lack in depth analysis and fail to answer questions like: How will service quality attribute be paid off (return on investment)? Or, how much should the company invest in service quality to maximise profitability?

There are two approaches for addressing these questions: offensive marketing and defensive marketing (Fornell and Wernerfelt, 1988; Rust and Zahorik, 1993; Zahorik and Rust, 1992). Such approaches do not have their roots in either industrial or service marketing but have emerged from the traditional consumer goods marketing (Storbacka *et al.*, 1994). Offensive marketing focuses on acquiring new customers and increase customers' transactions (purchase frequency), whereas defensive marketing is focused on minimising customer switching behaviour. This thesis evaluates the defensive impact of service quality through customer retention in order to measure the financial impact of service quality for the firm.

The basic assumption is that there is a direct and strong relationship between service quality attributes and customer behaviours, for instance; repurchase intention (Fornell and Wernerfelt 1987, 1988; Reichheld and Sasser 1990; Anderson and Sullivan 1990; Grönroos, 1990). The assumption is based on the idea that customer satisfaction can be predicted and assessed as the difference between perception and expectation. Therefore, if the service is performed poorly, then the difference between customer perception and expectation will be negative or the customer will be dissatisfied. If the difference is positive, a customer will be satisfied or desired. Moreover, this relationship is relied upon the assumption that the relationship between service quality attributes and customer satisfaction is linear and asymmetric.

In reality, what is vital to understand for a manager is whether service quality attributes have different or same impact on customer satisfaction? There is not consensus about the nature of this relationship. Figure 2.3 presents three commonly found relationships between service attributes performance and customer satisfaction.

Figure 2.3: Service attributes performance – customer satisfaction link

Linear and symmetric   Non-linear and asymmetric   Non-linear and asymmetric
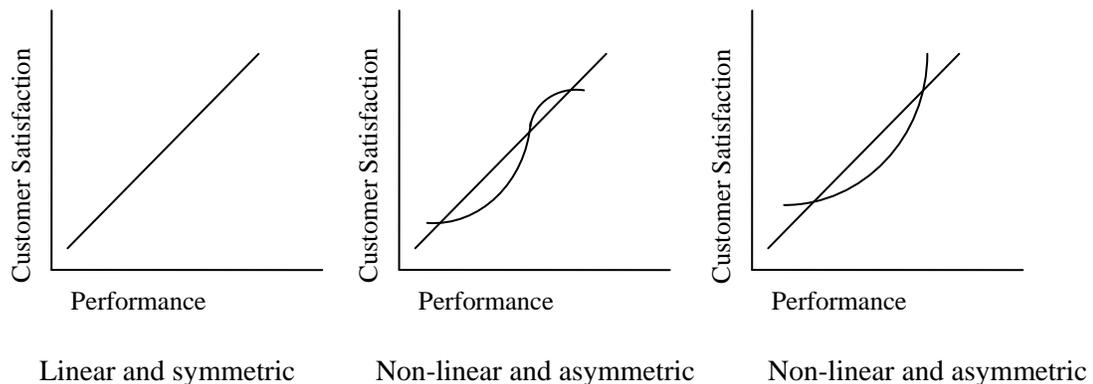
(Source: Anderson and Mittal, 2000)

In most customer satisfaction programs, the relationship between service attributes performance and customer satisfaction is assumed linear and symmetric (Goodman and associates 1995). However, there are some other studies that explain the non-linear and

asymmetric relationships, For example, Mitall and Baldasare (1996) in health care; Danaher (1998) in airline industry; Mittal, Ross and Baldasare (1998) in automotive industry; Bolton and Lemon (1999) in entertainment, and Kumar (1998) in business-to-business marketing that explain the relationship between performance of service attributes and customer satisfaction.

Research reveals that there is a significant difference between the key drivers of customer satisfaction and dissatisfaction (Shiba *et al.*, 1993; Dutka, 1993; Gale, 1994; Oliver, 1997). According to two-factor theory of Herzberg (1959), job satisfaction factors can be classified into two groups: "motivators" (increase job satisfaction) and "hygiene factors" (prevent dissatisfaction). Two-factor theory has also been adopted in marketing theory, where multi-attribute models are used to understand the construct of customer satisfaction. These models imply that service attributes do not have the same importance from customer perspective. In the context of customer satisfaction, the impact of low attribute-level performance on overall satisfaction is greater than attributes with high performance (Mittal *et al.*, 1998). This relationship has explained through prospect theory (Kahneman and Tversky, 1979) which describes how individuals form decisions and react to losses and gains, shown in Figure 2.4. However, later studies developed the three-factor theory (e.g., Anderson and Mittal, 2000; Matzler

Figure 2.4: S-shaped value function in prospect theory
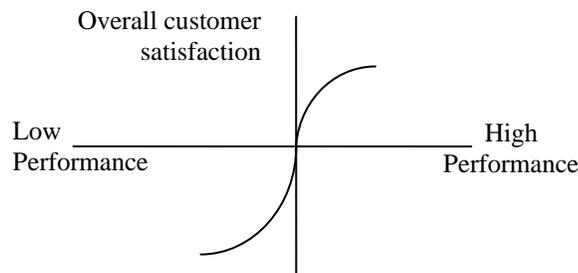
(Source: Matzler and Renzl, 2006)

and Sauerwein, 2002). As a result, service and product attributes fall into three groups: basic, performance and exciting attributes (the three-factor theory). The theory originally developed by Kano (1984) based on Herzberg's two-factor theory.

2.1.2 Customer Satisfaction (CS)

According to the service management literature, customer satisfaction is the result of a customer's perception of the service quality (Blanchard and Galloway, 1994; Heskett *et al.*, 1990) relative to the expectation (Zeithaml *et al.*, 1990). Moreover, Looy *et al.* (2003) defines customer satisfaction as:

> "*The customer's feeling regarding the gap between his or her expectations*
> *towards a company, product or service and the perceived performance of*
> *the company, product or service.*"

Both the service management and marketing literature suggest that there is a strong relationship between customer satisfaction, customer behavioural intentions (e.g., switching and word-of-mouth) and, in turn, profitability (Yi, 1990), shown in Figure 2.5. By improving product and service attributes performance, customer satisfaction level should increase (Mittal *et al.*, 1998; Wittink and Bayer, 1994) which, in turn, lead to greater customer retention (Zeithaml *et al.*, 1996; Anderson 1994). Accordingly, improved customer retention generates more profit (Anderson and Mittal, 2000). Despites it importance, there seems to be little experimental research that quantifies the complex relationships.

Figure 2.5: The satisfaction-profit chain

| Attribute performance | Customer satisfaction | Customer retention | Profit |
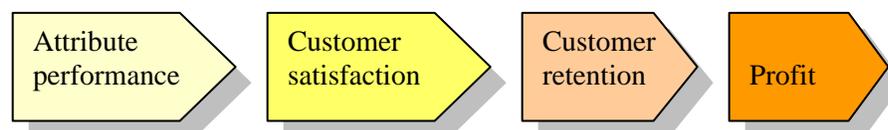
(Adopted from Anderson and Mittal 2000)

Customer satisfaction can be interpreted as an overall evaluation of service quality attributes or service attribute performance (Fornell *et al.*, 1996; Johnson and Fornell, 1991; Boulding *et al.*, 1993). Several studies discussed the relationship between two constructs of service attribute performance and overall customer satisfaction (Anderson and Sullivan, 1993; Oliva *et al.*, 1995; Oliver, 1993; Mittal *et al.*, 1998). It is argued that the relationship in most cases is nonlinear and asymmetric. More importantly, there is a strong relationship between customer satisfaction and customer future intentions (e.g. retention) and profitability (Anderson and Sullivan, 1993; Bearden and Teel, 1983; Boulding et al., 1993; Oliver, 1980; Yi, 1990; Rust *et al.*, 1994). Figure 2.6 illustrates the link between service quality attributes and customer attitude and behaviour (Storbacka *et al.*, 1994). Such comprehensive approaches to model the customer relationship profitability are lacking, as most studies have only focused on discrete aspects of the conceptual framework.

Figure 2.6: From service quality to customer relationship profitability
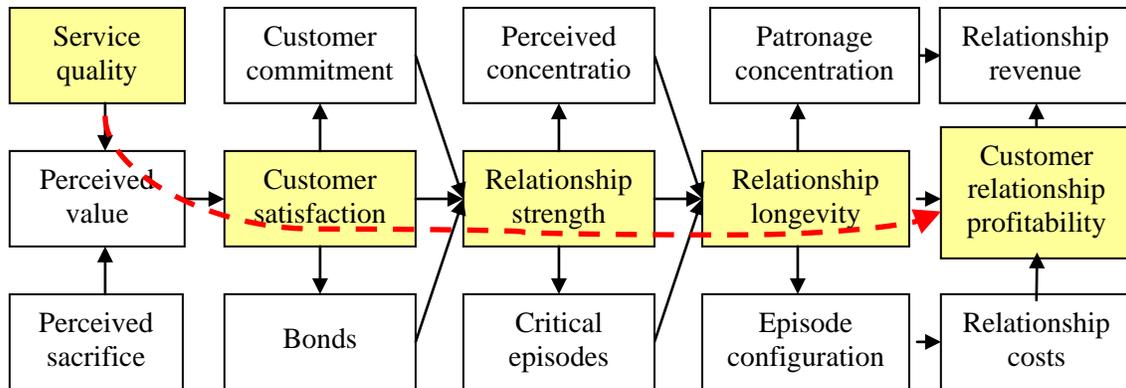
(Adopted form Storbacka *et al.*, 1994)

2.1.3 Customer Retention (CR)

Since 1990s the subject of customer satisfaction and customer retention, and their relationship with company's financial performance has become the core of attention for many managers. By interpreting customer behaviours like retention to profit, firms move closer to the inter-dependent variable − profitability (Reichheld and Sasser, 1990;

Reichheld *et al.*, 2000). In addition, the marketing domain has increasingly shifted from transactional approach (the value of an individual sale) to relationship marketing approach (the value of long-term relationships and repeat purchases). Table 2.3 presents the shift from transactional marketing to relationship marketing. More important, relationship marketing acknowledges that existing and new customers require different strategies.

Table 2.3: Transaction approach and relationship approach (Adopted from Peck *et al.* 2000, p. 44)

Characteristics	Transactions focus	Relationships focus
Focus	Obtaining new customers	Customer retention
Orientation	Service features	Customer value
Timescale	Short	Long
Customer service	Little emphasis	High emphasis
Customer commitment	Limited	High
Customer contact	Limited	High
Quality	An operations concern	The concern of all

Research in this area revealed that there is an asymmetric and non linear relationship between customer satisfaction and customer retention. Even though, customer dissatisfaction may have a greater impact on retention than customer satisfaction. It should be noticed that a number of factors such as type of industry, market competition, switching costs and risk factors may change the dynamics between customer satisfaction and retention (ACSI).

Retention and defection are like two sides of the same coin. Retention rate can be defined as the average likelihood that a customer repurchases product/service from the same firm. The defection or churning rate is defined as the average likelihood that a customer switches or defects from the company to another company, see Equations 2.1 and 2.2.

Retention rate (%) = 1 – (1/ Average lifetime duration)   (2.1)

Average retention rate (%) = 1 – Average defection rate   (2.2)

Lowering customer switching rates can be profitable to companies. Research confirms that retaining customers is a more profitable strategy than acquisition of new customers (Fornell and Wernerfelt, 1987 and 1988). Further, Reichheld and Sasser (1990) emphasis on zero customer detections (churning) as an overall performance:

> "*Ultimately, defections should be a key performance measure for senior management and a fundamental component of incentive systems. Managers should know the company's defection rate, what happens to profits when the rate moves up or down, and why defections occur.*" (p. 111)

The financial impact of customer retention assessed based on two assumptions. First, acquiring new customers is more expensive than retaining existing customers as it involves advertising, promotion and start-up operating expenses (Anderson and Sullivan, 1990; Reichheld and Sasser 1990). New customers, therefore, are more likely to be unprofitable for a period of time after acquisition. Second, existing customers are more likely to generate more profit to companies through cross-selling and word-of-mouth. A study from Rose (1990) reveals that a customer that retain with company minimum 10 years is on average three times more profitable than a customer with 5 years customer history.

2.1.4 Customer Loyalty (CL)

Marketing literature uses a wide range of terms to describe loyalty and methods to measure it. Terms used interchangeably in business include loyalty, customer retention, and switching behaviour. To this list other related terms include: relationship strength (Patterson, 1998) and continuance commitment (Shemwell *et al.*, 1994). There is also the lack of distinction between measures of customer loyalty and related factors such as customer satisfaction. Andreassen and Lindestad (1998) defined loyalty as "*an intended behaviour caused by the service and operationalised loyalty as a repurchase intention and willingness to provide positive word-of-mouth*". Moreover, Jones and Sasser (1995) have also found customer satisfaction as the key element in securing customer loyalty.

Customer loyalty has been described in service management and marketing literature. The service management literature defines loyalty as the behaviour that can be seen in various forms such as relationship continuance, cross-selling, up-selling, and word of mouth or customer referral (recommendation). This type of behaviours increase profitability through enhanced revenues, reduced costs to obtain new customers and retained existing customers, and lower customer-price sensitivity (Reichheld and Sasser, 1990; Hallowell, 1996). While marketing literature has defined customer loyalty into distinct ways (Jacoby and Kyner, 1973). The first defines customer loyalty as an attitude which indicates an individual's overall attachment to a product, service, or brand (Fornier, 1994). The second defines loyalty as behaviour can be evaluated in form of repurchase, word of mouth, and increasing the scale and scope of a relationship. However, the behavioural view of loyalty is similar from both service management and marketing point of view. In this thesis, we examine the behavioural rather than attitudinal loyalty (word of mouth). This approach is intended to, first, to include behavioural loyalty in the conceptualisation of customer loyalty that has been linked to customer retention (switching intention) and satisfaction, and second, to make the demonstrated service quality attributes- customer satisfaction-retention-loyalty relationship providing managers and decision makers interested in customer behaviours linked to firm performance (Figure 1.2).

Despite of several studies into customer loyalty, there is no consensus on the most appropriate way to measure loyalty. Existing studies in customer loyalty can be classified into three groups regardless of definition, measurement, and limitation. These three groups are: (1) loyalty as repeat purchase and word of mouth behaviour (Liljander and Strandvik, 1993), (2) loyalty as a combined composite of repeat patronage and attitudinal component (Dick and Basu, 1994), and (3) a psychological prospect of loyalty (Czepiel, 1990). In this study, customer loyalty is defined as customer word of mouth (WOM) behaviour. Jones and Sasser (1995) discuss that WOM is one of the most important factors in acquiring new customers.

Despite the benefits that accrue from WOM, many organisations can not yet link the service quality-customer satisfaction to WOM. This is due to the fact that satisfaction plays as a mediating attitude between service quality attributes and customers' word of mouth. More importantly, customer retention is not the same as customer loyalty. Customer retention rate is measured on a period-by-period basis and it is used as an indication of customer switching behaviour or intention, whereas customer loyalty has a much stronger theoretical meaning. If a customer is loyal toward a service or a brand, he or she has a positive emotional or psychological disposition towards this brand. Customers might continue to purchase a particular brand but this may be purely out of convenience or inertia. In this case, a customer may be retained, but not necessarily stay loyal to the product or service.

3. Marketing or Business Intelligence

As it has been discussed, companies need to develop and sustain long-term working relationship with their customers. In doing so, companies need a systematic process of gathering, analysing, supplying and applying information about the external market and internal environment. As a result, marketing or business intelligence plays a significant role in the formulation and implementation of plans to achieve this goal (Lee and Trim, 2006). Marketing intelligence supports the decision-making process by providing external (e.g., customer needs) and internal data from the environment (e.g., employee loyalty). Cornish (1997) defined marketing intelligence as:

> "*the process of acquiring and analysing information in order to understand the market (both existing and potential customers) to determine the current and future needs and preferences, attitudes and behaviour of the market; and to assess changes in the business environment that may affect the size and nature of the market in the future.*"

In reality, most businesses rely on conjecture to evaluate the efficiency of their processes. Whereas it is hard to make decisions without objective about how to improve business performance. As a result, the analytical result of customer value has received lots of attentions as a force for competitive differentiation. According to analyst firm

IDC (2006), the business intelligence market is a $20 billion market. Business intelligence has changed dramatically since its inception in the early 1990s. Figure 2.7 illustrates how technology and business intelligence tools have changed over time.

Figure 2.7: Evolution of BI tools - **Adopted from Eckerson, (2003)**
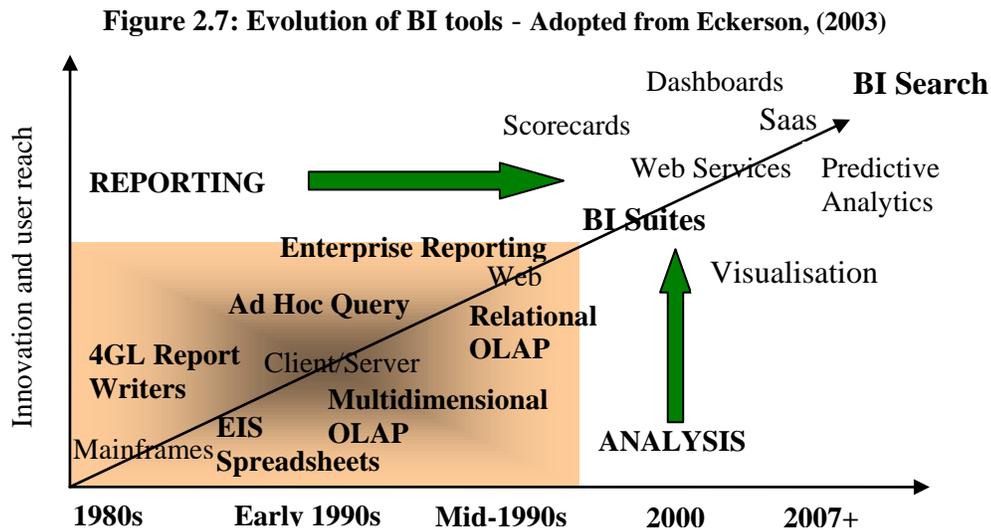
4. The Link between CRM and Database Marketing

Since the significant transformation in areas of information technology (IT) and the internet, and the improvement in flexible manufacturing and outsourcing practices, understating individual customer needs has become a key determinant of a company's profitability. This shift in marketing direction can be viewed in the definition of marketing that was updated by the American Marketing Association (2004), to be:

> "*Marketing is an organisational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organisation and its stakeholders.*"

Therefore, marketing plays an important role in aligning company's business processes and practices with customers' demand. Traditionally, database marketing provides valuable information about customers by identifying and analysing different segments of customer population (Figure 2.8). This provides the opportunity for firms to increasingly

disaggregate the levels of database marketing to ultimately reach their customers. Thus, CRM applies database marketing techniques at the customer level to strengthen company-customer relationships.

Figure 2.8: Use of database marketing - Adapted from Kumar and Reinartz (2005), p. 82
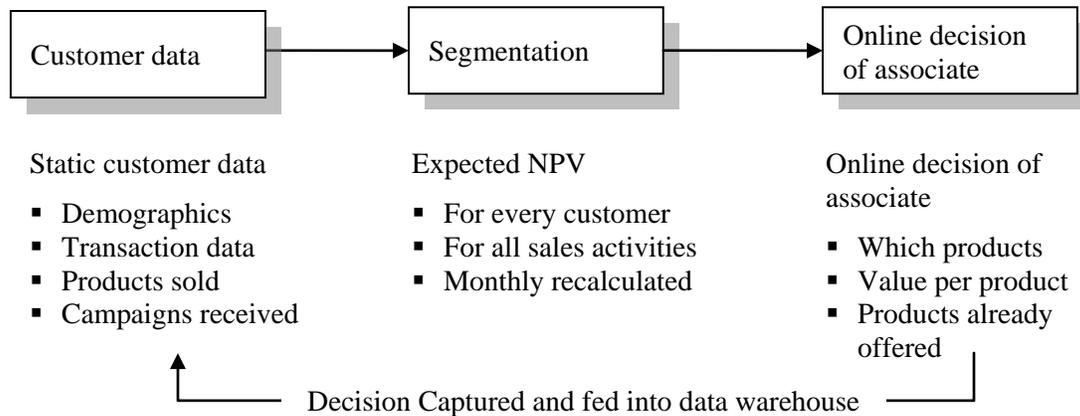
Figure 2.9 illustrates a timeline of the CRM concept evolution. The shift from transactional marketing to relational marketing has dramatically raised the importance of evaluation of the long-term economic value of a customer for the company. The concept of customer value refers to the present value of the future cash flows attributed to the customer relationship. Customer value is the economic value of the customer relationship to the company. Use of customer value as a marketing metric tends to redirect the forms of strategic planning towards long-term customer relationship, rather than maximising short-term sales.

Figure 2.9: Timeline of CRM evolution - Adapted from Kumar and Reinartz (2005), p. 20

First Generation > 1990	Second Generation > 1996	Third Generation >2002

Call centre management
Customer service support

Integrated customer-facing → Strategic CRM
Front-end (mktg., sales, service)

Sales force automation

ERP integration
Customer analytics
Complete web integration

Goals:

Improve service operations	Reduced cost of interaction	Costs reduction
Increase sales efficiency	Increase customer retention	Revenue growth
	Improve customer experience	Competitive advantage

5. Costumers as Decision Makers

The main objective of modern companies involves measuring the quality of customer relationship rather than track product releases to project profit and the number of transactions. Customers are not concerned with the amount of profit they are generating for the company, they rather expect the company to meet their needs. In other words, a customer cares about the quality of the relationship he has with the company. According to Yastrow (2007), "*relationships have become powerful differentiators.*" More importantly, he argues that companies should enhance personal relationships with their customers.

The chain of impact of the performance of service attributes on customer satisfaction, and consequently its impact on customer retention and loyalty, leading to profitability (Rust and Zahorik, 1993). However, there is a lack of studies investigating the relationship between customer perception and customer future intentions, i.e. purchase volume, length of association and word-of-mouth. Such analysis helps managers to estimate customer migration, and assign resources accordingly.

6. Customer Value

In order to implement long-term strategy, the management needs to know how the value of a customer evolves over time. To do so, corresponding control measures must be put in place. *Lifetime value* (LTV) is the general term used to describe the long-term economic value of a customer. In simple terms, customer value implies the fact that each customer has a value over his/her lifetime with a firm (Figure 2.10). Estimating, however, the lifetime of a customer by itself requires sophisticated modelling, as it involves prediction of the probability of retention. More importantly, the inputs of the lifetime value can change subject to nature of product or service, data availability, and analysis capability (Kurma and Reinartz, 2005). Therefore, the formulation should be adapted based on the type of industry and company attributes. For example, contractual relationship such as mobile phone subscription needs a different formulation vis a vis non-contractual relationship such as the airline industry.

Figure 2.10: Principals of LTV Calculation (Adopted from Kurma and Reinartz (2005), p.125)
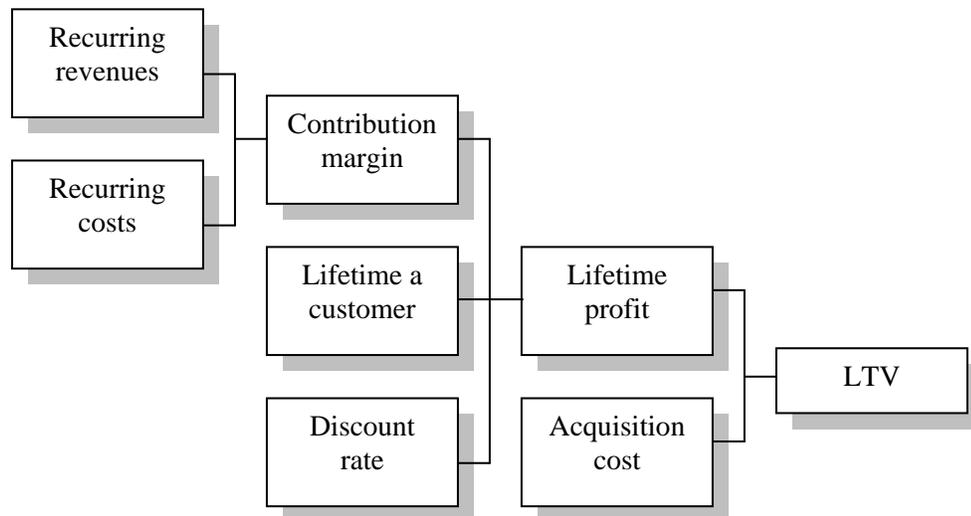
In theory, customer value represents the amount of profit generated from each customer, and therefore it should be willing to spend money to acquire or retain each customer. However, calculating customer value is very difficult due to its complexity and the uncertainty surrounding customer relationships. In order to calculate customer value, the following parameters are required:

- *Churn rate:* is the percentage of customers who end their relationship (contract or subscription) with a company in a given period. Therefore, one minus the churn rate is the *retention rate*.

- *Discount rate:* is the cost of capital used to discount future revenue from a customer.

- *Retention cost:* is the amount of money has to be spent in a given period to retain an existing customer.

- *Period:* is the length of customer relationship decided to be analysed (one year is the most commonly used period). Customer lifetime value is a multi-period calculation (for example; 3-7 years).

- *Periodic: revenue* is the amount of revenue generated by a customer in the period.

- *Profit margin:* is the difference between revenue and costs, even though this may be reflected as a percentage of gross or net profit.

Using the analytical result of customer value evaluation, the marketing department should target the customer that has the highest likelihood to be profitable to the company. The customer value-based approach brings the following benefits to the company:

1. Increased rate of investment (ROI)
2. Increase in acquisition and retention of profitable customers
3. Decrease in costs

7. Customer Segmentation

Due to an ever increasing number of competitors, reduction in customer switching costs and consequent customer retention, the competition to acquire more customers has intensified among companies. The organisation needs to prioritise its customers in order to create the capabilities, processes and infrastructure to meet their demands. Without segmentation, differences in customer needs might never be recognised.

Customer segmentation is a process of classifying customers into a number of smaller groups, or market segments based on the characteristics or responses of customers in those segments. This approach helps managers to denitrify the most attractive segments and to develop an appropriate strategy for winning and retaining high value customers.

Bounsaythip and Rinta-Runsala (2001) define segmentation as:

> "*Customer segmentation is a term used to describe the process of dividing customers into homogeneous groups on the basis of shared or common attributes (habits, tastes, etc.).*"

The needs of diverse customers in the modern business environment cannot be met by mass traditional marketing strategy (Ahn *et al.*, 2003). Segmentation theory categorises customers and markets into different clusters or groups with similar needs and/or characteristics that are likely to exhibit similar behaviours. Therefore, segmentation is an essential element for customer relationship management (CRM) system. Wedel and Kamakura (1997) classified segmentation parameters into two groups: (1) the general variables that include the customer demographics and lifestyles, and (2) the product specific variables such as customer purchasing behaviours.

Customer segmentation (Kamakula, 1998) refers to the process of classifying customers into different groups of customers. It enables viewing the entire database in a single picture, thus allowing the firm to treat customers differently according to class and pursue marketing that is suitable to each class. Studying customer profitability reveals that there is not always a positive correlation between customer revenue and customer profitability (Kaplan and Narayanan, 2001). Customers from different segments contribute differently to financial performance. In other words, some customers bring more income to the firm than the others. Figure 2.11 shows that two customers, A and B, have the same revenue but their sales amount is considerably different. Foster *et al.* (2001) states that "*each dollar of revenue does not contribute equally to net income*".

Figure 2.11: Costs and revenue relationship - Adapted from Rajj (2005)
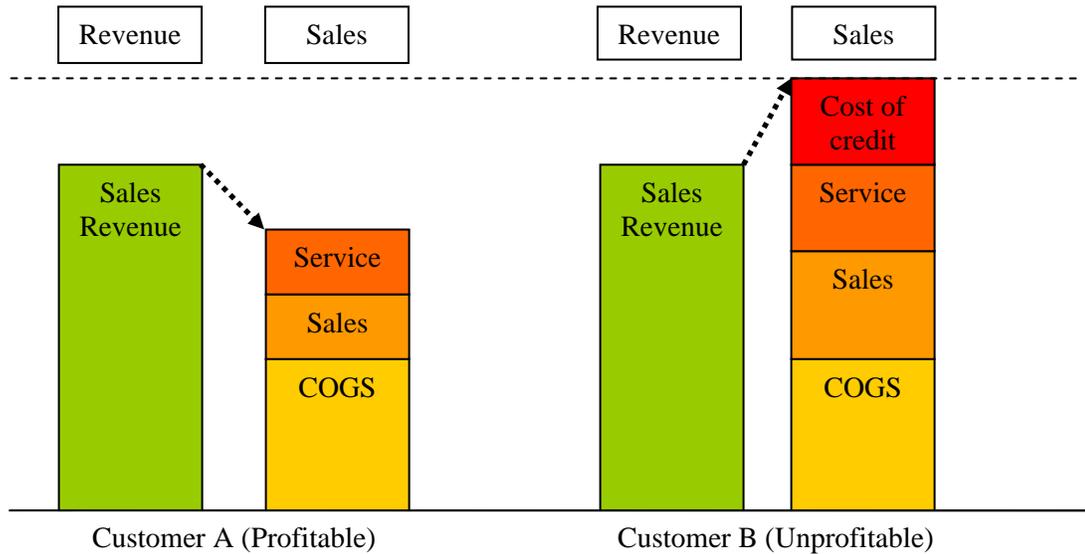
Keiningham *et al.* (2005) cited that "*while improving revenue for profitable clients does indeed improve profitability, exactly the opposite occurs for unprofitable clients*". As a result, customers' profitability level has an essential influence to net income. Further, Raajj (2005) shows this difference by a pyramid segments base on their size (percentage), revenue and profit shown (Figure 2.12). As a result, customer segmentation can be viewed as a tactic to prioritise customers by their value, to the company. For example, in some scenarios, a small proportion of customers bring the most profit to the company. A study from Banc One of Columbus, Ohio, reveals that 20 per cent of their customers provide all of the bank's profit, while the rest, 80%, only cost money (McDougall *et al.*, 1997). Therefore, different segments should be approached by different strategies (Elsner *et al.*, 2004).

Figure 2.12: A customer pyramid with four revenue tiers

Large:
4% of customers
23% of revenues
25% of profits

Top:
1% of customers
50% of revenues
49% of profits

Small:
80% of customers
7% of revenues
5% of profits

Medium-Sized:
15% of customers
20% of revenues
21% of profits
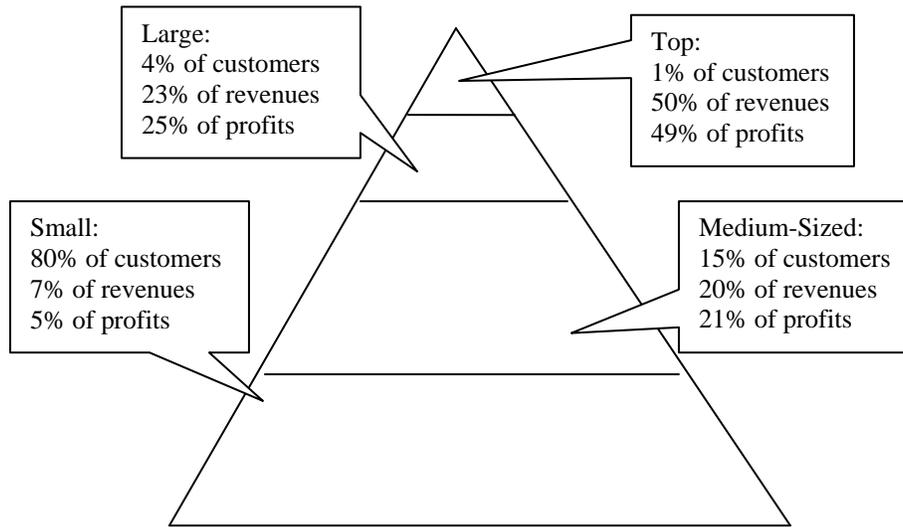
(Adapted form Raaij, 2005)

8. Costumer Activity Measurement

Customer behaviours are meaningless unless it translates into a measurable metrics. In reality, companies balance the cost of an initiative against the service attribute (e.g., reduced waiting in the call centre) instead of measuring the cost against the increase in, for instance, customer satisfaction (and finally how increased satisfaction will impact profits). The problem is that some benefits, while appearing to be objectively significant, may have only a limited effect on customer behaviour. Unless a company realises the cost versus benefits of increased customer outcomes (satisfaction, retention and loyalty), the effort to implement a new strategy like new technology may be a waste of capital. More interestingly there is evidence in the literature that there have been attempts to describe the relationship between these constructs, nevertheless, these descriptions are by no means fully established (Moutinho and Smith, 2000).

It is found that the link between customer behaviours and profitability is not nearly as straightforward as usually proposed. As a result, this study aims to provide an objective means to explain the relationship between service quality attributes and customer behaviours.

9. Chapter Conclusions

The review highlighted gaps in the strategic implications of relationship marketing, therefore little direction can be offered to managers concerned with the long-term relationship. In order to initiate those efforts, we adopt satisfaction-profit chain (Anderson and Mittal, 2000), the thesis draw upon literature from relationship marketing concept to establish a framework for analysing the relationship between service quality and customer behaviours (satisfaction, retention and loyalty). Such approaches provide guidance about the complex interrelationships among operational investments, customer perceptions and behavioural.

The customer behaviour literature has been reviewed for the research programme to be outlined in chapter 3. The background theory of relationship marketing (RM) was reviewed from two perspectives: service quality and customer behaviours. Each of these two perspectives provides a different aspect to the discipline and identifies links to the focal point of this research. As a result, this chapter highlights the gap in the following areas:

1. The relationship between service quality and customer satisfaction
2. The relationship between importance and performance of service attributes
3. The relationship between service quality, customer satisfaction, retention and loyalty.
4. The impact of the length of relationship on customer future intentions

Marketing is an ongoing process in which its outcomes must be monitored continuously in order to sustain the organisation's relationships with customers and therefore generate more profits. The key conclusion from this chapter's discussion is the importance of using customer relationship management (CRM) as an essential economic tool for gaining competitive advantage. Focusing just on internal quality shows to be insufficient. Consequently, marketing is a series of customer processes; optimisation of acquisition, navigation, persuasion, conversion, loyalty and ROI. Moving to customer profitability is the key determinant of good marketing decisions. Yet, there is a lack of approaches that combine data such as service operations, customer perceptions and

behaviours, and financial incomes, providing companies with both a comprehensive diagnosis and a roadmap for implementation.

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3

CHAPTER 3

FOUNDATION OF MODEL DEVELOPMENT

"If you can not measure it, you can not improve it."

"When you can measure what you are speaking about and express it in numbers you know something about it."

Lord Kelvin
(Scottish mathematician and physicist)

Discussion in Chapter 2 revealed that (1) the research in the area of customer relationship profitability remains limited, and (2) there is no comprehensive approach to model the relationship between customer relationship management and profitability, where most studies in this area have only focused on discrete aspects of the conceptual framework (see Figure 2.2).

In this chapter, we aim to examine the relationship among main components of service quality-customer behaviour framework introduced in Chapter 2. In doing so, first the relation between service quality attributes and customer satisfaction is examined. It evaluates customer satisfaction based on two factors of service attributes: importance and performance. Following, the connection between customer satisfaction and customer switching intention (retention) is discussed. Next, the author discusses the relationship between customer switching intention and word of mouth behaviour (loyalty). Finally, the relevant hypothesis to each part will be presented and discussed.

1. Customer Relationship Management (CRM)

There are two routes to understand CRM: (1) analytical CRM, and (2) behavioural CRM (Kamakura *et al.*, 2005). Analytical CRM aims to increase the revenues by analysing customers' data for a variety of purposes (e.g., marketing campaigns, product development, pricing), while behavioural CRM supports decision-making process and managerial strategies by conducting surveys and experiments. It is argued that CRM systems must be organised along a continuous process consisting of three stages: (1) customer acquisition, (2) relationship development, and (3) retention strategies (Figure 3.1). The company should attempt to acquire new customers through different channels such as direct marketing. Appropriate strategies (e.g., delivering customised products) enhance customer value such as cross-selling (Ansari and Mela, 2003; Kamakura *et al.*, 1991, 2003). Retaining existing customers significantly decreases marketing and operation costs and enhance the total lifetime value (LTV) of the customer base. To implement these constructs, we need a sophisticated framework includes predictions of both customer retention probabilities and revenues.

Figure 3.1: CRM process

Customer acquisition	→	Relationship development	→	Retention strategies
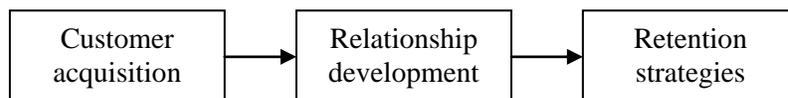
The dominating perspective within customer relationship research has been to assume that there is a direct and positive correlation between service quality and customer satisfaction, which in turn will lead to increased retention rate, degree of loyalty and profitability (Fornell 1992; Fornell *et al.*, 2006). Thus, the identification of the determinants of customer satisfaction is the first priority for the management. One needs to determine which service attributes fulfil the minimum requirements and minimise dissatisfaction? Which service attribute adds value and increases satisfaction? And which attributes achieve both. A good understanding of service quality attributes helps

management to make better decisions on resource allocation and thus reduce operation costs (Matzler and Sauerwein, 2002).

As this thesis deals with the relationship between changes in attribute-performance, customer satisfaction and customer behaviours, therefore, it is imperative to examine factors affecting customer retention and loyalty (customer relationship economics) in light of the current service attribute quality and customer satisfaction paradigm.

2. The Relationship between Service Quality Attributes and Customer Satisfaction

According to marketing literature, there is a strong and direct relationship between service quality and customer satisfaction (Storbacka and Luukinen, 1994; Strandvik and Liljander, 1994a, 1994b). The current customer satisfaction concepts rely on customers' perception of quality (Storbacka *et al.*, 1994). However, there has been some discussion whether customer satisfaction and service quality can be evaluated at a relationship level. In other words, perceived service quality would, according to Liljander and Strandvik (1994), refer to an outsider perspective, a cognitive judgment of a service. Quality therefore, does not necessarily need to be experienced first time. It can be achieved through customer referral (word of mouth) or advertising. In contrast customer satisfaction is the outcome of direct evaluation through customer experience (Liljander and Strandvik, 1994).

Research on customer satisfaction management has been going on for decades (see Table 3.1). A number of methods have been proposed to identify the different categories of service/product attributes such as the critical incident technique (CIT), a special questionnaire by Kano (1984), importance-performance analysis (IPA), and the analysis of complaints and compliments. Some early studies (Swan and Combs, 1976; Maddox, 1981; Cadotte and Turgeon, 1988; Johnston and Silvestro, 1990) reported two factors: satisfiers and dissatisfiers. These findings were originally based on Herzberg's model (two-factor or Motivator-Hygiene theory). However, later studies added the third factor

which accounts for both dissatisfaction and satisfaction (Brandt 1987; Bitner *et al.*, 1990; Stauss and Hentschel, 1992; Anderson and Mittal, 2000).

Table 3.1: Empirical studies on the factor structure of customer satisfaction

Author(s)	Hypothesis	Method	Results
Swan and Combs (1976)	Two-factor theory	Critical incident technique	Hypothesis confirmed
Leavitt (1977)	Two-factor theory	Factor analysis	Two-factor theory not supported
Maddox (1981)	Replication of the findings of Swan/Combs (1976)	Critical incident technique	Two-factor theory partially supported
Brandt (1988, 1987), Brandt and Reffet (1989)	Three factors: penalty-factors (minimum requirements), reward-factors (value enhancing factors), and hybrid factors with impact on satisfaction as well as on dissatisfaction	Regression analysis with dummy variables	Three-factor theory supported
Cadotte and Turgeon (1988)	Two-factor theory: complaints as dissatisfiers and compliments as satisfiers	Analysis of the content of complaints and compliments	Two-factor theory supported. In addition some variables elicit both satisfaction and dissatisfaction
Silvestro and Johnston (1990), Johnston and Silvestro (1990)	Two-factor theory: hygiene-factors and motivators	Critical incident technique	Two-factor theory supported. In addition some variables elicit both satisfaction and dissatisfaction
Mersha and Adlakha (1992)	Hypothesis: different causes of good and bad service	Rank order of attributes according to perceived importance	Hypothesis supported: causes of good and bad service are different
Anderson and Mittal (2000)	Non-linear relationship between attribute-satisfaction and overall satisfaction	Regression analysis with dummy variables	Three-factor theory supported

(Adapted from Matzler and Sauewen, 2002)

Kano *et al.* (1984) argue that service attributes do not contribute to the overall customer satisfaction and dissatisfaction with equal weight. There are significant difference

between the key drivers of customer satisfaction and dissatisfaction (Shiba *et al.*, 1993; Dutka, 1993; Gale, 1994; Oliver, 1997). The unpleasant experience that creates dissatisfaction is not the same as the pleasant experience that creates satisfaction. Service quality attributes can therefore be classified into three types (Three-factor theory): (1) basic, (2) performance, and (3) excitement (Anderson and Mittal, 2000; Matzler *et al.*, 2004; Oliver, 1997). The original classification of attributes was proposed in Kano's questionnaire. The questionnaire follows two scenarios: first the respondents are asked to state their feeling if a product or service has a certain attribute, and second where it does not have that attribute (Kano *et al.*, 1984; Berger *et al.*, 1993).

(1) *Basic attributes* or *dissatisfiers.* These are the basic functionalities that customers expect from a service or product. Their absence would be unacceptable, while their presence in no way generates any satisfaction or delight (Solomon and Corbit, 1974; Solomon, 1980; Kano *et al.*, 1984). For example, the punctuality and safety are considered to be the basic attributes for airline services.

(2) *Performance* or *One-dimensional attributes*. These attributes tend to have linear relationship with overall customer satisfaction. For example, petrol consumption of a car is considered to be a performance attribute.

(3) *Exciting attributes* or *satisfiers*. These attributes are the unexpected attributes and contribute to increased customer satisfaction levels when presented but cause no dissatisfaction if they do not exist. High performance on these attributes has a greater impact on overall customer satisfaction rather than low performance. For example, promotional offers such as extra features come with mobile phones (e.g., games, radio, dictionary and etc.) can be considered as an exciting factor for some customers.

The three different types of service attributes influence the relationship between service quality attributes and customer satisfaction (Figure 3.2). They imply an asymmetric and

nonlinear relationship between service quality attributes (performance) and customer satisfaction. However, there is still no universal consensus amongst researchers and practitioners regarding the nature of this relationship. Figure 3.3 shows how service attributes may impact customer satisfaction. Moreover, the classification of service attributes may be influenced by customer expectations and may vary between industries (Matzler and Renzl, 2007). The three-factor theory (Kano's model of customer satisfaction) is also supported by different research methodologies including critical incident technique (CIT) (Stauss and Hentschel, 1992; Bitner *et al.*, 1990; Swan and Combs, 1976), a content analysis of complaints and compliments (Cadotte and Turgeon, 1988), a rank order of service attributes for good and bad service (Mersha and Adlakha, 1992), and regression analysis techniques (Anderson and Mittal, 2000).

Figure 3.2: Three-factor theory of customer satisfaction - Adapted from Busacca and Padula (2005)
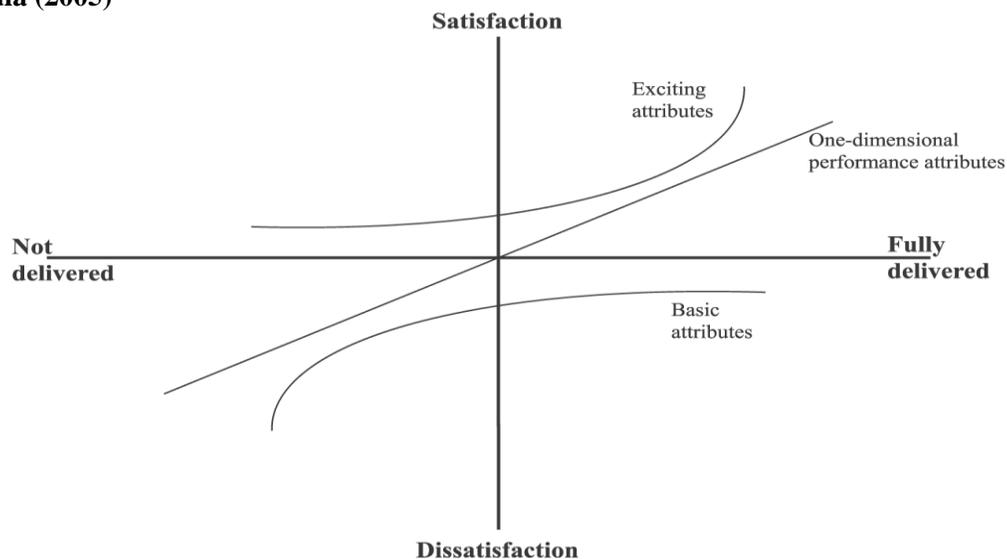
More importantly, the three-factor theory has some significant implications for service quality improvement and customer satisfaction management. As a rule of thumb, basic factors (minimum requirements) must be identified and well performed. If they are presented at a satisfactory level, however, improving their performance does not create or increase satisfaction-level. Performance factors (one-dimensional) typically represent customer requirements (Matzler and Sauerwein, 2002). Therefore, companies should be

competitive with respect to these attributes. Finally, exciting attributes are not expected, so they may surprise the customer. So, it is therefore not prudent for a service provider to compete on these attributes with other service providers. Research, however, on customer satisfaction has emphasised the need to account for the non-linear and asymmetric relationship between service quality attributes and customer satisfaction.

There are a number of methods to differentiate between the type of service attributes. They include the critical incident technique (CIT), importance grid, Kano's questionnaire, regression analysis with dummy variables and the analysis of complaints and complements. Next section discusses the relationship between service attribute and customer satisfaction based on two factors of service attributes: importance and performance.

3. The Relationship between Attribute Performance and Importance

It is argued that understanding the relationship between service quality attributes and customer satisfaction is vital to marketing managers. Operationally, if resource allocation to improve attribute performance to be prioritised correctly with regard to customer satisfaction, there is a pressing need to adopt viable analytic to help them optimise resource allocation (Mittal *et al.*, 1998; Anderson and Mittal, 2000; Bruno and Padula, 2005). Several studies have pointed to the issues within misallocation of resources resulting from viewing the relationship between customer satisfaction and service attribute performance through a linear and symmetric prospective (Anderson and Mittal, 2000). The basic assumption is that the performance of an attribute can be changed without this affecting the importance of the attribute (Martilla and James, 1977; Oliver, 1997; Bacon, 2003). Based on this assumption an attribute with low performance-level and high importance-level is the highest priority for a company conducting a customer satisfaction survey. However, such approach may not increase customer satisfaction-level (Mittal *et al.*, 2001; Matzler *et al.*, 2003). It is argued that there is a dynamic relationship (non-linear and asymmetric) between service attribute performance and importance. In other words, attribute importance has to be seen as a

function of attribute performance (Matzler and Sauerwein, 2002; Matzler *et al.*, 2003). A few studies discussed that the nature and magnitude of the relationship between service attribute importance and customer satisfaction may change with fluctuation in performance levels (Mittal *et al.*, 1999; Matzler *et al.*, 2003 and 2004; Bacon, 2003). However, this relationship is more complex and the validity of this assumption has been questioned by researcher and practitioners. Depending on a method used for estimating the relative importance of service attributes, the managerial implementations (resource allocation) would vary (Varva, 1997). Moreover, it is argued that direct methods (customer self-stated importance) may not measure importance values realistically, because customers do consider the current level of service attribute performance.

4. The relationship between Customer Satisfaction and Future intention

Customer retention is an important factor in maintaining company profitability. According to marketing literature, recruiting an existing customer is easier and less expensive than obtaining a new customer. Brown (2004) stated that recruiting a new customer in wireless industry is eight times more expensive than retaining an existing customer. In addition, companies generate more profit over customer lifetime cycle by selling more services and products (cross-selling, up-selling). For example, in mobile telecommunication industry, customers contribute to the revenues by purchasing extra services such as internet broadband, insurance and music. Several studies have evaluated the relationship between customer satisfaction and customer retention in these industries (Kumar 1998; Bolton 1998). A study form Gupta *et al.* (2004) reveals that a 1% increase in customer retention rate can increase profitability by 5%. Furthermore, Ralston (1996) estimates that a one-unit change in customer satisfaction-level produces a 6% change in the likelihood of customer retention. However, most of these studies assumed the relationship between satisfaction and retention to be linear and symmetric. This, however does not seem to be a universal rule. Figure 3.3 shows a typical asymmetric relationship between satisfaction and retention observed in the Swedish customer satisfaction barometer and American Customer Satisfaction Index (ACSI) databases

(Fornell 1992; Anderson *et al.*, 1994). The basic assumption is that satisfied customers are less likely to consider other suppliers than dissatisfied customers (Srinivasan and Ratchford, 1991). According to Anderson and Mittal (2000), the behaviour may be different and rely on whether switching behaviour or switching intention is used as the dependent variable. They also found significant differences between satisfaction-switching behaviour and switching intention in the automotive industry.

In the conceptual model, customer retention is assumed as switching intention or churning probability. Moreover, different industries may exhibit patterns of asymmetry that deviate from patterns presented in Figure 3.3. For instance, churning ratio would be greater in telecommunication where customers can easily switch to other service providers.

Figure 3.3: Customer satisfaction – retention link
The dotted line represents a linear approximation of the nonlinear relationship shown.

Chun *et al.* (2007) highlights the importance of customer retention in his study. He reports that a typical service provider loses approximately four percent of its customers each month. The cost of customer switching is more than four billion dollars each year in wireless industry (Anderson Consulting, 2000). The service marketing literature identifies two factors that influence customer retention; customer satisfaction and switching costs (Kim *et al.*, 2004). Companies need to understand the determinants of customer defection and be able to predict the probability and the associated risk of

customer switching at a particular point of time. More accurate forecasting of customer behaviours can enable both more effective industry response.

In this research work, switching rate is assumed to be the percentage of customers who end their relationship with a company in a given period of time. Based on this assumption **retention rate** can be one minus the switching rate.

$$R= 1-S \qquad\qquad (3.1)$$

Our research to date shows that there is a lack experimental research in measuring customer switching intention that can be applicable to different industries. So far, most empirical research in customer behaviour studies describe customer switching intention based on the actual customer transaction and billing data (Mozer *et al.*, 2000; Ng and Liu, 2000; Wei and Liu, 2002; Drew *et al.*, 2001; Weerahandi and Moitra, 1995). Some research, in mobile telecommunication industry, utilised forecasting techniques, they predict the probability of customer switching with respect to usage time, call frequency, unpaid balances and calling plan (Ahn *et al.*, 2006). Such models are more predictive than descriptive in which managers may not be able to improve company operations, specifically service quality and customer satisfaction. As the author discussed in Chapter 2, customer behaviours cannot be adequately measured and improved through financial statement (Peppers and Rogers, 2008).

In the next section, the author discusses how switching barriers affect the risk of customer switching.

4.1 Switching Barriers

There is a universal consensus among academics and practitioners that customer satisfaction may not necessarily lead to customer retention. For example, a study in retail banking shows that between 65 and 85 per cent of customers who switch suppliers declared to be satisfied or very satisfied with their former supplier (Reichheld, 1993). In reality, switching costs continue to be a significant barrier for the dissatisfied customers to switch suppliers (Grönhaug and Gilly, 1991).

Studying switching barriers from customer perspective differentiate switching barriers into financial, psychological, and social (Storbacka *et al.*, 1994). Considering financial aspect of switching barriers, switching costs can be classified into three groups: (1) transaction, (2) learning, and (3) artificial (Klemperer, 1987). However, there are different classification such as search costs, learning costs, and emotional costs (Storbacka *et al.*, 1994). Transaction costs take place when a customer switches to another supplier. For instance, joining or start up fees for setting up a new service. Learning costs are those when "*a customer has to put in effort to reach to same level of comfort and facility with the new product or service as the old one*" (Seo *et al.*, 2008). Artificial or contractual costs are those developed by service provider, for example withdrawal penalties or loyalty benefits, to encourage retention of existing customers. The difference between switching costs is called perceived switching cost. However, perceived switching costs may not include non-financial switching costs. Shin and Kim (2007) argue that "*perceived switching cost rather than actual switching cost explains customer switching intention and affects the market outcome.*" As a result, perceived switching costs mainly used to retain customers. In simple words, customers may have different attitudes (negative, positive, or neutral) towards their future intentions (e.g. switching or repurchase). A customer with a negative attitude might still buy repeatedly because of switching costs and barriers. This also means that customer retention is not always based on a positive attitude, and long-term relationships do not necessarily require positive attitude and commitment from the customers. As the conceptual model is conducted in the mobile telecommunication services, switching cost (e.g., penalty) plays a significant role in customer switching intention. As a result, customers have been segmented into different groups with regard to the level of switching costs.

East *et al.* (2008) define Word of mouth (WOM) as "*informal advice passed between customers*". Keaveney (1995) reported that 50% of service provider replacements were found through word of mouth. Research shows that there is a strong theoretical underpinning that relates customer satisfaction, customer retention and customer loyalty. Word of mouth behaviour from loyal, satisfied customers decreases the cost of attracting

new customers and also enhances the corporate reputation, while negative word of mouth from dissatisfied customers, has the opposite effect (Danaher and Rust, 1996). According to the service management and marketing literature, there seems to be a limited number of empirical research studies that tackles the relationship between customer satisfaction, customer retention and customer loyalty (Hallowell 1996; Storbacka *et al.*, 1994).

In this thesis, customer loyalty is measured by customer word of mouth behaviour. In other words, customer loyalty is measured with regard to the customer willingness to recommend a service provider to friends or relatives based on his/her experience with the service. Figure 3.4 shows the service quality-customer behaviour conceptual model.

Figure 3.4: Service quality-customer behaviour model
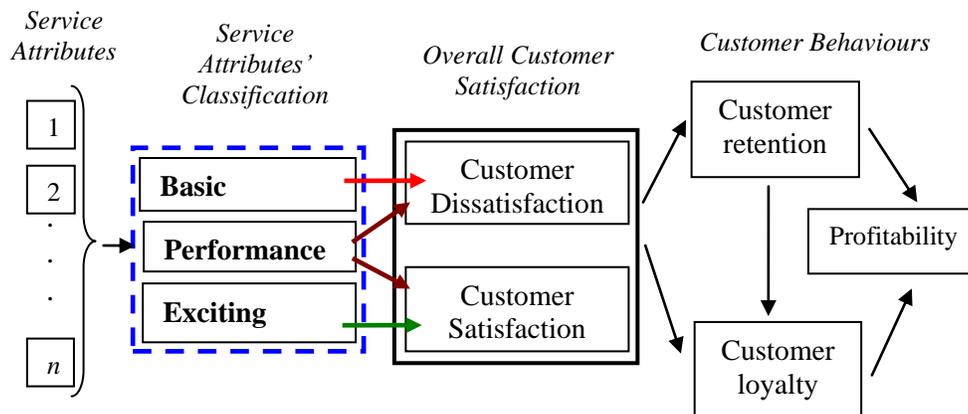
5. Length of Relationship

As it has been discussed in Section 2.6, combining customer insights with a segmentation scheme may help to marketing strategies tailored to particular segments and individuals. Segment-specific differences in the customer behaviour-profitability relationship have been the focus of research studies in recent years. So far, several studies have applied segmentation techniques to customer behaviour field (Reichheld, 1996; Rust *et al.*, 1994; Garbarino and Johnson, 1999; Mittal and Kamakura, 2000; Marple and Zimmerman, 1999; Kamakura *et al.*, 2000). Segmentation variables can be divided into two groups: psychological and demographic. The goal of segmentation, however, in many studies is to separate profitable customers from non-profitable customers. However, this study looks at the issue from proactive approach. By segmenting customers, companies can make profitable customer more profitable and push non-profitable to profitable group through service customisation. In reality, companies approach to customers in various ways, while some companies just design their service and product for rich people, some may target all segments and so on.

In this thesis, customer segmentation is implemented in order to investigate the impact of length of relationship on customer future intention such switching and word-of-mouth. By studying the mobile telecommunication services, it is learned that customer behaviour may vary with respect to the length of their relationship shown in Figure 3.5.

Figure 3.5 Customer segmentation
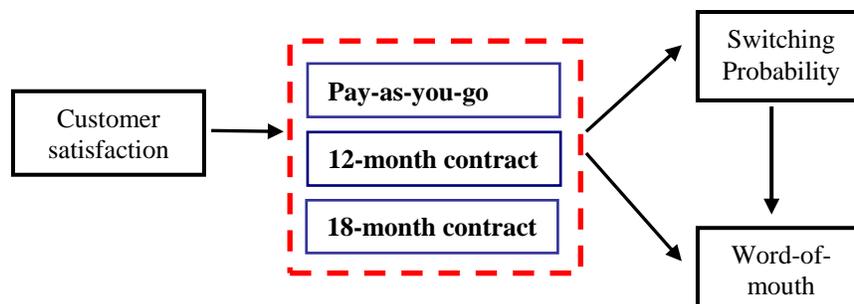
Such approach develops a better strategic view of profitability analysis for each segment (Anderson and Mittal, 2000). For example, Kamakura *et al.* (2000) compared the

retention-profitability for several branches of a bank in Brazil. They found that once the costs of maintaining customers in one segment takes the company 6 years to recoup the cost of recruiting new customers, in another segment, it would have taken more than 230 years. The next section considers testing main components of the conceptual model.

7. Testing the Conceptual Model (Service Quality-Customer Behaviour)

As discussed in Section 2, the relationship between service attribute performance and overall customer satisfaction is non-linear and asymmetric. This leads to the following hypothesis:

H1. There is an asymmetric relationship between service quality attributes and overall customer satisfaction.

As a result, service quality attributes can be classified into different groups with respect to their impact on overall customer satisfaction. In order to classify service attributes, the author proposes following hypothesises:

H1.1 For some service attributes, low performance has a greater impact on overall customer satisfaction than high performance with the same attribute (Basic factor).

H1.2 For some service attributes, high performance has the same impact on overall customer satisfaction as the same magnitude of low performance with the same attribute (Performance factor).

H1.3 For some service attributes, high performance has a greater impact on overall customer satisfaction than low performance with the same attribute (Exciting factor).

It is argued that customer satisfaction should be assessed based on two important factors of service attributes: importance and performance. In Section 3, the author discussed that

the correlation between service attribute importance and performance is not linear and symmetric. To do so, the following hypothesises are tested:

H2. There is an asymmetric and non-linear relationship between attribute performance and attribute importance.

H2.1 Attribute importance is a function of attribute performance.

Regarding attribute importance measurement, the results of direct and indirect methods may differ in which affect decision making process. As a result, the following hypotheses are tested empirically:

H3. Explicitly (self-stated importance) and implicitly (statistically inferred) derived importance of attributes may differ.

H3.1 Customer's self-stated importance is not a function of customer satisfaction.

In Section 4, the author discussed that the relationship between customer satisfaction and customer retention, thus, the following hypothesis proposed:

H4. There is an asymmetric correlation between customer satisfaction and customer switching intention.

In addition, switching costs significantly affect customer switching intention. In order to assess this relationship, customers are classified into contractual and non-contractual. It is learned that the customers from on-contractual segment are not involved or committed to supplier as there is little switching costs. Whereas in contractual segment, the customers face with penalties if they switch supplier. This distinction is important as it challenges the relationship between customer satisfaction and switching intention. This discussion leads to the following hypothesises:

H5. There is a positive and direct correlation between length of contract and customer switching intention.

H6. Higher levels of switching costs are associated with higher levels of switching barriers.

H7. Higher levels of perceived of switching barriers are associated with lower levels of switching intention.

Finally, it is argued that customer switching intention (retention) may affect customer word of mouth behaviour (loyalty), thus, the author would expect that these two constructs asymmetrically linked as it proposed below:

H8. There is an asymmetric relationship between customer retention and word of mouth behaviour.

Figure 3.6 shows the interaction between eight research hypothesises proposed for this study and the conceptual model.

Figure 3.6: Conceptual model to study service quality-customer behaviour the in mobile telecommunication industry
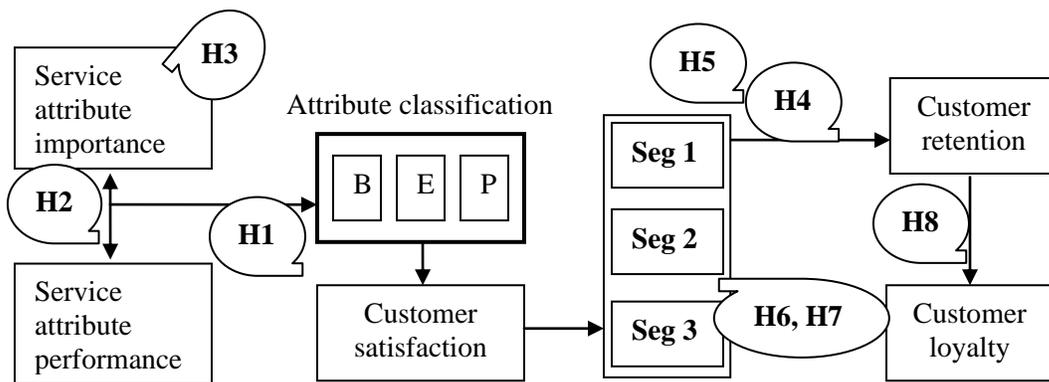
7. Chapter Conclusions

This chapter discussed various aspects of the service quality-customer behaviour model (Figure 3.4). Based on the literature review, it explained the interaction among components of the conceptual model. As a result, the chapter proposes eight hypothesises for testing the relationship between factors. Briefly, it is discussed that the relationship between service quality attributes and customer satisfaction is dynamic. There are significant difference between the key drivers of customer satisfaction and dissatisfaction. Consequently, service attributes can be classified into three groups: (1) Basic, (2) Exciting, and (3) Performance. In addition, it discussed and proposed that the relationship between attribute performance and attribute importance is non-linear which varies with respect to attribute classification. In other words, the relationship between service attributes importance and customer satisfaction may change when performance changes. The outcomes of this stage will help managers within the customer satisfaction management, resource allocation and strategic planning. This distinction is important as it leads to customised product and efficient resource allocation. It also argued that customer satisfaction is only one dimension in increasing relationship strength, where switching barriers may affect customer satisfaction-retention link.

Finally, the chapter proposed that the relationship between customer retention and customer loyalty (WOM) is asymmetric and nonlinear. It is argued that the length of relationship with supplier may not necessarily result in positive word of mouth behaviour. In testing the conceptual model in the practical arena, the author proposed eight research issues, which is presented in Table 3.2.

In Chapter 4, the author presents the research methodology used to test the aforementioned model and issues proposed for investigation.

Table 3.2: Proposed Issues for further investigation

Issue	Description	Hypothesis
Attribute performance-importance analysis	There is an asymmetric relationship between attribute importance and attribute performance. Attribute performance can be associated with a change of attribute importance.	H2 H2.1 H3 H3.1
Resource allocation	There is a nonlinear correlation between attribute importance and performance. Attribute importance depends on attribute performance.	H2 H2.1
Classification of quality attributes	There is a dynamic (asymmetric and nonlinear) relationship between service quality attributes (performance) and customer satisfaction.	H1 H1.1 H1.2 H1.3
customer satisfaction management	Without attributes' classification and importance-performance analysis, it would be impossible to manage customer satisfaction.	H1 H2 H3
Customer retention and loyalty	There is an asymmetric relationship between customer retention and customer loyalty.	H4 H6 H7 H8
Length of relationship	Customer behaviours (switching behaviour, word of mouth) would vary across different segments regarding the length of contract and switching costs.	H5

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4

CHAPTER 4

RESEARCH METHODOLOGY

This chapter develops an argument for choosing suitable methodologies for modelling and analysing the service quality-customer behaviour framework. Relevant mathematical techniques will be presented which will result into the justification of the approach that will be adopted.

1. Methods for Measuring Customer Satisfaction Factors

The measurement of customer satisfaction has received considerable attention from both academia and practitioners in the last two decades (Parasuraman *et al.*, 1991; Cronin and Taylor, 1992). Pearson and Wilson (1992) report that over 15,000 articles have been published on customer satisfaction measurement in the past 20 years. The main interest in customer satisfaction measurement is based on service quality attributes and to help managers to understand the relationship between these two elements

There are a number of methods for measuring customer satisfaction determinants. They include the critical incident techniques (CIT), importance grid, Kano's questionnaire, regression analysis with dummy variables (RADV), and the analysis of complaints and compliments. Following, the author discussed five popular methods for measuring customer satisfaction.

1.1 Analysis of Complaints and Compliments

First developed by Cadotte and Turgeon (1988a, b), the analysis of complaints and compliments is an analytical procedure that identifies the sources of complaints and

complements and estimates customer satisfaction. The rational for this method can be listed as:

- The dissatisfier or basic attributes elicits complaints when performance is low but does not elicit compliments when performance is high.

- The satisfier or exciting factors elicits compliments but does not elicit complaints.

- The performance or one-dimensional factors: cause both complaints and compliments.

This method classifies the service attributes into groups by rating the frequency of complaints and compliments. In this method rank-order numbers are used instead of the actual frequency values. This type of rank-order may cause ambiguity. The main reason is that it is generally known that complimenting rates are relatively is low comparing to complaining rates.

1.2 The Critical Incident Technique (CIT)

The method was developed by Flanagan in 1954. This method is similar to the analysis of complaints and compliments. The method classifies service attributes into three types: basic, exciting and performance. The basis for this procedure is that the basic attributes are never associated with satisfaction, the exciting attributes do not elicit dissatisfaction, and finally, the performance attributes can be associated with both satisfaction and dissatisfaction.

The customers are asked to indicate the antecedents of dissatisfaction and satisfaction for a specific service or product. The anecdotes are then associated with a list of attributes. The factor structure of customer satisfaction is estimated based on the frequency of each attribute. Several studies, in the field of service quality, have questioned the reliability of the CIT (Silvestro and Johnston, 1990; Stauss and Hentschel, 1992; Bakhaus and Bauer, 2000). Figure 4.1 illustrates an example of CIT application in the banking industry (Johnston, 1995).

The method has similar limitation as the analysis of complaints and compliments has with rank-order numbers. As a result, the reliability of the method can be questioned with respect to attribute classification as it uses rank-order numbers instead of the actual frequency values. Moreover, Johnston (1995) argues that the time that data collection undertaken may significantly affect the result of CIT. If the process of data collection takes place after the incidents (good or bad experience) then respondents perception may

Figure 4.1: An application of critical incident technique
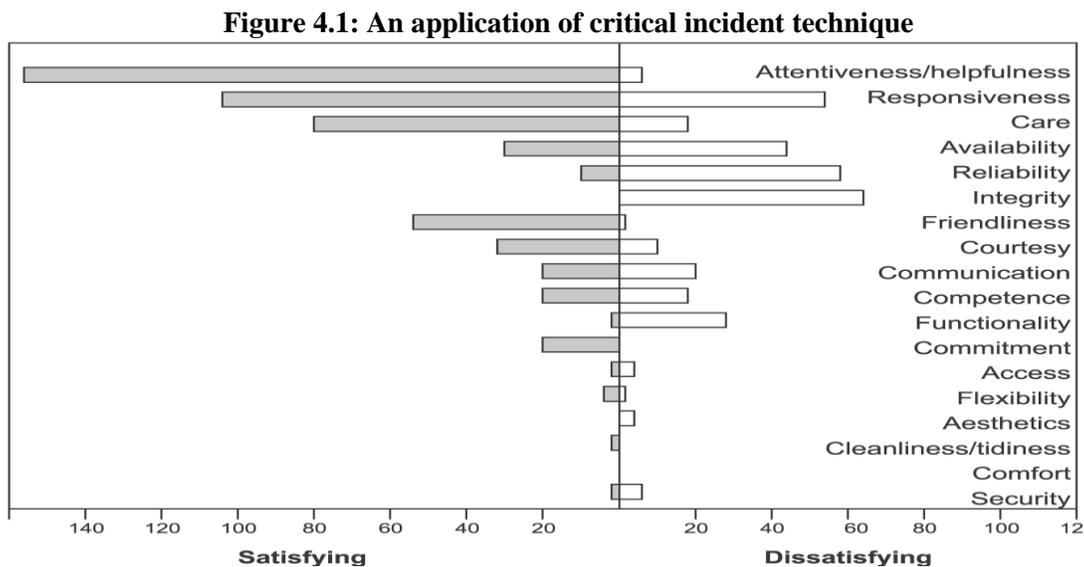
(Adopted from Johnston, 1995)

have been modified. However, this issue can occur with all methods that are based on customer data. The processing and analysing respondents' data makes the approach a complex method. The method is suggested for a small size. As a result, it may not be a suitable method in marketing research where a small sample is hardly representative of the target population.

1.3 Kano's Questionnaire

Kano (1984) developed a questionnaire to classify service attributes. For each attribute, a pair of questions was designed in which the respondent is asked to answer two questions: if the service attribute performed poor? and if the attributed performed well?,

using the 5-likert scale (extremely satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, and extremely dissatisfied). Next, the frequency of responds for each attribute was used for attribute classification. Figure 4.2 shows the Kano's evaluation table.

The limitation of this method is that the questionnaire becomes too long when many attributes are analysed. In addition, Busacca and Padula (2005) argue that the method has weak outcomes as it is based on frequency distribution of the responses. There is a probability that the boundaries between different categories are distorted. In general, the application is time consuming and costly and less suitable in practice.

Figure 4.2: Kano's questionnaire

If the attribute worked poor:	Extremely satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Extremely dissatisfied
If the attribute worked well:					
Extremely satisfied			A	A	O
Somewhat satisfied	R	R	I	O	M
Neither satisfied nor dissatisfied	R	R/I	I	I	M
Somewhat dissatisfied	R	R/I	R/I	R/I	
Extremely dissatisfied	R	R	R	R	

(Adopted from Kano's 1984)

O = one dimension or performance factor
A= attractive or exciting factor
I = Indifference factor
R = reverse factor
M = must be or basic attribute

1.4 Importance Grid

The method was first introduced by the IBM Consulting Group. It is a two dimensional grid based on implicit (statistically inferred) and explicit importance ratings (customer's self-stated) (Varva 1997; Homburg and Warner, 1998). Figure 4.3 illustrates the two-dimensional importance grid. Such approach differentiates service/product based on:

- Basic attributes: high explicit and low implicit
- Exciting attributes: low explicit and high implicit
- Performance attribute: high explicit – high implicit, low explicit – low implicit

The application is a user-friendly approach and based on a typical customer satisfaction survey data (service attribute performance and overall satisfaction) which makes it suitable for being employed in customer satisfaction surveys. However, the reliability of this method has not been tested so far. As we discuss later in Section 2, there are several methods for measuring the importance of service attributes in which the result of each method may vary (Pezeshki and Mousavi, 2008).

Figure 4.3: The importance grid - Adopted from Varva (1997)

1.5 Regression Analysis with Dummy Variables (RADV)

The RADV method classifies attribute performance ratings into three groups: high performance (1,0), average performance (0,0), and low performance (0,1). Based on this coding scheme, two regression coefficients are obtained for each attribute, one to measure the impact when the attribute performance is low, and the other one when the

attribute performance is high. If the positive coefficient is significantly greater than the negative coefficient, then the attribute associated to the exciting factor. On the other hand, if the negative coefficient is significantly greater than the positive coefficient, then the service attribute that is associated to the basic factor. Finally, if the positive and negative coefficient is relatively close, then the service attribute associated with the dimensional or performance factor. This method has proved to be a reliable method for service attribute classification when compared to other methods. The method is also a user-friendly approach since it based on customer satisfaction survey data (service attribute performance and overall satisfaction). To date the attempts employed by practitioners to account for non-linear and asymmetric response of customer satisfaction to service quality attributes are based on the application of the regression with dummy variables.

All these arguments suggest that the regression analysis with dummy variables seem the more suitable method in the real world applications. The method can be carried out for a sample population. It provides a measure of the relative importance of attribute performance based on overall customer satisfaction. Based on the proposed discussion above, Figure 4.4 shows how service attributes are classified with respect to their impact customer satisfaction, using RADV. Next section considers the methods for measuring service attribute importance.

Figure 4.4: Service quality attributes – customer satisfaction
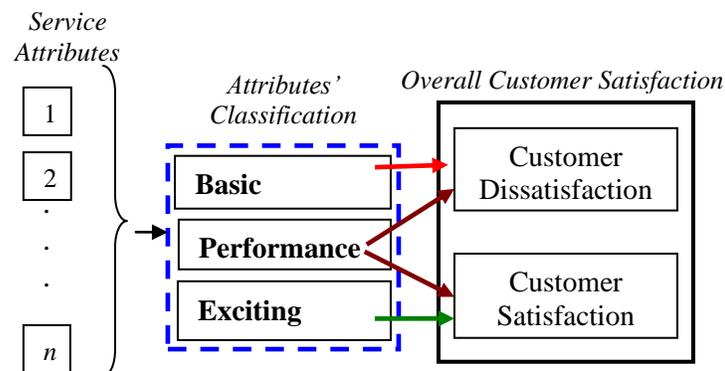
2. Techniques for Measuring Service Attribute Importance

The importance of service attribute performance in service industries has accelerated over the past twenty years (Danaher, 1997). Much of this importance has been driven by the impact of service quality on customer satisfaction-levels, customer retention rates, and degree of customer loyalty (Bolton and Drew, 1991; Boulding *et al.*, 1993; Buzzel and Gale, 1987; Danaher and Rust, 1996; Rust *et al.*, 1994; Woodside *et al.*, 1989). Determining the relative importance of service and product attributes is one of the primary objectives of customer satisfaction measurement. Typically, performance is evaluated on a rating scale whereas importance can be either rated by the respondents or calculated on the basis of performance (Oliver, 1997).

There are two popular methods for measuring importance of service attribute: direct (customer self-stated importance) and indirect (statistically inferred importance). The previous research reports that the relative importance of service attributes depends on whether it is customer stated or statistically inferred based. Indentifying the importance that consumers place on the service attributes that affect overall customer satisfaction, as a mediating attribute, which in turn affects customer retention (e.g., repurchase intention) and customer loyalty (e.g., feedback and word of mouth) is an important criterion for resource allocation process. Thus, the study of importance of service attributes has been one of central topics in consumer relationship and market research for decades (Figure 4.5). Moreover, the focus of attribute importance has shifted from traditional evaluations of service concepts within controlled settings, such as conjoint analysis (Green and Srinivasan, 1990) and choice modelling (Gaudagni, and Little, 1983), to understanding the determinants of behaviours and intentions (Gustafsson, and Johnson, 1997; Ryan *et al.*, 1999).

Figure 4.5: The three dimensions of attribute importance
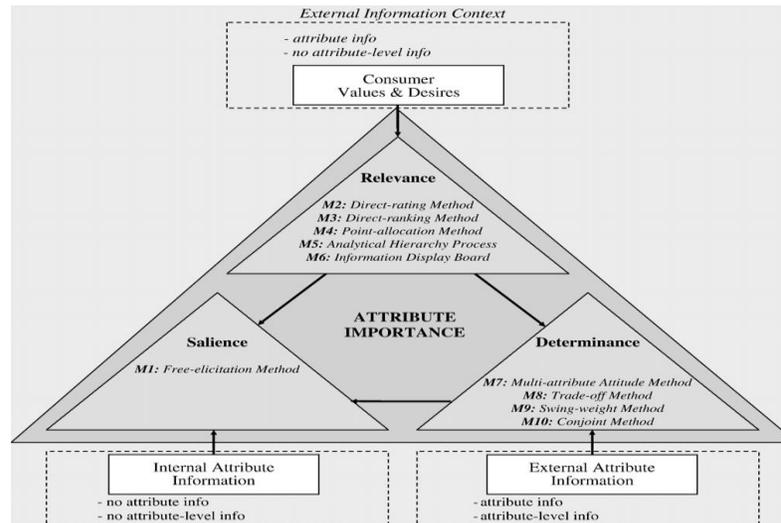
(Adopted from Ittersum *et al.*, 2007)

2.1 Customer Self-Stated Importance (Direct Method)

A common approach to execute a quality improvement strategy is to identify and select the key performance indicators (KPIs). With customer self-stated importance method, through surveys customers are directly asked to rate the importance of service or product attributes based on their preferences (Danaher and Mattsson, 1994; Rust *et al.*, 1993). Techniques such as rating scales and constant sum scales are normally used for customer self-stated importance. In this approach, the basic attributes normally get the highest level of importance. Being basic attributes, they have little impact on overall customer satisfaction even if their performance levels are high.

The exciting attributes are expected to be less important than basic attributes. Subsequently the importance levels of performance attributes will be rated somewhere between basic and exciting attributes. Previous studies reveal that there is a cause-effect relationship between service attribute performance and attribute importance (Matzler *et al.*, 2004; Oh, 2000; Pezeshki and Mousavi, 2008). In other words, attribute performance and importance are inter dependent (Matzler and Sauerwein, 2002). Therefore, direct methods do not adequately measure the actual relative importance of attributes. The

reason is that respondents may not take into account the current level of attribute performance. For instance in airline industry, if customers are asked about importance of safety, mostly rank it as the most important factor, at the same time this factor does not generate additional satisfaction if it is fulfilled. To adhere this problem, practitioners usually use statistical methods such as regression analysis and structural equation modelling (SEM).

For the purpose of evaluating service attribute importance (customer self-stated), we employ a methodology by Abalo *et al.* (2007). To doing so, respondents were asked to rate the three (k = 3) most important attributes; from "1 = most important" to "3 = least important". In order to assign each attribute (*i*) an importance value (P_i) lying between 0 and 1 (using equation 4.1), we integrate the ranked assigned by respondents (using Equation 1) to a ranking score (h_{ij}) using Equation 4.2.

$$h_{ij} = \begin{cases} (k - g_{ij} + 1)/k & g_{ij} \text{ not void} \\ 0 & \text{otherwise} \end{cases} \tag{4.1}$$

$$P_i = (n^{-1} \sum_j h_{ij})^{k/s} \tag{4.2}$$

Where;

n = number of respondents/raters
k = top k preferences
s = number of attributes
i = attribute (*i* = 1,…, n)
j = respondent/rater (*j* = 1,…, n)
g_{ij} = the rank assigned to the *i*-th attribute by the *j*-th respondent
h_{ij} = the normalised g_{ij} that lie between 0 and 1
P_i = importance value of attribute *i*

2.2 Statistically Inferred Importance (Indirect Method)

In this method, the importance of attributes is inferred from customer satisfaction or product performance surveys. The data is then analysed by one of statistical methods such as multiple regression analysis or structural equation modelling (SEM), normalised pair wise estimation, and partial least squares models (Danaher and Mattsson, 1994; Wittink and Bayer, 1994; Taylor, 1997; Varva, 1997; Anderson and Mittal, 2000; Chu, 2002). Therefore, the results from such indirect methods may differ from direct methods as they elicit importance weights regarding the current level of performance.

For the purpose of measuring attribute importance, using indirect method, we employed multiple regression analysis. The method simply regresses the relative performance ratings of service attributes against dependent variable (overall customer satisfaction) to generate significant-level for individual attribute. As a result, the service attribute with the greatest slope parameter will result into larger increase in overall customer satisfaction per unit increase in service attribute performance. In simple words, the linear compensatory model operationalised by regressing overall customer satisfaction on the performance scores of the service quality attributes (Rust *et al.*, 1994; Parasuraman *et al.*, 1988; Danaher and Mattsson, 1994). According to literature, multiple regression analysis seems to be a suitable tool for measuring attribute importance.

The statistical nature of this approach makes it a suitable analytical technique. One of the advantages of regression analysis is that the method provides a model for all attributes and forms an overall rating. As a result, multiple regression analysis estimates the degree of influence that attributes have in determining customer satisfaction. The primary problem with this approach is the multicollinearity among the independent variables.

$$\text{Overall Customer Satisfaction} = \alpha_0 + \alpha_1 X_1 + \ldots + \alpha_n X_n + \varepsilon \qquad (4.3)$$

Next section considers an analytical method called importance-performance analysis (IPA). The method uses importance and performance of service attributes for customer satisfaction management and resource allocation.

3. Analytical Methods

3.1 Importance-Performance Analysis (IPA)

Importance-performance analysis (IPA) is a method for measuring customer satisfaction introduced by Martilla and James (1977). 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 example, 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: First, performance and importance of attributes are independent variables (Martilla and James, 1997; Oliver 1997; Bacon 2003), and second assumption there is that a symmetric and linear relationship exists 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 describes the levels of concentration of managerial initiatives in the quadrants (in this case II and IV – see Figure 4.6). In contrast, a negative association between importance and performance 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

Figure 4.6: Traditional importance-performance analysis (IPA) grid

		Quadrant I: Improvement efforts should be concentrated on the attributes of this cell (major weakness).
Quadrant I High Importance Low Performance	**Quadrant II** High Importance High Performance	**Quadrant II:** Keep up the good work (major strength).
Quadrant IV Low Importance Low Performance	**Quadrant III** Low Importance High Performance	**Quadrant III:** Low priority efforts should be spent on the attributes of this cell (minor strength). **Quadrant IV:** Unnecessary to spend present efforts on the attributes of this cell (minor weakness).

(Vertical axis label: **Attribute importance**)

Attribute performance

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).

4. Statistical Methods for Measuring the Relationship between Service Attribute performance and Customer Behaviours

4.1 Multiple Regression Analysis with Dummy Variables

In order to identify the asymmetric impact of attribute performance on attribute importance, a regression analysis with dummy variables was proposed by Anderson and Mittal (2000), Brandt (1998), Matzler and Sauerwein (2002). Here, two sets of dummy variables were defined; the first set dummy of variables quantify as basic attributes, and

the second ones quantify as exciting attributes. 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 will be obtained.

$$Sat_{total} = \alpha_0 + \alpha_{1Att_1} \times dummy_{1Att_1} + \alpha_{2Att_1} \times dummy_{2Att_1} + ... +$$
$$\alpha_{1n} \times dummy_{1Att_n} + \alpha_{2n} \times dummy_{2Att_n} \qquad (4.4)$$

Where Sat_{total} is the overall customer satisfaction, and n is the number of quality attributes (n = 7), $dummy_1$ indicates the lowest customer satisfaction level, $dummy_2$ indicates the highest customer satisfaction levels, α_1 is the incremental decline in overall satisfaction associated with low satisfaction levels, and α_2 is the incremental increase in overall satisfaction associated with high satisfaction levels. In this case, multiple regression analysis can be inappropriate if multicollinearly exists within the independent variables (Matzler *et al.*, 2004). In the case of multicollinearly, partial correlation analysis with dummy variables and multiple regression with natural logarithmic dummy variables are proposed to be more suitable (Ting and Chen, 2002; Matzler *et al.*, 2004; Brandt, 1988; Anderson and Mittal, 2000; Hair *et al.*, 1995).

4.2 Binary Logistic Regression Analysis

Despite the similarities between linear regression and logistic regression, linear regression can not be applied to a situation in which the dependent variable is categorical or dichotomous. The linearity assumption of linear regression will be violated when the dependent variable is dichotomous (Berry, 1993). Since the probability of an event must lie between 0 and 1, it is impractical to model probabilities with linear regression technique, because linear a regression model allows the dependent variable to take values greater than 1 or less than 0. One solution for this issue is to transform the data using the logarithmic transformation (Berry and Feldman, 1985, and chapter 3). There are two forms of logit models that are suitable for this type of modelling; "logit models" and "logistic regression models". According to literature, the distinction between two

models, sometime, is based on whether continuous explanatory variables are included in the set of *X* variables (Liao, 1994) or not. Logit models used (equation 4.5) for categorical variables, and logistic regression models within mixed categorical and continuous variables.

$$Log\left[\frac{P(y=1)}{1-p(y=1)}\right] = \sum_{k=1}^{k} \beta_k \chi_k \qquad (4.5)$$

Equation 4.5 expresses the multiple linear regression equation in logarithmic terms. The independent variables are estimated by using the maximum-likelihood estimation, which selects coefficients that make the observed values that were most likely to occur. In this thesis, logistic regression is used for estimating the relationship between customer satisfaction and switching intention. The method is useful for situations in which you need to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. Logistic regression is multiple regression but with categorical dependent variable, and continuous or categorical independent variables. In other words, which of two categories (black and white) a person or an event is likely to belong to given certain other information. Mathematically, logistic regression predicts the probability of Y occurring given known values of X_1 or X_n; see equations 4.6 and 4.7, while ordinary regression predicts the value of a variable Y from a predictor variable X_1 or several predictor variables X_n. The resulting value of Y is a probability value that varies between 0 and 1, see Figure 4.7. A value close to 0 means that *Y* is very unlikely to occur and value close to 1 means that *Y* is very likely to occur.

$$P(Y) = \frac{1}{1+e^{-(\alpha+\beta X_1+\varepsilon_i)}} \qquad (4.6)$$

$$P(Y) = \frac{1}{1+e^{-(\alpha+\sum \beta_i X_1+\varepsilon_i)}} \qquad (4.7)$$

P(Y) is the probability of customer switching intention; α is a constant, β is the estimated coefficients, X_i are the independent variables, and ε is the base of natural logarithm. According to equations 4.6 and 4.7, the probability of switching behaviour increases with a unit increase in the independent variable when a coefficient of independent variable is positive. In this research work the logistic regression technique is used to construct a model to predict and classify customer data.
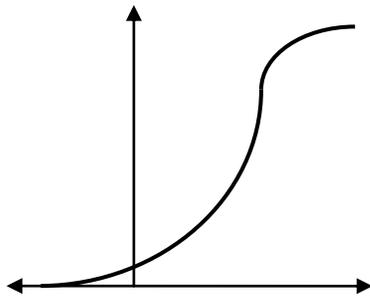
Figure 4.7: Logistic Regression   **Linear Regression**
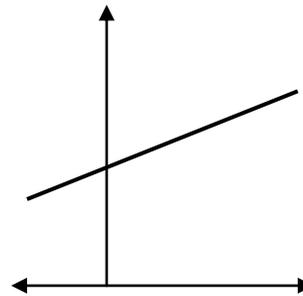
4.3 Logistic Regression with Dummy Variables

In order to identify the asymmetric impact of overall customer satisfaction on customer switching intention (CSI), a binary logistic regression analysis with dummy variables will be used (Equation 4.8). Accordingly, two sets of dummy variables; the first dummy variable evaluates the impact of customer dissatisfaction, and the second dummy variable evaluates customer satisfaction. The overall customer satisfaction 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 will be obtained.

$$\text{Customer Switching Intention} = \frac{1}{1 + e^{-(\alpha_0 + \alpha_{1.Disatisfaction} \times dummy_1 + \alpha_{2.Satisfaction} \times dummy_2)}} \qquad (4.8)$$

CRP is the customer retention probability, $dummy_1$ indicates lowest customer satisfaction level, $dummy_2$ indicates highest customer satisfaction levels, α_1 the

incremental decline in overall customer satisfaction associated with low satisfaction levels, and α_2 the incremental increase in overall customer satisfaction associated with high satisfaction level.

4.4 Structural Equation Modelling (SEM)

Structural equation modelling (SEM) is a statistical technique for evaluating causal relationships using a combination of statistical data and qualitative causal assumptions. However, this technique is suited for confirmatory rather than exploratory modelling. In simple words, it is a cause-effect modelling technique that provides a quantitative assessment of relationships between variables. The method can be employed for two purposes; (1) validation of theoretically based causal relationships, and (2) prediction of the latent variables.

Effect = f (specified causes, unspecified causes)   (4.10)

In other words, SEM is a statistical model that explains the relationship between dependent and independent variable. Similar to multiple regression equation, the technique examines the structure of the relationships expressed in a series of equations. By using SEM, each variable needs to be linked to its theoretical construct in a reflective manner.

Using SEM technique, a confirmatory factor analysis (CFA) is computed and the relationships are tested using with the AMOS 7.0 software. The sample size of 200 is seemed to be sufficient for SEM (Spector 1992; Hair *et al.*, 1995). The reason is that small sample sizes are not compatible with maximum likelihood (ML) estimation of covariance structure models. However, Fornell (1983) reported that ML can be justified when the sample size minus the number of parameters to be estimated exceeds 50.

In order to test hypothesises defined in this thesis, a case study conducted in the mobile telecommunication industry. Next section discusses the UK mobile telecommunication industry.

5. Case Study: Mobile Telecommunication Services

The industry of study for this thesis is the UK mobile telecommunication industry. There has been rapid technological growth over the last 10 years in the mobile telecommunication market. The number of mobile subscriber per 100 fixed lines has nearly doubled from 2000 to 2004 year, whereas this growth was much larger in 1990s. Ofcom (2007) reported that mobile services account for 53 per cent of total telecom revenues. The UK has one of the largest mobile markets in Europe, served by six major operators: Vodafone, Orange, T-Mobile, Virgin, O2 and 3-network. The following are additional information regarding the UK telecommunication:

- There are over 73.4 million mobile subscribers in the UK in 2007 including more than 115 subscriptions per hundred people (source: research markets).
- People in the UK send 43 billion texts, an average of 621 per mobile user.
- The number of landlines fell by 5 per cent to 34 million homes.
- The number of mobile-only households in the UK has risen to around 13 per cent.

The fierce competition have forced firms to concentrate their resources on packaging service bundles and line service promotions, and providing mobile searching and advertising facilities. The UK is one of the leading countries in Europe for the telecommunications industry. It has one of the most open and competitive telecoms market in the world. Some incentives like liberal market regime, access to leading-edge technology, and substantial deregulation has attracted lots of telecommunication operators, service providers and manufacturers to the UK telecoms market. In a market characterised by high acquisition costs and falling growth, companies have focused strongly on customer retention. The migration to longer contracts is a key trend across the mobile telecoms industry. Until 2005, the maximum contract length available was 12 months; in the first three of months of 2007, 79% of new contracts were for 18 months or longer (shown in Figure 4.8). In July 2007 the lunch of a 24-month contract by O2 meant that all five network operators were offering customers two-year contracts.

Figure 4.8: Lengths of new mobile contract connections (Source: Ofcom)
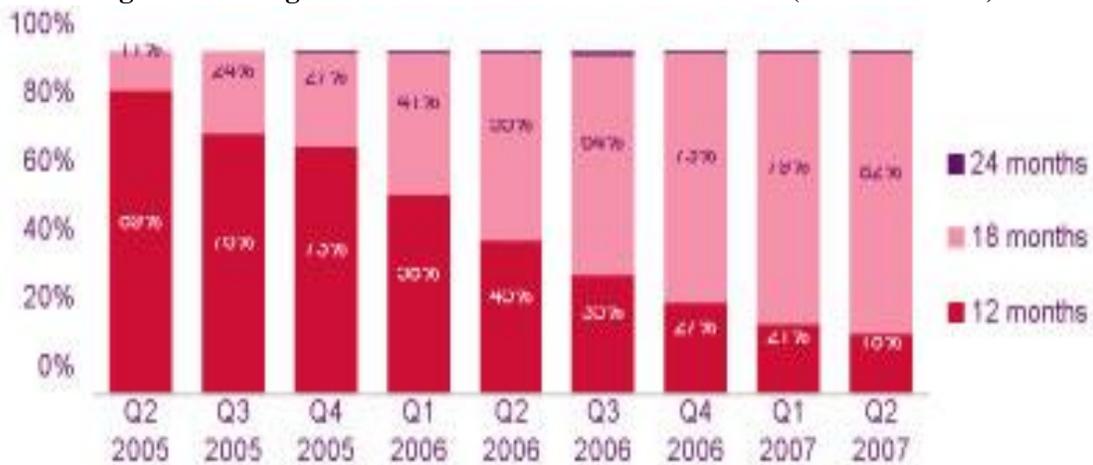
UK revenues from mobile telephony includes calls and fixed charges, connection, picture and text were about £9bn annually in 2003 (Ofcom, 2007). There is evidence of accelerating substitution of fixed calls by mobile calls (shown in Figures 4.9 and 4.10), driven by falling mobile prices and an increasing number of mobile contracts with a large number of inclusive minutes.

Figure 4.9: UK total outbound call volumes (Source: Ofcom)
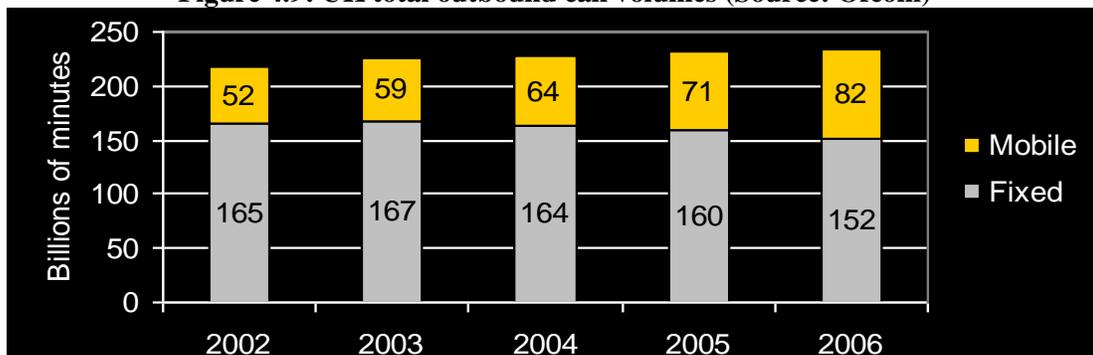
Despite further growth in the number of mobile phone connections coming primarily from ownership of multiple handsets (at the end of 2006 there were 69.7 million active mobile connections, compared to the UK population of around 70 million), average outbound calls per mobile connection rose to over 100 minutes for the first time in 2006, with average call per fixed line falling below 300 minutes (Ofcom, 2006). In addition, Figure 4.11 presents real costs of a basket of residential telecoms services. Interestingly,

customer usage of broadband and fixed voice calls has significantly decreased in the past few years. Following section discusses the data collection and research instrument in this study.

Figure 4.10: Household spends on telecommunication services (Source: Ofcom)
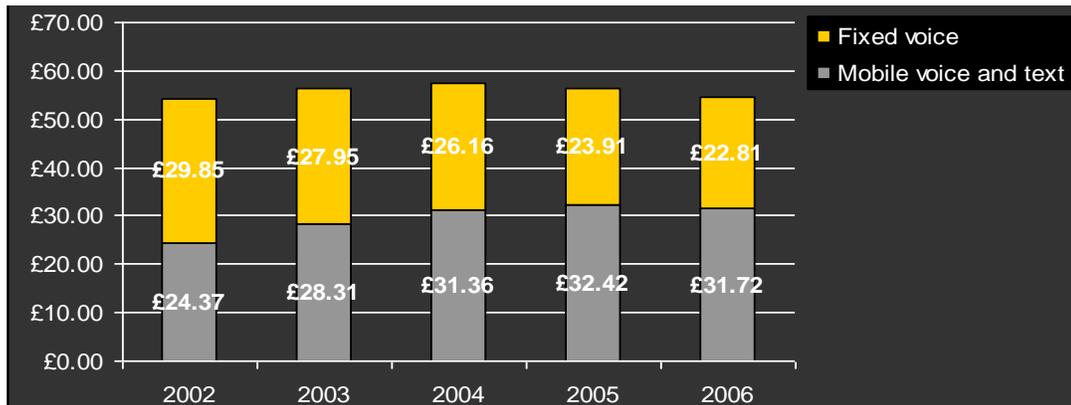
Figure 4.11: Real costs of a basket of residential telecoms services (Source: Ofcom)
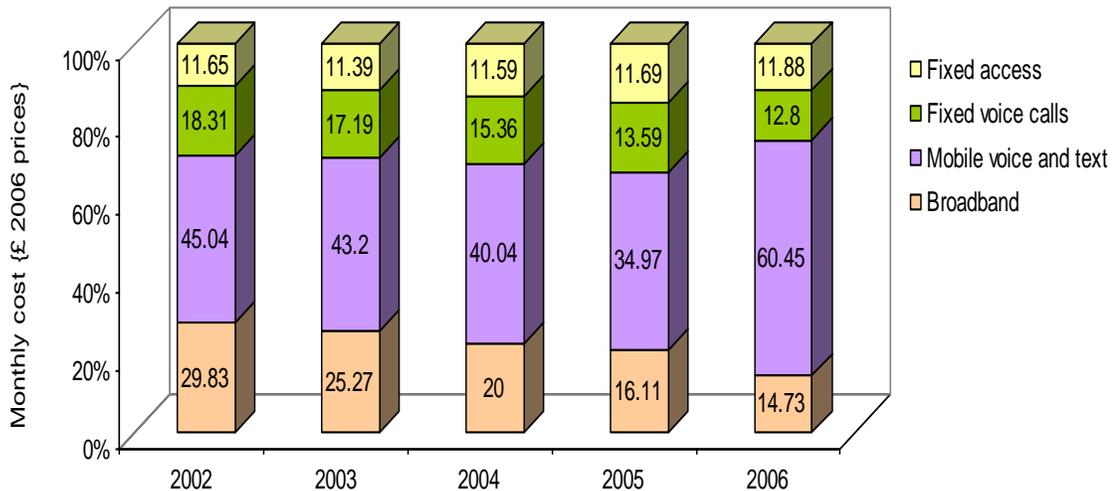
6. Data Collection and Research Instrument

This thesis utilised quantitative surveys for data collection (Appendix A). Data are collected by face to face interview and analysed by standard statistical techniques to establish relationships between variables. The research survey instrument was a self-administered questionnaire. In order to have consistent responses, respondents were selected from similar age groups and job profile. As a result, the questionnaire was distributed among students of the Brunel University. The sample consists of 270 respondents. From this sample, 74.4% of the respondents were under 27 years old. This consistency helps with outcomes, as customers from different groups in terms of age and occupation are likely to have different behaviours.

Regarding the sample size, the traditional rule suggested that a study has at least 10-15 participants per variable. Later some studies recommended 5-10 participants per variable up to a total of 300 (Kass and Tinsley, 1979). Comrey and Lee (1992) stated that a sample size of 300 to be sufficient, 100 as poor and 1000 an excellent. Moreover, Spector (1992) and Hair *et al.*, 1995 declare that the sample size of 200 is seemed to be sufficient.

Several studies strongly recommended pre-testing questionnaire to detect deficiencies in design, administration and question wording (Robson 1993; Remenyi *et al.*, 1998). For this reason, the questionnaire was pre-tested by administrating it to students that had been contacted and participated in the pilot study. A random sample of 30 students were selected and interviewed. Pre-test respondents took between 10 and 15 minutes to complete the questionnaire. Results of the pre-test led to minor wording changes and design within the questionnaire structure.

There is no consensus over Likert scale in terms of how many points should be used. It is, however, suggested to use 5 or 7 points rather than 9 points in order to reduce respondent confusion and time (Mentzer *et al.*, 1999; Robson, 1993). In addition, Likert argued that "*it seems justifiable and to use this assumption as the basis for combining the different statements*" (1932, p.22). Spector provided four characteristics of rating

scales: "*a scale must contain multiple items… each individual item must measure something that has an underlying, quantitative measurement continuum… each item has no right answer… and each item in a scale is a statement and respondents are asked to give ratings about statement*" (1992, p.1). Furthermore, he supports this format scale through three reasons: "*it can produce scales that have good psychometric properties – that is good reliability and validity… it is relatively cheap and easy to develop… and it is usually quick and easy for respondents to complete and typically does not induce complaints from them*" (1992, p.2).

Main attributes of mobile phone services were extracted and adopted from previous studies (Botton and Drew, 1991; Kim and Yoon, 2004; Busacca and Padula, 2005; Ofcom). In addition, in the pilot study, participants were asked to comment on service attributes variety. As a result, 9 different attributes selected for measuring the performance mobile services in the UK; network performance, customer service quality, brand image, range of services, service plans, range of phones, accuracy of billing and payment, value for money, and entertainment features, see Appendix A.

For measuring service attribute importance, participants were asked to rank the three most important attributes out of 9 attributes. The data of this section used for measuring service attribute important using direct method.

Participants were asked to rate the performance of service attributes based on a 7-point scale ranging from "1=poor" to "7=Excellent". For measuring customer satisfaction (CS), participants were asked to comment on the statement "What is your overall satisfaction level towards your mobile phone and service provider?", using a 7-point scale anchored with the reply options "1= Strongly dissatisfied" to "7 = Strongly satisfied". For measuring customer switching intention (SI) or customer retention (CR), participants were asked "whether they would consider switching to a better offer from another service provider?" (Russ and Zahorik, 1993). Answers had to be given on a 2-point scale either "Yes" or "No". Table 4.1 reports data distribution of the CR indicator in this sample data. The reason for measuring customer retention on binary scale is that customer retention has defined as switching intention based on experience with a service

provider. To measure customer word of mouth (WOM) or customer loyalty (CL), an indicator of willingness to recommend a product or service to others was indentified. Reichheld (2003) argues that recommend intention is by far the best indicator of actual customer loyalty behaviour. Therefore, participants were asked to about the extent their experience, and would recommend their own network operator to friends or relatives. Participants were provided with a five-point scale ranging from "1 = I would highly oppose" to "5 = I would highly recommend".

Table 4.1: Distribution of answers for variables customer satisfaction, customer loyalty, and customer retention

	Percentage frequency of answers for scale level (Low ---> High)							M^b	S	n
Variables	1	2	3	4	5	6	7	M^b	S	n
Customer satisfaction	2.6	3.4	6.4	13.2	19.5	48.1	6.8	5.15	1.36	266

	Percentage frequency of answers for scale level (Low ------------------------> High)					M^b	S	n
	1	2	3	4	5	M^b	S	n
Customer loyalty	2.3	5.3	28.8	45.8	17.8	3.72	.897	264

	Unlikely to switch	Likely to switch	n
Customer retention	38.8	61.2	268

M^b = mean value, S = standard deviation; n = number of valid answers received

7. Chapter Conclusions

This chapter provided a rational for the research approach and methods undertaken in this thesis. It first justified the quantitative research approach within the context of the service quality-customer behaviour shown in Figure 3.5. Table 4.2 lists the analytical and statistical methods employed in this thesis. Next, the industrial sector of UK mobile

telecommunication was discussed. The chapter introduced and discussed the framework of research instrument in terms of measurement scales and constructs. The application of the two-stage approach including the pilot and main study were outlined, and finally data collection and research instrument were briefly introduced as a precursor to more detailed discussions in Chapter 5 regarding the data reliability and validity.

Table 4.2: Analytical and statistical methods

Method(s)	Issue
-Multiple regression analysis -Customer self-stated importance (Abalo *et al*. 2007)	Measuring attribute importance
-Importance-performance analysis (IPA) -Multiple regression with dummy variables	Customer satisfaction management Resource allocation
-Structural equation modelling (SEM) -Regression with dummy variables	Service attribute performance-customer satisfaction
-Logistic regression -Logistic regression with dummy variables	Customer satisfaction-customer switching intention
-Logistic Regression analysis with dummy variables	Customer switching intention-customer loyalty (WOM)

Finally, in Table 4.3, the author summarises the outcomes of this chapter, through highlighting the major decisions and justification made to conduct this research.

Table 4.3: Summary of the research design

Level of Decision	Choice for the Specific Research Setting	Chapter/Section
Research Topic	Three Dimensional Modelling of Customer Satisfaction, Retention and Loyalty for Measuring Quality of Service	3
Case Studies Research Timeline	Mobile Telecommunication - UK	4.6 and 4.7
Research Approach	Qualitative and quantitative	3 and 4
Research Strategy	Case Study	4.4 and 4.5
Data Collection Research Methods	(a) Interviews (b) Questionnaire	4.6
Data Analysis	Analytical and statistical analysis	5 and 6

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5

CHAPTER 5

DATA Validity and Reliability

Testing the validity and reliability of survey data is the perquisite for data analysis and inference. This chapter is organised into two parts; in the first part the reliability of the questionnaire is tested. In the second part, the factor analysis is conducted which aims to validate the survey questionnaire.

1. Reliability Analysis

Reliability analysis tests whether a scale consistently reflects the subset it measures (Churchill, 1979; Dunn *et al.*, 1994; Nunnally and Bernstein, 1994). By consistency it is firstly meant that a respondent should score questionnaire the same way at different times. Secondly, two respondents with the same attitude towards a product/service be able to identically score the survey. Thus, scale reliability is a necessary prerequisite for survey validity test (Carmines and Zeller, 1979; Lam and Woo, 1997).

Split-half could be one of the most suitable method to test survey reliability (Field, 2005). This method randomly splits the data set into two and conducts correlation testing. In other words, a score for each participant is calculated based on each half of the scale. If the scale is reliable, then the scores from the two halves of the questionnaire should correlate perfectly. It is argued that the method used for splitting the data into two can affect the results of reliability analysis. Cronbach (1951) introduced a method that is equivalent to splitting data into two parts in every possible way (Cronbach's α). The

method is the most common measure of scale for reliability testing (Nunnally and Bernstein, 1994; Flynn and Pearcy, 2001).

$$\alpha = \frac{N^2 \, \overline{Cov}}{\sum s_{item}^2 + \sum Cov_{item}}$$
(5.1)

Where;

N = number of items
$\overline{Cov}$ = average covariance between items
S = variance within items

In this thesis, the Cronbach's α is used as measure of internal scale consistency, using SPSS (Statistical Package for the Social Sciences). According to Field (2005), values between 0.7 and 0.8 of Cronbach's α are acceptable values of consistency. Any values less than that would be considered as unreliable. The overall Cronbach's α for the surveys designed for this study is 0.839 (Table 5.1). Table 5.2 reports on the reliability analysis. The values in the column labelled *Corrected Item-Total Correlation* indicate measurable estimate. The values in the column labelled *Cronbach's Alpha if item deleted* indicate the values of the overall α when an item with survey is omitted. All Cronbach's α values in that column are in the close approximation of one another, which indicates good reliability of the date. Furthermore, none of the items in the column are greater than overall Cronbach's α. This means the deletion of any item would not improve reliability. However, Field (2000) argues that removing the item at this stage may not significantly improve reliability. In addition, further omitting of any item from the survey may affect the accuracy of the factor analysis. The other column labelled *Corrected Item-total Correlation* shows the correlations between

Table 5.1: Reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.839	0.840	9

the values of each item and the total score from the questionnaire. For these data, all the data have, *Item-Total Correlations*, above 0.3 which means that all items correlate with the total.

Table 5.2: Item-total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Network performance	40.13	60.009	.425	.253	.836
Customer service quality	40.68	57.532	.527	.312	.825
Brand image	40.36	59.379	.546	.384	.824
Range of services	40.27	57.792	.634	.439	.815
Service plans	40.44	58.757	.474	.387	.831
Range of phones	40.54	58.364	.525	.368	.825
Accuracy of billing and payment	40.39	56.482	.575	.365	.820
Value for money	40.63	52.732	.725	.593	.802
Entertainment features	40.87	57.224	.541	.368	.824

The result of Cronbach's α shows that the results extracted from the questionnaire is highly reliable. Next section considers data validity by implementing factors analysis.

2. Exploratory Factor Analysis

Factor analysis is a statistical technique used to identify and explain the correlations among variables. Furthermore, the method identifies the relationship between variables that may indirectly be connected. The technique can be adopted:

1) to understand the structure of a set of variables
2) to construct a questionnaire to measure an underlying variable
3) to reduce a data set to a more manageable size

The first output of the preliminary analysis is based on descriptive statistics. Table 5.3 contains descriptive statistics for the mean and standard deviation of each attribute. This information reveals that the highest agreement between correspondents' responses is for "network performance" and the smallest agreement is for "range for phones".

Table 5.3: Item statistics

	Mean	Std. Deviation
Overall satisfaction	5.28	1.287
Network performance	5.41	1.428
Customer service quality	4.86	1.469
Brand image	5.18	1.249
Range of services	5.27	1.254
Service plans	5.10	1.455
Range of phones	4.99	1.389
Accuracy of billing and payment	5.15	1.479
Value for money	4.91	1.549
Entertainment features	4.67	1.474

In order to test multicollinearity within the customer data set, a correlation matrix is constructed, using the SPSS tool. The analysis produces a matrix indicating the significance of the value of each correlation. Table 5.4 shows the results of the implementation of the correlation matrix or *R*-matrix that generates the coefficients and significance levels. The first part of the table contains the Pearson correlation coefficient between all service attributes whereas the second part contains the one-tailed significance of these coefficients. The correlation matrix can be used to check the pattern of relationships. For these data, the significance value (*P*) of majority of attributes (variables) is greater than 0.05 apart from *service plans*. In addition, all correlation coefficients are less than 0.9. The determinant of the correlation matrix (0.185) is greater than necessary value of 0.00001. From this estimation values, one can conclude that all questions in the survey are consistent and valid for data analysis. Therefore, we can be confident that multicolinearity does not occur in our case. It further confirms that there is no need to eliminate any attribute from the data set at this stage.

Moreover, sample size is important in the factor analysis reliability tests. As correlation coefficients changes from sample to sample, especially in small sample size. The traditional rule suggested that a study has at least 10-15 participants per variable. Later some studies recommended 5-10 participants per variable up to a total of 300 (Kass and

Table 5.4: Correlation matrix

		Network performance	Customer service quality	Rang of phones	Range of services	Accuracy of billing and payment	Value for money	Service plans
Correlation	Network performance	1.000	.357	.247	.347	.306	.389	.076
	Customer service quality	.357	1.000	.304	.372	.417	.444	.246
	Rang of phones	.247	.304	1.000	.226	.225	.291	.136
	Range of services	.347	.372	.226	1.000	.344	.416	.340
	Accuracy of billing and payment	.306	.417	.225	.344	1.000	.550	.322
	Value for money	.389	.444	.291	.416	.550	1.000	.531
	Service plans	.076	.246	.136	.340	.322	.531	1.000
Sig. (1-tailed)	Network performance		.000	.000	.000	.000	.000	.141
	Customer service quality	.000		.000	.000	.000	.000	.000
	Rang of phones	.000	.000		.001	.001	.000	.028
	Range of services	.000	.000	.001		.000	.000	.000
	Accuracy of billing and payment	.000	.000	.001	.000		.000	.000
	Value for money	.000	.000	.000	.000	.000		.000
	Service plans	.141	.000	.028	.000	.000	.000	

a. Determinant = .185

Tinsley, 1979). Comrey and Lee (1992) stated that a sample size of 300 to be sufficient, 100 as poor and 1000 an excellent.

Kaiser-Meyer-Olkin technique to measure adequacy of sampling (KMO) could be also a suitable method (Kaiser, 1970). The method calculates the squared correlation between variables to the squared partial correlation between variables. The KMO value varies between 0 and 1. A value of 0 indicates that the factor analysis would be inappropriate, whereas a value close to 1 indicates that the factor analysis is reliable. Kaiser (1974) recommends a KMO = 0.5 to be the main acceptable value, whilst values $0.5 < KMO < 0.7$ to be mediocre, $0.7 < KNO < 0.8$ to be good, and $KMO > 0.8$ to be excellent (Hutcheson and Sofroniou, 1999, pp. 224-225). The KMO for the current research is equal to 0.798, which falls into the range of being good: so, we should be confident that factor analysis is an appropriate method for data analysis.

Table 5.5: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.798
Bartlett's Test of Sphericity	Approx. Chi-Square	332.669
	df	21
	Sig.	.000

Bartlett's test of sphericity and the anti-image correlation and covariance metrics provide similar information to the relationship between correlation and covariance, shown in Table 5.6 (Field, 2005). The KMO values for each attributes are generated on the diagonal of the anti-image correlation matrix (as highlighted the values in red bold). All values are above the bare minimum 0.5 which is good. The rest of anti-image correlation matrix, the off-diagonal elements represent the partial correlations between attributes (variables). The majority of these correlations are very small. For this study, the Bartlett's test is highly significant ($P= 0.001$), and therefore based on the anti-image correlation and covariance metrics the factor analysis is appropriate.

Table 5.6: Anti-image metrics

		Network performance	Customer service quality	Rang of phones	Range of services	Accuracy of billing and payment	Value for money	Service plans
Anti-image Covariance	Network performance	.738	-.106	-.073	-.145	-.041	-.139	.145
	Customer service quality	-.106	.691	-.121	-.107	-.124	-.083	-.007
	Rang of phones	-.073	-.121	.863	-.047	-.017	-.068	.015
	Range of services	-.145	-.107	-.047	.722	-.057	-.049	-.131
	Accuracy of billing and payment	-.041	-.124	-.017	-.057	.650	-.185	-.025
	Value for money	-.139	-.083	-.068	-.049	-.185	.474	-.242
	Service plans	.145	-.007	.015	-.131	-.025	-.242	.670
Anti-image Correlation	Network performance	.766[a]	-.149	-.092	-.198	-.059	-.235	.207
	Customer service quality	-.149	.864[a]	-.156	-.152	-.185	-.145	-.011
	Rang of phones	-.092	-.156	.880[a]	-.059	-.023	-.107	.020
	Range of services	-.198	-.152	-.059	.861[a]	-.083	-.084	-.189
	Accuracy of billing and payment	-.059	-.185	-.023	-.083	.842[a]	-.334	-.038
	Value for money	-.235	-.145	-.107	-.084	-.334	.753[a]	-.430
	Service plans	.207	-.011	.020	-.189	-.038	-.430	.689[a]

a. Measuring of sampling adequacy (MSA)

In the next section, the factor extraction will be presented as part of factor analysis. The outcome of this analysis helps to determine which factors to retain and which factor to discard

2.1 Factor Extraction

This part of factor analysis assesses the eigenvalues that determine the linear components within the data set. The eigenvalue is a measure for discovering whether predictors are dependent or otherwise. Table 5.7 represents eigenvalues associated with each linear factor (component) before extraction, after extraction and after rotation. Before extraction, 7 linear components have been identified within the data set. The eigenvalues with each factor represent the variance explained by that particular linear component and using the SPSS tool eigenvalue can be reached in terms of the percentage of the variance (for instance, attribute 1 explains 43.209% of total variance). Some attributes explain relatively a large amounts of variance (especially attribute 1) while subsequent attributes explain only small amounts of variance. In the Extraction Sums of Squared Loadings column, the attributes with eigenvalues greater than 1 are extracted from the previous part (two attributes).

Table 5.7: Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.025	43.209	43.209	3.025	43.209	43.209	2.170	30.999	30.999
2	1.013	14.473	57.681	1.013	14.473	57.681	1.868	26.682	57.681
3	.792	11.319	69.001						
4	.686	9.801	78.802						
5	.605	8.648	87.450						
6	.539	7.702	95.152						
7	.339	4.848	100.000						

Extraction method: Principal component analysis

In the final part of the table, the eigenvalues of the attributes after rotation are displayed. Rotation has the effect of optimising the facture structure and the consequence is that the relative importance of the two factors is equalised. Before rotation, attribute 1 accounted for considerably more variance than the remaining one (43.209% compared to

14.473%); however, after extraction it accounts for only 30.999% of variance compared to 26.682%.

Table 5.8 reports the communalities before and after the extraction. The communality is the proportion of common variance within a variable. Thus, the communalities after extraction show the degree of common variance. For example, 60.4% of the variance associated with question 1 (network performance) is common, or shared, variance. In other words, the amount of variance in each variable is explained by the retained factors presented by the communalities after extraction. According to Field, the results of this part is acceptable and fine as the sample size exceeds 250 and the average of the communalities is nearly 0.6 (2005, p.656).

Table 5.8: Communalities before and after extraction

Communalities

	Initial	Extraction
Network performance	1.000	.604
Customer service quality	1.000	.528
Rang of phones	1.000	.434
Range of services	1.000	.448
Accuracy of billing and payment	1.000	.521
Value for money	1.000	.718
Service plans	1.000	.784

Extraction method:
Principal component analysis.

Component Matrix

	Components	
	1	2
Value for money	.818	
Accuracy of billing and payment	.714	
Customer service quality	.696	
Range of services	.696	
Network performance	.584	.513
Rang of phones	.486	.445
Service plans	.579	-.670

Extraction method: Principal component analysis.
(a) 2 components extracted.

2.2 Collinearity Test

As it has been discussed in Chapter 4, two or more variables can be strongly correlated in a regression model. In this case (multicollinearity), it becomes impossible to obtain accurate estimates of the regression coefficients because there are infinite number of combinations of coefficients that would work equally well.

In order to test collinearity, tolerance and variance influence factor (VIF) were measured (Table 5.9). According to Menard (1995), a tolerance value less than 0.2 almost certainly indicates a serious collinearity problem. All tolerance values are substantially greater than 0.2. Moreover, a VIF value greater than 10 is a cause for concern (Myers, 1990; Bowerman and O'Connel, 1990). In this data set, the average VIF value is not substantially greater than 1 (Equation 5.2) which confirms that collinearity would not be a problem for this model (Bowerman and O'Connel, 1990). Furthermore, SPSS

Table 5.9: Coefficients

		Collinearity Statistics	
Model		Tolerance	VIF
1	Network performance	.747	1.338
	Customer service quality	.688	1.454
	Brand image	.616	1.622
	Range of services	.561	1.784
	Service plans	.613	1.631
	Range of phones	.632	1.583
	Accuracy of billing and payment	.635	1.574
	Value for money	.407	2.455
	Entertainment features	.632	1.582

Dependent variable: Overall customer satisfaction

$$\overline{VIF} = \frac{\sum_{i=1}^{k} VIF_i}{k} = \frac{.747 + .688 + .616 + .561 + .613 + .632 + .635 + .407 + .632}{9} = 1.66 \quad (5.2)$$

A table of eigenvalues of the scaled, uncentred cross-products matrix, the condition index and the variance proportions for each predictor is displayed in Table 5.10. The

variance proportions vary between 0 and 1, and for each eigenvalue should be distributed across different dimensions. The variance of each regression coefficient can be broken down across the eigenvalues. The variance proportions tell us the proportion of the variance of each variable regression coefficient that is assigned to each eigenvalue. It can be argued that if some of the eigenvalues are greater than others, the any small change to the prediction of an outcome may affect the solutions for the regressed parameters. In other words, the eigenvalues represent the accuracy of the regression model.

In terms of collinearity, variables that have high proportions on the same small eigenvalue indicate that the variances of their regression coefficients are dependent. The only eigenvalues of interest mainly are the ones that have small eigenvalues (the bottom few rows, Table 5.10). In this study, for example, 41% of the variance in the regression coefficients of "service plans" and 46% of value for money are associated with eigenvalue number 10 (the smallest eigenvalue). Moreover, 86% of the variance in the regression coefficients of "range of services" is associated with eigenvalue number 9. These results indicate a kind of dependency between these variables. In addition, Pearson correlation between all of the attributes was conducted in this regression analysis. The correlation between the above mentioned variables was measured (Table 5.11). The results prove that the attributes are not highly correlated ($r = 0.403$ and 0.455).

The "Condition Index" is an alternative route for expressing these eigenvalues and presents the square root of the ratio of the largest eigenvalue of interest. For these data, the final dimension has a condition index of 22.937.

Table 5.10: Collinearity diagnostics

Dimension	Eigenvalue	Condition Index	Variance Proportions								
			(Constant)	Network performance	Customer Service	Brand Image	Range of services	Service plans	Range of phones	Accuracy of billing and payment	Entertainment features
1	9.600	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.078	11.067	.01	.10	.10	.03	.00	.14	.00	.06	.16
3	.065	12.197	.01	.02	.11	.03	.02	.05	.21	.07	.11
4	.053	13.463	.00	.24	.00	.03	.00	.09	.17	.00	.39
5	.050	13.856	.08	.16	.26	.00	.00	.20	.02	.02	.10
6	.047	14.252	.00	.01	.46	.04	.02	.06	.00	.02	.00
7	.037	16.051	.10	.16	.01	.01	.04	.02	.11	.34	.01
8	.027	18.949	.01	.13	.00	.71	.02	.00	.47	.03	.01
9	.025	19.547	.15	.01	.05	.04	.86	.01	.00	.01	.16
10	.018	22.937	.65	.16	.01	.11	.03	.41	.02	.46	.05

Dependent Variable: Overall customer satisfaction

Table 5.11: Correlations

		Overall satisfaction	Network performance	Customer service quality	Brand image	Range of services	Service plans	Range of phones	Accuracy of billing and payment	Value for money	Entertainment features
Pearson Correlation	Overall satisfaction	1.000	.452	.466	.277	.340	.382	.268	.466	.553	.312
	Network performance	.452	1.000	.370	.344	.330	.145	.188	.324	.382	.243
	Customer service quality	.466	.370	1.000	.361	.411	.260	.324	.408	.439	.267
	Brand image	.277	.344	.361	1.000	.429	.200	.507	.403	.413	.281
	Range of services	.340	.330	.411	.429	1.000	.387	.462	.374	.455	.506
	Service plans	.382	.145	.260	.200	.387	1.000	.265	.327	.592	.366
	Range of phones	.268	.188	.324	.507	.462	.265	1.000	.323	.411	.379
	Accuracy of billing and payment	.466	.324	.408	.403	.374	.327	.323	1.000	.545	.349
	Value for money	.553	.382	.439	.413	.455	.592	.411	.545	1.000	.509
	Entertainment features	.312	.243	.267	.281	.506	.366	.379	.349	.509	1.000
Sig. (1-tailed)	Overall satisfaction	.	.000	.000	.000	.000	.000	.000	.000	.000	.000
	Network performance	.000	.	.000	.000	.000	.034	.009	.000	.000	.001
	Customer service quality	.000	.000	.	.000	.000	.000	.000	.000	.000	.000
	Brand image	.000	.000	.000	.	.000	.006	.000	.000	.000	.000
	Range of services	.000	.000	.000	.000	.	.000	.000	.000	.000	.000
	Service plans	.000	.034	.000	.006	.000	.	.000	.000	.000	.000
	Range of phones	.000	.009	.000	.000	.000	.000	.	.000	.000	.000
	Accuracy of billing and payment	.000	.000	.000	.000	.000	.000	.000	.	.000	.000
	Value for money	.000	.000	.000	.000	.000	.000	.000	.000	.	.000
	Entertainment features	.000	.001	.000	.000	.000	.000	.000	.000	.000	.
N	Overall satisfaction	158	158	158	158	158	158	158	158	158	158
	Network performance	158	158	158	158	158	158	158	158	158	158
	Customer service quality	158	158	158	158	158	158	158	158	158	158
	Brand image	158	158	158	158	158	158	158	158	158	158
	Range of services	158	158	158	158	158	158	158	158	158	158
	Service plans	158	158	158	158	158	158	158	158	158	158
	Range of phones	158	158	158	158	158	158	158	158	158	158
	Accuracy of billing and payment	158	158	158	158	158	158	158	158	158	158
	Value for money	158	158	158	158	158	158	158	158	158	158
	Entertainment features	158	158	158	158	158	158	158	158	158	158

3. Chapter Conclusion

In this chapter, the author conducted the reliability and validity analysis for the collected data set. For the reliability analysis, Cronbach method (1951) was implemented. The results show that all variables are significantly reliable by the overall Cronbach's α = 0.839.

For this data, all attributes correlate with the dependent variable. In the second stage, the validity analysis was conducted by using the factor analysis method. The results of the factor analysis revealed that 71% of the variance in the regression coefficients of "brand image" is associated with eigenvalue of "accuracy of billing and payment", and 86% of the variance in the regression coefficients of "range of services" is associated with eigenvalue of "value for money". For this reason, two attributes of "brand image" and "range of services" were omitted from the list of key service attributes. Moreover, the results showed that there is no evidence of collinearity for this data set.

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CHAPTER 6

6

DATA ANALYSIS

The literature in customer relationship management was reviewed in Chapter 2. A conceptual model to formulate the service quality-customer behaviour profitability was proposed in Chapter 3. The proposed conceptual framework seeks to model the relationship between service attribute performance, customer satisfaction, customer retention (switching probability) and customer loyalty (word of mouth). To do so, a suitable research methodology was justified and introduced in Chapter 4. In addition, the research instrument in terms of reliability and validity of data set and key assumptions were appraised in Chapter 5. This chapter presents the analysis of the empirical data to test the conceptual model (Figure 3.7). This chapter offers an empirical analysis of the case study perspectives that describes service quality-customer behaviours model in the UK mobile telecommunication industry.

The chapter discusses the interrelationships between service quality and customer behaviours using various statistical and analytical methods. In Section 1 of this chapter the relationship between service attribute performance and customer satisfaction is measured using regression analysis with dummy variables. In Section 2, the author evaluates the relationship between the importance and the performance of service attributes. In order to measure attribute importance, a direct and an indirect method are employed. However, the regression analysis with dummy variables was also used to revise the traditional importance-performance analysis (IPA). Section 3 considers the use of additional statistical method (SEM) to measure the service quality-customer satisfaction. Section 4 discusses the relationship between customer satisfaction and switching intention using logistic regression. Section 5 of this chapter assesses the impact of length of relationship with customer satisfaction and customer switching patterns. Finally, Section 6 measures the relationship between satisfaction, retention and loyalty.

1. Measuring the Relationship between Service Attribute Performance and Customer Satisfaction

As it has been discussed in Chapter 3, customer satisfaction management has been traditionally based on the assumption that the relationship between attribute performance and customer satisfaction is linear and asymmetric. This assumption has led to the development of customer satisfaction measurement methods. The customer satisfaction measurement method can be used to classify the more important attributes into which managers should invest resources to maximise customer satisfaction (Wittink and Bayer, 1994; Martilla and James, 1977). Moreover, the research revealed that there are significant difference between the key drivers of customer satisfaction and customer dissatisfaction (Herzberg, 1987; Shiba *et al.*, 1993; Dutka, 1993; Gale, 1994; Oliver, 1997; Cadotte and Turgeon; 1988a, b).

To assess the relationship between service attribute performance and customer satisfaction, regression analysis with dummy variables was employed due to the reliability of the techniques in comparison to other techniques such as Kano's questionnaire (1984) and CIT (Flanagan, 954). To run the regression analysis with dummy variables, the performance scores of each mobile service attribute were recorded so that "low performance" was coded (0, 1), "high performance" (1, 0), and "average performance" (0, 0), using the SPSS tool. This exercise allows for the formulation of the dummy variables. The study defined as "low performance" all ratings from 1 to 3, "high performance" all ratings from 5 to 7, and "average performance" all ratings of 4 (Equation 6.1).

$$Overall\,Customer\,Satisfaction = \alpha_0 + \alpha_{1\,Att_1} \times dummy_{1\,Att_1} + \alpha_{2\,Att_1} \times dummy_{2\,Att_1} + ... + $$
$$\alpha_{1n} \times dummy_{1\,Att_n} + \alpha_{2n} \times dummy_{2\,Att_n}$$

(6.1)

Table 6.1 shows the results from the customer satisfaction model. The results indicate that by entering six predictors (service attributes), the correlation (R) between predictors and overall customer satisfaction is equal to 0.469. For this model R^2 value is 0.439.

The value of R^2 explains that the service attributes account for 43.9% of the variation in overall customer satisfaction.

Table 6.1: The customer satisfaction model statistics using regression with dummy variables

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
				R Square Change	F Change	df1	df2	Sig. F Change	
0.685	0.469	0.439	1.013	0.469	15.338	12	208	0.000	1.956

Predictors: (Constant), network performance, customer service quality, service plans, accuracy of billing and payment, range of phones, value for money

Dependent variable: Overall customer satisfaction

In addition, Table 6.2 contains an analysis of variance (ANOVA) that tests whether the model is significantly better at predicting customer satisfaction when there is no visible pattern. In other words, a variance equal to 43.9% is a significant amount. The F-ratio represents the ratio of improvement in prediction that results from fitting the model. The sum of squares (SS_M) represents the improvement in prediction resulting from fitting a regression line to the data rather than using the mean as an estimate of the outcome. Residual sum of squares (SS_R) represents the total difference between the model and the observed data. The degrees of freedom (*df*) is equal to the number of predictors, and for SS_R is the number of observations (208) minus the number of coefficients in the regression model. The model has twelve coefficients; one for each of the 12 independent variables (service attributes), see Table 6.1. The *F*-ratio is 15.338 ($p < 0.0001$) which is significant.

Table 6.2: An analysis of variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	188.927	12	15.744	15.338	0.000
Residual	213.498	208	1.026		
Total	402.425	220			

Based on this coding scheme, a multiple regression was conducted to estimate the impact of each service quality attribute on overall customer satisfaction. For each attribute, two regression coefficients were obtained, one to measure the impact when performance ranked low, the other one when performance was ranked high. Table 6.3 presents the model parameters. The *b*-values represent the relationship between overall customer satisfaction and each predictor (service attributes). In other words, the beta value shows the change in the dependent variable due to a unit change in the predictor. In this case, a unit change in the dependent variable (overall satisfaction) is the change from 0 to 1. The positive b-value represents that there is a positive relationship

Table 6.3: The model summary of service attributes' classification using regression analysis with dummy variables

Service attribute classification	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.592	0.305		11.765	0.000	2.990	4.194
Network performance – low	0.079	0.111	0.048	0.713	0.477	-0.140	0.299
Network performance – high	0.196	0.038	0.366	5.222	0.000	0.122	0.270
Customer service quality – low	-0.001	0.095	-0.001	-0.010	0.992	-0.189	0.187
Customer service quality – high	0.104	0.029	0.221	3.546	0.000	0.046	0.161
Service plans – low	-0.014	0.093	-0.009	-0.147	0.883	-0.197	0.169
Service plans – high	0.033	0.032	0.068	1.012	0.313	-0.031	0.097
Range of phones – low	-0.204	0.092	-0.130	-2.230	0.027	-0.385	-0.024
Range of phones – high	-0.054	0.029	-0.114	-1.854	0.065	-0.112	0.003
Accuracy of billing and payment – low	-0.178	0.099	-0.115	-1.797	0.074	-0.373	0.017
Accuracy of billing and payment – high	0.031	0.035	0.064	0.877	0.382	-0.038	0.100
Value for money – low	-0.015	0.091	-0.012	-0.168	0.867	-0.195	0.164
Value for money – high	0.097	0.038	0.202	2.572	0.011	0.023	0.172

between the predictor and the dependent variable whereas a negative coefficient represents a negative relationship. For these data, we have both positive and negative

relationship between predictors and the outcome. Network performance (low and high performance), customer service quality (high performance), service plans (high performance), accuracy of billing and payment (high performance), and value for money (high performance) have a positive relationship with the overall customer satisfaction. This means, when performance level increases then overall satisfaction-level increases. In this case, customer service quality (low performance), service plans (low performance), range of phones (low and high performance) and value for money (low performance) have a negative relationship with overall customer satisfaction. So as performance-level increases, overall satisfaction may decrease. In addition, provided that the coefficients of all other variables are held constant then the *b*-values demonstrate the extent to which each variable influences the dependent variable. Each *b*-value contains an associated error which is used to determine whether or not the b-value differs significantly from zero. The standard error indicates the extent that the *b*-value varies across different samples. However, the *t*-test is the most appropriate method to measure the predictor significance in the model.

The other criterion for relational test is the standardised *b*-value which indicates the number of standard deviations that the dependent variable will change as the result of any standard deviation change in the independent variable. This change can be applied at different levels to each predictor. In case of having different samples, the confidence interval of the unstandardised *b*-values indicates the boundaries that 95% of samples will contain the true value of *b*.

The analysis of the impact of attribute performance on overall satisfaction based on the trend from negative to the positive performance domain, the factor structure is proposed here to differentiate between basic, exciting, and performance service attributes (see Table 6.4). As a result, the accuracy of billing and payment (AoBP) and range of phones (RoP) can be classified as basic attributes. Their impact (coefficient) on overall customer satisfaction is high when performance-level is ranked low, while they do not

Table 6.4: The asymmetric impact of attribute performance on overall customer satisfaction in negative and positive performance domains

Service attributes	Dummy-variable regression coefficient (a)		Service attribute classification
	Low performance	High performance	
Network performance	0.048 (*ns*)	0.366 ***	Exciting
Customer service quality	-0.001 (*ns*)	0.221***	Exciting
Service plans	-0.009 (*ns*)	0.068 (*ns*)	Neutral
Range of phones	-0.130**	-0.114*	Basic
Accuracy of billing and payment	-0.115**	0.064 (*ns*)	Basic
Value for money	-0.012 (*ns*)	0.202***	Exciting

(a) Standardised coefficients, $R^2 = 0.469$; *F*-Value = 15.338
***$P < 0.01$, **$P < 0.05$, *$P < 0.1$, *ns* = not significant

significantly affect overall customer satisfaction when performance-level is ranked high (Figure 6.1). Customer service quality (CSQ), network performance (NP), and value for money (VFM) can be viewed as exciting attributes. However, network performance has a higher impact on overall customer satisfaction when performance-level is ranked high comparing to CSQ and VFM. Furthermore, results show that the service plans (SP) is a neutral attribute, as it does not result in either customer satisfaction or customer dissatisfaction. However, the result for this attribute is not statistically significant (*P* >0.1).

Figure 6.1: The asymmetric impact of attribute-level performance on overall satisfaction
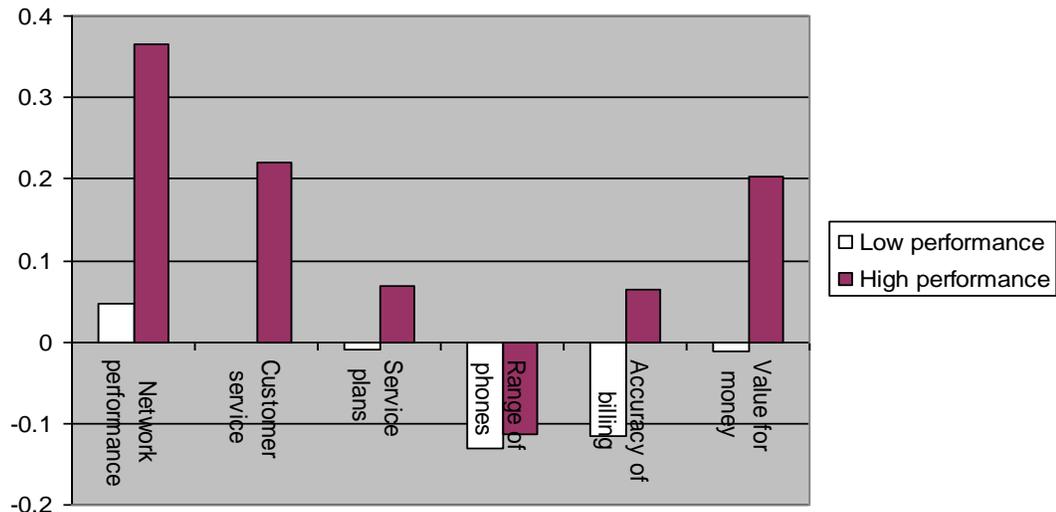
In this study, no performance or one dimensional attribute was identified. The impact of service attribute performance on customer satisfaction can be varied from industry to industry (Matzler and Renzl, 2007) and the results here are specific to mobile telecommunication industry. It can be argued that the correlation between service attribute performance and overall satisfaction, in the mobile communication industry, is not linear or one-dimensional. As a result, customers expect that the main attributes (basic) of mobile phone services to perform very well (e.g., accuracy of billing and payment). Figure 6.2 shows the factor structure of customer satisfaction derived from the regression with dummy variables technique.

According to attractive quality theory (Kano, 2001), the strength or importance of service attributes may change over time. In this study we do not apply this theory to our model, mainly because data collection should be executed at least 6 or 7 year periods.

Figure 6.2: The factor structure of customer satisfaction using regression analysis with dummy variables

High Performance

		Low Impact	High Impact
Low Performance	High Impact	**Basic Factor** • Accuracy of billing and payment • Range of phones	**Performance Factor** NA
	Low Impact	**Performance Factor** NA	**Exciting Factor** • Customer service quality • Network performance • Value for money

Finally, the results of regression with dummy variables confirm that service quality attributes have dynamic characteristic (asymmetric and non-linear). Therefore, **H1** can be confirmed (there is an asymmetric and non-linear relationship between service attribute's performance and overall customer satisfaction). In addition, two types of attributes were identified within the data set: the basic (**H1.1**) and the exciting attributes (**H1.3**). In this special case, there is no performance attribute were identified.

However, the classification of quality attributes in this industry may differ from other industries. For instance, value for money in other industries may have different impact on customer satisfaction. For instance, customers in automobile industry may consider other attributes like design, brand and safety before value for money, whereas value for money plays as core value in aviation industry. One could conclude that businesses should fulfil all basic attributes, be competitive with regard to performance factors, and stand out from competition regarding excitement factors.

This method is a useful tool in product/service development with respect to product/service quality evaluation by the customers. Operationally, the classification of service attributes helps managers to focus on the most important attributes that may maximise customer satisfaction.

Next section considers the relationship between attribute importance and performance. The relationship between these two factors may affect customer satisfaction management and resource allocation processes.

2. Measuring the Relationship between Attribute Importance and Performance of Service Attributes

The understanding of the relationship between attribute performance and overall customer satisfaction plays a basic role in allocation of resources in business operations. Measuring the impact of service attribute performance on customer satisfaction is an important factor for companies and helps in determining the attributes that may yield higher returns. However, customer satisfaction is not the only determinant in the decision-making process. In this thesis, customer satisfaction is proposed as a mediating attitude between performance of service quality attributes and the customers' future intentions, i.e. customer switching (retention) and word of mouth (loyalty).

In order to measure the relationship between attribute performance and attribute importance, two methods were used in this study: (1) customer self-stated importance (direct method), and (2) the multiple regression analysis (indirect method). There are

several methods for measuring attribute importance-level directly (e.g. rating scales, constant sum scales, etc.). In this study, we employed a method presented by Abalo *et al.* (2007).

To measure the explicit importance (customer self-stated importance), the mean value for customer's rating of attribute importance for each attribute was computed, using Equations 4.1 and 4.2 (Abalo *et al.*, 2007). Respondents were asked to indicate the three most important (k = 3) service attributes, using the Natural numbers from 1 (most preferred) to 3 (least preferred), with no ties allowed (Shown in Appendix A). Using such method avoids ambiguity while asking participants to rank attributes' importance one by one may result in skewness and ambiguity.

In order to assign each attribute (*i*) an importance value (P_i) lying between 0 and 1, we integrate the attribute ranking assigned by respondents. The value of P_i should increase with the importance of attribute *i*. g_{ij} presents the rank assigned to the *i*-th attribute by the *j*-th respondent. As a result, the value 0 is assigned to all attributes not mentioned by respondent *j*. In Equation 6.2, the g_{ij} is recoded as the ranking scores h_{ij} lies in the desired interval. Table 6.5 lists the frequency of ranks 1, 2 and 3 assigned by the respondents for each attributes and Table 6.6 lists the aggregate importance and performance value of each attribute. The determination of aggregate importance is estimated by Equation 6.3.

$$h_{ij} = \begin{cases} (k - g_{ij} + 1)/k & g_{ij} \text{ not void} \\ 0 & \text{otherwise} \end{cases} \tag{6.2}$$

$$P_i = (n^{-1} \sum_j h_{ij})^{k/s} \tag{6.3}$$

n = number of respondents/raters
k = top k preferences
s = number of attributes
i = attribute (*i* = 1,…, n)
j = respondent/rater (*j* = 1,…, n)
g_{ij} = the rank assigned to the *i*-th attribute by the *j*-th respondent

h_{ij} = the normalised g_{ij} that lie between 0 and 1

P_i = importance value of attribute i

Table 6.5: Explicit importance ratings per each attribute and performance

Service attribute	Ranking order		
	1	2	3
1. Network performance	82	51	52
2. Customer service quality	9	27	38
3. Service plans	87	47	31
4. Range of phones	9	22	30
5. Accuracy of billing and payment	6	19	18
6. Value for money	56	62	43
Total	253	252	249

Since the respondents were asked only to rank their top 3 preferences among 6 attributes rather than one by one, then this procedure reduces risk of fatigue.

Table 6.6: Aggregate importance and performance scores of each attribute

Service attribute	Explicit derived	Attribute performance (Mean)
1. Network performance	0.81	5.44
2. Customer service quality	0.54	4.88
3. Service plans	0.79	5.05
4. Range of phones	0.51	4.36
5. Accuracy of billing and payment	0.46	5.11
6. Value for money	0.76	4.92

To measure the implicit importance (statistically derived importance), a linear regression model was used, using attribute performance as independent variables and overall customer satisfaction as dependent variable (Equation 6.4). One of the advantages of regression analysis is that the method provides a model for all attributes to form the overall rating. As a result, multiple regression analysis estimates the degree of influence that attributes have in determining customer satisfaction.

$$\text{Overall Customer Satisfaction} = \alpha_0 + \alpha_1 X_1 + ... + \alpha_n X_n + \varepsilon \qquad (6.4)$$

Using multiple regression analysis, the slope coefficient (or t-statistic (Bring, 1994)) for an attribute is proportional to the relative importance of the attribute if the standard errors for the attribute estimates are approximately equal. Multicollinearity is the main issue when using regression analysis. The factor analysis was conducted to evaluate whether there is multicollinearity among the independent variables. Table 6.7 contains an analysis of variance (ANOVA). The degrees of freedom (df) is 6 which is equal to the number of dependent variables. For this model the F-ratio is 30.192 ($P < 0.0001$).

Table 6.7: An analysis of variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	176.517	6	29.419	30.192	0.000
Residual	205.598	211	0.974		
Total	382.115	217			

In addition, Table 6.8 reports the results of the linear regression model estimations. In both methods, all attributes show a significant impact on customer satisfaction. However, in some cases, such as the accuracy of billing & payment and the service plans, the strength of the impact seems to be lower.

Table 6.8: linear estimates of the impact of attribute-level performance on overall customer satisfaction

Service attribute	Regression coefficient (a)
Network performance	0.302***
Customer service quality	0.199***
Service plans	0.141*
Range of phones	-0.089*
Accuracy of billing and payment	0.145**
Value for money	0.222**

(a) $R^2 = .462$, F-value = 30.192

***$P < 0.01$, **$P < 0.05$, *$P < 0.1$, ns = not significant

In the following section, the IPA approach is adopted to discriminate among attribute as targets for improvement actions. Using multiple regression analysis, Equation 6.5 is

derived, where the impact of service attributes on overall customer satisfaction is explained.

$$\textbf{Overall Customer Satisfaction} = \textbf{1.008} + \textbf{0.302} \times Network\,Performance +$$
$$\textbf{0.199} \times Customer\,service\,quality + \textbf{0.141} \times Service\,plans \qquad\qquad (6.5)$$
$$+ \textbf{0.145} \times Accuracy\,of\,billing\,\&\,payment + \textbf{0.222} \times Value\,for\,money$$

In the next section, the author uses the results of attribute importance for importance-performance analysis. The results of two methods will be discussed in terms of managerial implementation.

2.1 Importance-Performance Analysis (IPA)

No matter which method one uses to drive attribute-level importance, the overall conclusions of the survey are typically drawn from the importance-performance matrix first described by Martilla and James (1977). The conventional IPA matrix is constructed using attribute importance data and actual attribute performance data (mean) to represent the X and Y axes, respectively. The means were used to split the axes. Following the importance-performance analysis (IPA), one can now associate each attribute to a satisfaction factor by using their explicit and implicit importance provided in Tables 6.6 and 6.9. The results of IPA matrix show a significant difference, Figure 6.3 (a) and (b), between the two methods in terms of implementation. Therefore, **H3** (customer's self-stated importance and statistically derived importance differs) can be confirmed.

The analysis of conventional IPA yields the following recommendations:

➢ Quadrant I (*low importance, high performance*): attributes in this quadrant are relatively unimportant to the customer though the performance level is high. Management might wish to relocate resources to quadrant II.

➢ Quadrant II (*high importance, high performance*): quality of service is the key driver of customer satisfaction, and the firm must keep up the good work.

Figure 6.3: Importance-performance analysis (IPA) matrix

(a) Statistically derived importance (indirect)   (b) Customer self-stated importance (direct)
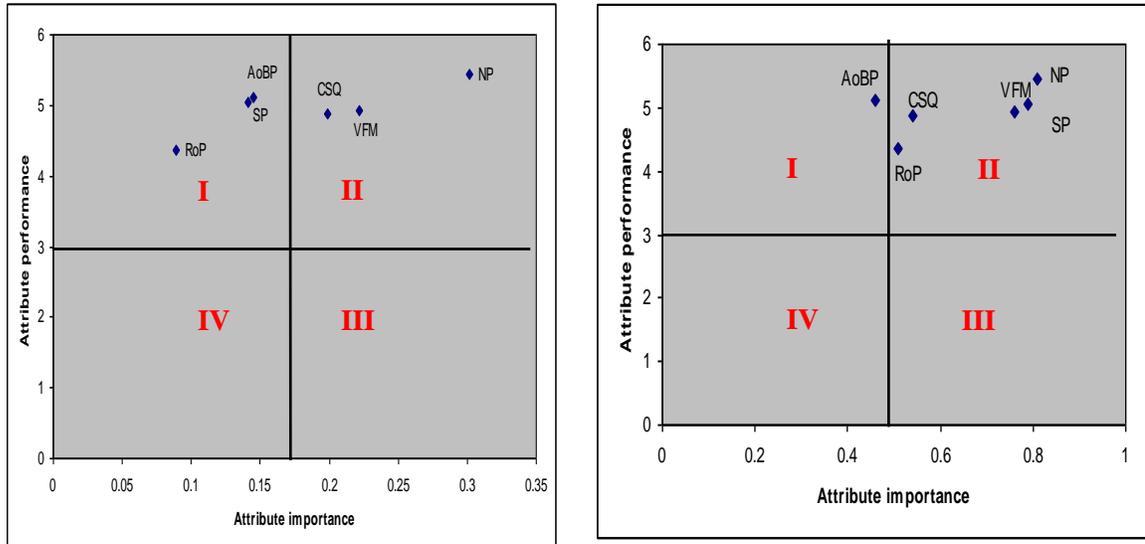
> Quadrant III (*high importance, low performance*): Low performance on highly important attributes demand immediate attention. A firm should concentrate on these attributes.

> Quadrant IV (*low importance, low performance*): in this quadrant the poor performance will not be considered as a priority, as these attributes are relatively unimportant. The performance level should be improved if there are no often attributes in the quadrant II (higher priority) and/or if the improvements are not too costly.

The results of direct importance assessment are misleading because ratings are uniformly high. As a result, all attributes crowd together at the top the right hand corner of IPA matrix, Figure 6.2 (a). While indirect method is more realistic as relative importance of each attribute depends on the data collected for all the attributes. It also reduces the demands on the respondent's attention since only the performance or satisfaction level is asked rather than importance of an attribute. In other words, it can be concluded that customer self-stated importance is not a function of customer satisfaction (**H3.1**). Consequently, using invalid IPA to identify the potential improvement direction

for customer satisfaction management can cause inefficient improvement, due to faulty distribution of efforts and resources.

The indirect approach can have two weaknesses: (1) the possibility of collinearity (Danaher, 1997; Bacon, 2003) and (2) the relationship between service attribute performance and overall customer satisfaction (or overall performance) may well be non-linear. For the criticism, collinearity test can be run among independent variables (Chapter 5). It is reported that there is no collinearity can be detected among the service attributes. For the second issue, the result of regression analysis with dummy variables was applied to the traditional IPA approach.

2.2 Attribute Importance as a Function of Attribute Performance

The way that importance-performance matrix is interpreted is largely based on the assumption that attribute importance and performance are independent from each other (Eskildsen and Kristensen, 2006). Previous research asserts that the performance of an attribute can be changed without having an impact on the importance of the attribute (Martilla and James, 1977; Slack, 1994; Oliver, 1997; Bacon, 2003).

The result from multiple regression analysis with dummy variables accommodates the concept of change in the relative importance of attributes with change in attribute performance as a function of overall customer satisfaction. Assuming that changes to an attribute performance-level may affect the relative attribute importance, then, the self-stated importance could not be the most appropriate method for evaluation attribute importance. In order to conduct the analysis, service attribute performance ratings need to be recoded. Using the SPSS tool the performance ratings can be recoded to form the dummy variables as "low performance" (0,1), "high performance" (1,0) and average performance (0,0). For each service attribute, two regression coefficients can then be obtained. The first coefficient will be used to measure the impact on importance when performance is low, and the second coefficient will be used when the performance is

high. This will help to estimate the possible asymmetric impact of attribute-level performance on overall customer satisfaction.

Figure 6.4 illustrates the asymmetric relationship between attribute performance and importance as it was proposed in **H2** (There is an asymmetric and non-linear relationship between attribute performance and attribute importance). In addition, it is concluded that attribute importance is a function of attribute performance (**H2.1**).

Figure 6.4: Relationship between importance and performance
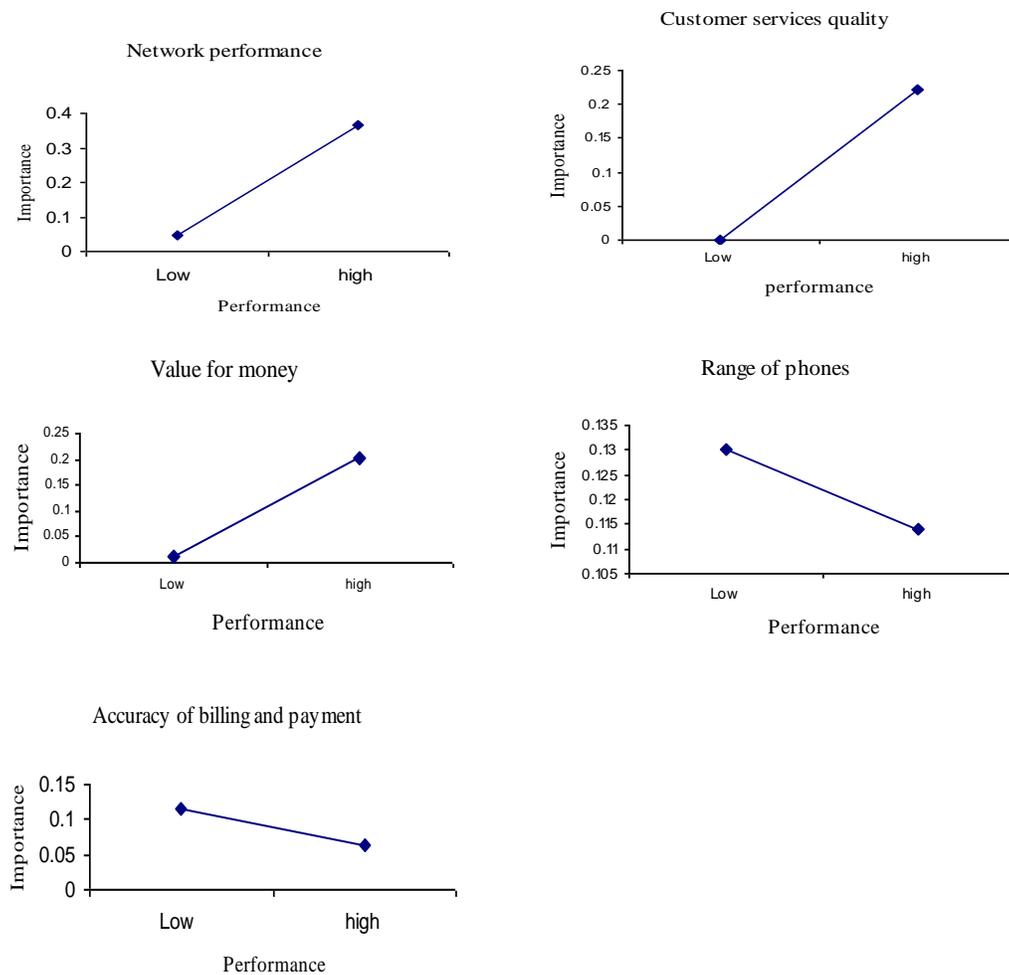
Considering attribute classification from Section 1, importance of a basic or an exciting attribute depends on its performance. Exiting attributes are important if performance is high but are unimportant when performance is low (network performance, customer

service quality, and value for money). Basic attributes are important if performance is low, but unimportant if performance is high (range of phones and accuracy of billing and payment).

The result of regression with dummy variables contradicts the traditional view that the relative importance of service attributes is adequately represented as a point estimate (Pezeshki *et al.*, 2009). Therefore, managers must be aware that changes to attribute performance are associated with changes to attribute importance. If the asymmetries are not considered, the impact of the different service attributes on overall customer satisfaction is not correctly assessed. In other words, the importance of basic attributes is underestimated if performance is high, and overestimated if performance is low. If the performance of excitement factors is low, their impact is underestimated and vice versa.

In order to demonstrate that strategies derived from the traditional IPA are misleading, the sample was classified into satisfied customers (5 to 7 on the satisfaction scale) and dissatisfied customers (1 to 4 on the satisfaction scale). For both groups the IPA matrix was constructed (shown in Figures 6.5 and 6.6). The application of the traditional IPA matrix for two groups of satisfied and dissatisfied customers reveals that managerial

Figure 6.5: IPA for dissatisfied customers
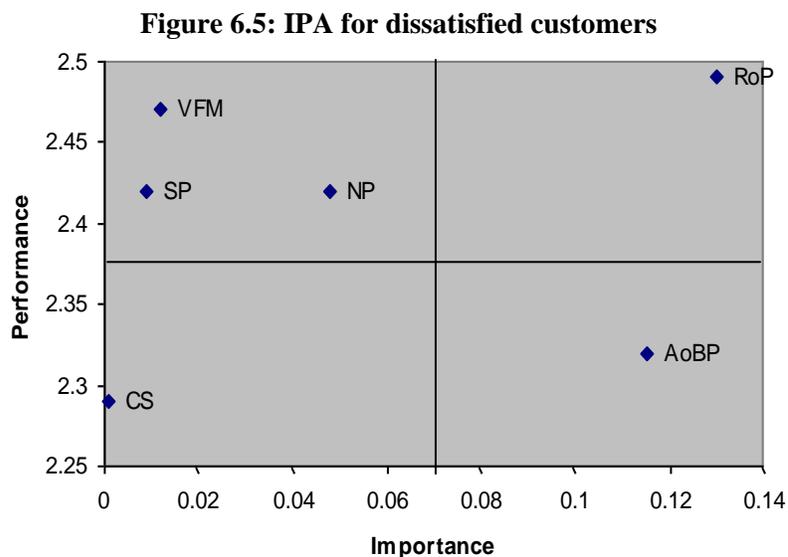
implementation derived from traditional IPA method could be misleading. For instance, in the case of dissatisfied customers, the importance-level of attribute AoBP (accuracy of billing and payment) is high whilst its performance is low. Therefore the company's priority should be to improve the performance 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. Figure 6.6 represents a similar case for satisfied customers.

Figure 6.6: IPA for satisfied customers
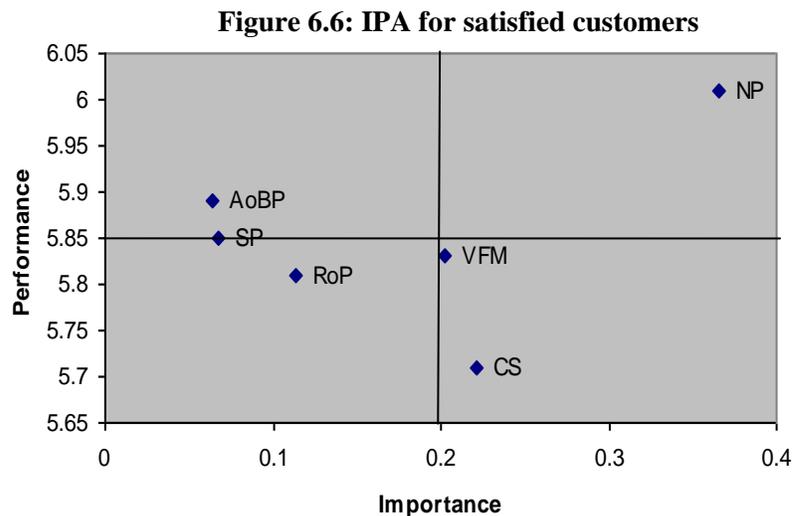
By applying the multiple regression analysis with dummy variables, the attribute value for money and network performance becomes the exciting attributes. Consequently, the increase in performance-level increases the importance-level. Accordingly, the accuracy of billing and payment becomes a basic attribute. 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 6.3.

In the next section, the author uses the structural equation modelling (SEM) approach mainly for modelling the relationship between service quality attributes and customer satisfaction. The main reason of using this method is to justify the regression analysis with dummy variables.

3. Structural Equation Modelling (SEM)

In order to run the analysis, the dependent variable "Overall customer satisfaction" was measured with a single item on the same 7-point scale. Using AMOS 7.0 software, structural equation modeling (SEM) tests were conducted to determine whether the data fits the hypothesised model. The results for goodness of fit tests show that the data fits the original hypothesis (Chi² = 56.65, DF 24, P = 0.000, Chi²/DF = 2.3, AGFI = 0.92, GFI = 0.95, NFI = 0.92, RMSEA = 0.07). The Composite Reliability (CR), average variance extracted (AVE) and the Fornell-Larcker-Ratio indicate very good psychometric properties of the measures (Fornell and Larcker, 1981).

The hypothesised model is recursive, such that there are 45 distinct sample moments (pieces of information) from which to compute the estimates of the default model and 21 distinct parameters to be estimated, leaving 24 degrees of freedom. The model achieves minimum iteration, ensuring that the estimation process yields an admissible solution and eliminating any concern about multicollinearity effects. The X^2 value is 56.65. The fit indexes demonstrate that the data is a good fit of the proposed model (Table 6.9). Figure 6.7 displays all of the structural relationships among constructs (service attributes, satisfaction, switching intention and word of mouth behaviour).

Table 6.9: **Proposed model fit statistics (SEM)**

Fit statistics		Obtained
Chi²		56.65
DF		24
Chi²/DF	< 3	2.3
CFI	> 0.95	0.95
GFI	> 0.90	0.96
RMSEA	< 0.08	0.07
NFI	> 0.9	0.92
AGFI	> 0.9	0.92
RMR	< 0.1	0.08

Shaded cells represent the common indexes threshold value

The path coefficients and their significance for each dependent model is also presented in this figure. Each service attribute has been assigned a weight (coefficient) based on

the strength of their association to the latent variable. Here, the latent variable is considered to be the overall service performance.

Figure 6.7: Structural equation modelling (SEM) analysis
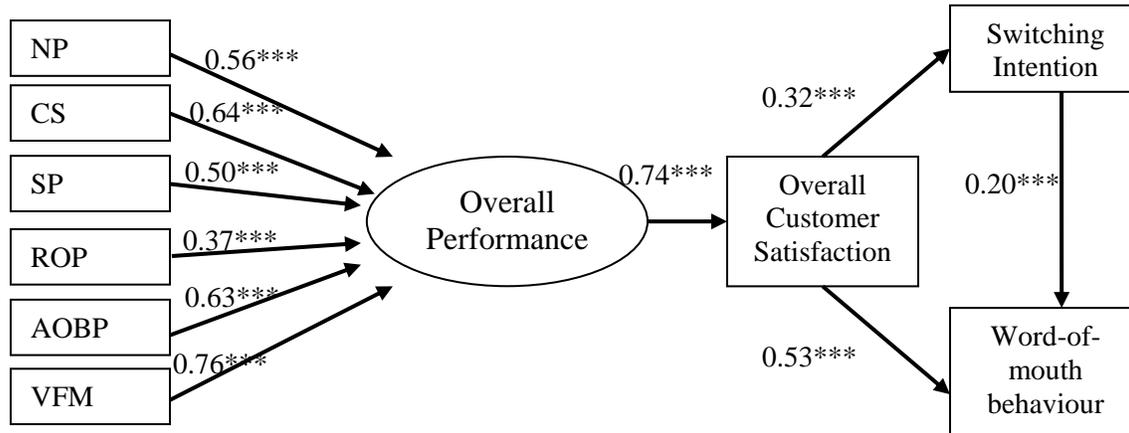
***P <0.001, **P <0.05, *P <0.01, *ns* = not significant

The parameter estimates show no negative variances and covariance or correlation matrixes that are not positively definite. Moreover, there are no parameter estimates greater than 1.00. The standardised solutions reveal that the estimates of all hypotheses are reasonable and statistically significant at the 0.001 level (Table 6.10).

Table 6.10: SEM regression results

Hypothesis	Regression coefficient
Overall performance → Overall customer satisfaction	0.74***
Customer satisfaction → Switching intention	0.32***
Customer satisfaction → Word of mouth behaviour	0.53***
Switching intention → word of mouth behaviour	0.20***

***P <0.001, **P <0.05, *P <0.01, *ns* = not significant

Overall customer satisfaction is an imperative determinant of word of mouth (customer loyalty), with R.W.=0.4 and C.R.=11. Moreover, switching intention has significant

impact on customers loyalty with R.W.=0.4 and C.R.= 4. Moreover, together overall customer satisfaction and switching intention explains 40% of customer loyalty variance. In addition, overall customer satisfaction, with R.W.= 0.1 and C.R.=6, explains more than 10% of the switching behaviour variance. Finally overall performance, with R.W.= 0.9 and C.R.=10, explains more than 55% of the overall satisfaction variance. The only disadvantage of using SEM approach is that it is not able to show how change in attribute performance-level influences customer satisfaction. This is due to the fact that the method assumes the relationship to be symmetric and linear. While in previous section, regression analysis with dummy variables showed how changes in attribute performance would change the overall satisfaction-levels. Thus, it can be concluded that SEM may not be an appropriate method for analysing asymmetric relationships. However, the dummy variables can be also applied into AMOS since the technique is based on multiple regression analysis. For example, if a company wishes to improve service quality based on customer satisfaction-level, attributes with larger coefficient would be in high priority, whereas based on this analysis some attributes may not have similar impact on overall satisfaction. More importantly, the impact of attribute importance and performance on satisfaction need to be also taken to into consideration. The following section considers the relationship between customer satisfaction and customer switching intentions.

4. The Impact of Customer Satisfaction on Customer Switching Intention

The prevention of customer churn is the ultimate goal of a company through implementation of CRM system. By minimising customer switching ratio a company minimises its marketing costs and, in turn, maximises its profitability. As a result, customer retention measurement is highly important to mobile service providers, where in the current market climate it would be relatively easy for a customer to switch to other service providers. It was reported previously that mobile service providers have customer churn ratio between 2.5 to 4 per cent on monthly basis (Howlett, 2000). As it was discussed in Chapters 2 and 3, there is a link between customer satisfaction and

customer switching intention. In order to estimate this relationship, we used binary logistic regression analysis. Logistic regression is multiple regression but with a categorical outcome variable and predictor variables that are continuous. In other words, a person or an event is likely to belong to a given category based on other information. Mathematically, logistic regression predicts the probability of Y occurring given the known values of X_1 $(or\ X_s)$, while ordinary regression predicts the value of a variable Y from a predictor variable X_1 or several predictor variables X_s, as demonstrated in Equations 6.6 and 6.7.

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_1 + \varepsilon_i)}} \quad \text{or} \quad \text{Odds} = \frac{P\,(event)}{P\,(no\,event)} \tag{6.6}$$

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_n X_n + \varepsilon_i)}} \tag{6.7}$$

Table 6.11 (a) shows the results of logistic regression analysis, using SPSS. The significance values of the Wald statistics for each independent variable indicate that overall satisfaction can project customer switching intentions ($P < 0.0001$). The interpretation of *b*-value in logistic regression is that the change in the logit of the dependent variable (switching intention probability) associated with one unit change in the independent variable. The logit of the dependent variable is simply the natural logarithm of the odds of *Y* occurring (see Equation 6.6). Thus, the value of *exp* b for overall satisfaction indicates that if the level of customer satisfaction increase by one level, then the odds of switching decreases (because *exp* b is less than 1). The confidence interval for this value ranges from 0.404 to 0.679 so we can be very confident that the value of the *exp* b in the population lies somewhere between these two values. In addition, because both values are less than 1 we can be confident that the relationship between overall satisfaction and switching behaviour is true. Consequently, equation 6.8 shows the linear estimate of customer switching.

Table 6.11 (a): logistic regression estimates of the impact of overall customer satisfaction on customer switching behaviour

	B	S.E.	Wald	df	Sig.	Exp (B)	95.0% C.I. for EXP (B)	
							Lower	Upper
Overall customer satisfaction	-0.647	0.132	23.834	1	0.000	0.524	0.404	0.679
Constant	3.894	0.740	27.708	1	0.000	49.096		

Dependent variable: Customer switching intention

$$P \text{ (Switching intention} \mid \text{Overall customer satisfaction)} = \frac{1}{1 + e^{-(3.894 - .647 X_1 + \varepsilon_i)}} \quad (6.8)$$

Tables 6.11b and c show a summary of the statistics with respect to the proposed model. The overall fit of the model is assessed using the log-likelihood statistics. The value of log-likelihood has an approximately chi-square distribution. Even though, in this case the log-likelihood value is somehow large. The statistics from Hosmer and Lemeshow's (1989) goodness-of-fit, Table 5.8 (C), tests the hypothesis that declaring that the data are significantly different from the predicted values from the model. Therefore, if the statistics are non-significant then it can be interpreted that the model does not differ significantly from the observed data. The test statistic (2.610) and the significance value (0.456) indicate that the data is a reasonable projection.

Table 6.11 (b): Hosmer and Lemeshow Test

Chi-square	df	Sig.
2.610	3	0.456

Table 6.11 (c): Model summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
321.774	0.115	0.156

Estimation terminated at iteration number 5 due to changes in the parameter estimates by less than 0.001.

Figure 6.8 is a histogram of the predicted probabilities of a customer switching intention. It shows all of the cases in of customers may intention to churn on the left-hand side (close to 0), and all the cases for which customers intend to stay on the right-hand side (close to 1). The points clustered in the centre of the plot presenting a probability of 0.5 that the customer may churn. However, for these cases there is little more than 50:50 chance that the data are correctly predicted.

Figure 6.8: Predicted Probabilities of a customer switching

```
      160 +                                                                    +
                                                                                
   F                                          N                                 
   R      120 +                               N                                 +
   E                                          N                                 
   Q                                          N                                 
   U                                          N                                 
   E       80 +                               N                                 +
   N                                          Y                                 
   C                                          Y                                 
   Y                                          Y          N                      
           40 +                               Y          N          N           +
                                              Y          N          N           
                                   N          Y          N          N    N      
                                   Y          Y          Y          Y    N  N N 
Predicted ─────────────────────────────────────────────────────────────────────
   Prob:    0              .25            .5             .75             1
   Group:  YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

         Predicted Probability is of Membership for No
         The Cut Value is .50
         Symbols: Y - Yes
                  N - No
         Each Symbol Represents 10 Cases.
```

Moreover, the impact of high and low level of customer satisfaction on switching intention as it was proposed in H4 was measured. In doing so, the customer satisfaction scores to form the dummy variables were recorded so that "low satisfaction" was coded

(0, 1) and "high satisfaction" (1, 0). The ratings between 1 and 4 are defined as "low satisfaction", ratings between 5 and 7 are considered to be "high satisfaction" (Equation 6.8). Based on this coding scheme, a logistic regression was conducted to estimate the impact of the satisfaction-levels on customer switching intentions. Two regression coefficients were obtained, one to measure the impact when overall satisfaction ranked low, and the other when the overall satisfaction is ranked high.

$$\text{CSI} = \frac{1}{1 + e^{-(\beta_0 + \beta_{1.Disatisfaction} \times dummy_1 + \beta_{2.Satisfaction} \times dummy_2)}} \tag{6.8}$$

CSI = customer switching intention or switching probability
$Dummy_1$ = lowest customer satisfaction level
$Dummy_2$ = highest customer satisfaction-level

Table 6.12 shows the results of logistic regression with dummy variables. By analysing how the impact of customer satisfaction on switching intention varies from negative to positive within the overall satisfaction domain, the structure of customer switching intention was identified. The results verify that there is a non-linear and asymmetric relationship between overall satisfaction (predictor) and customer switching intention (dependent variable). Comparing the results of satisfaction-levels on switching intentions shows that the higher levels of customer satisfaction (B = -0.260) has greater impact on customer switching intention rather than the lower levels (B = 0.1) (Equation 6.9). In other words, satisfied customers are twice likely to remain with the service provider than dissatisfied customers. However, in this particular case the result of low satisfaction is not statistically significant ($P > 0.1$). The sample size may have played an important role for this conclusion. Table 6.13 presents the model summary.

$$\text{CSI} = \frac{1}{1 + e^{-(1.63 + 0.1 \times X_1 - 0.260 \times X_2)}} \tag{6.9}$$

Table 6.12: The impact of satisfaction-level on customer switching behaviour

	B	S.E.	Wald	df	Sig.	Exp(B)
Low satisfaction	0.100	0.269	0.139	1	0.709	1.106
High satisfaction	-0.260	0.075	11.911	1	0.001	0.771
Constant	1.630	0.419	15.122	1	0.000	5.103

Independent variables: low satisfaction and high satisfaction.

Table 6.13: Model Summary of customer satisfaction vs. customer switching intention

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
328.673	0.092	0.124

Therefore, with respect to changes in customer switching intentions, when overall satisfaction-level fluctuates between low and high, we can confirm that there is an asymmetric and non-linear relationship between customer satisfaction and customer switching intention (**H4**). The result shows that satisfied customers are less likely to switch than dissatisfied customers. The probability of switching of a dissatisfied customer can therefore be 2.5 times more than satisfied customers. These statistics highlight the role of customer satisfaction as a mediating attitude between service attribute performance and customer switching intention.

Based on this argument, Figure 6.9 illustrates how service providers can benefit from this approach. By understanding the relationship between service quality attributes and customer satisfaction, decision makers will be able to manage then customer satisfaction levels. By altering these inputs (service attribute performance), they could conceivably alter the output (customer switching probability) in order to maximise profitability. In the next section, the relationship between customer satisfaction and switching intention will be analysed.

Figure 6.9: Customer retention management
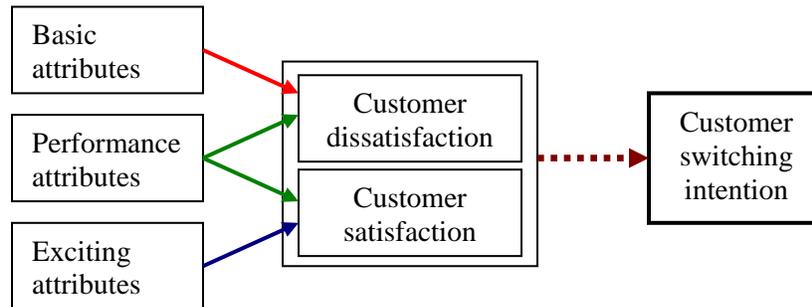
5. The Impact of Customer Satisfaction on Customer Switching Intention across Different Customer Segments

Customer behaviours may change with respect to the length of the contract in the mobile telecommunication industry. For this reason, customer data is divided into three segments: pay as you go (non-contractual), 12-month (medium term) and 18-month (long term). The logistic regression analysis separately conducted within each segment. Table 6.14 presents the summary statistics of the model. The values are statistically significant, however, the log-likelihood value for 18-month segment is slightly large.

Table 6.14: Logistic regression estimates of customer switching behaviour across different customer segments

	Non-contractual	Contractual	
	Short (pay as you go)	Medium (12-month)	Long (18-month)
Overall customer satisfaction	-1.992***	-1.104***	-0.378*
Constant	-11.185***	-7.278**	-2.223**
Cox and Snell R²	0.373	0.149	0.060
Nagelkerke R²	0.499	0.219	0.080
H-L test χ^2 (-2×log-likelihood)	78.663	72.837	129.420
Chi²	40.550***	12.058***	6.111**

Unstandardised beta coefficient are reported for all models

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, ns = not significant

The strength of the relationship between customer satisfaction and their switching intentions are positively increased from non-contractual to contractual. Non-contractual

customers are most likely to churn than contractual customers. However, it is still difficult to predict customer switching in non-contractual relationships where customers do not have any switching barriers or commitments to their service provider. For example, switching probability among non-contractual customers is nearly twice as much as the 12-month contractual customers. Moreover, in non-contractual segment, 40% of respondents stated that they use other networks. However, the customer data shows just only one percent use the service of a second network, on monthly basis. In other words, customers use second network for receiving calls rather than making calls. In addition, 33% of respondents in this segment use VOIP and the average spend is £13.36. In the 12-month segment, 30.8% of the respondents have another mobile line from a different network. On average, they spend £17.69 per month on the second network. Also 37.5% of the customers use VOIP services with an average cost of £7.15 per month. In the last segment (18-month), the customers use the service more frequently than the medium or non-contractual customers. The company would spend more resources on this segment since customers spend more (cross buying) and stay longer which in turn generate larger profit (Table 6.15). In additional, switching probability among customers in this segment is less than the other two segments (B = -0.378). The main reason is that customer behaviour changes over time. Customers usually get more committed to their service provider after a while, and then they would not easily shift to other providers (i.e. locked-in).

In addition, Figure 6.10 shows that the switching intention of customers in the three segments. In contractual segment, customers with 18-month contract are less likely to shift to other service providers comparing to 12-month segment, 57% against 73%. Consider 12-month contract, if 73% of customers leave each year, then it can be assumed that there is a 73% chance that any given customer will churn after a year. Thus, the average customer lifetime value would be reduced at a rate of 73% each year. Although in reality, the churn rate may not be as high as this rate. But customer churn rate is very high in mobile telecommunication sector comparing to other industries. If

the company by any means could improve customer churn rate, then average customer lifetime value may increase substantially.

Table 6.15: Spending behaviour across different segments

	Non-contractual	Contractual	
	Short (pay as you go)	Medium (12-month)	Long (18-month)
Average spending monthly basis	£21.00	£27.84	£34.72
Cross selling monthly basis	NA	£4.20	£5.73
VOIP spending monthly basis	£13.36	£2.51	£1.52
Average length of contract (S.D.)	NA	2.77 (1.82)	2.6 (2.017)
Share of wallet	NA	£5.44	£3.74

Figure 6.10: Customer switching behaviour
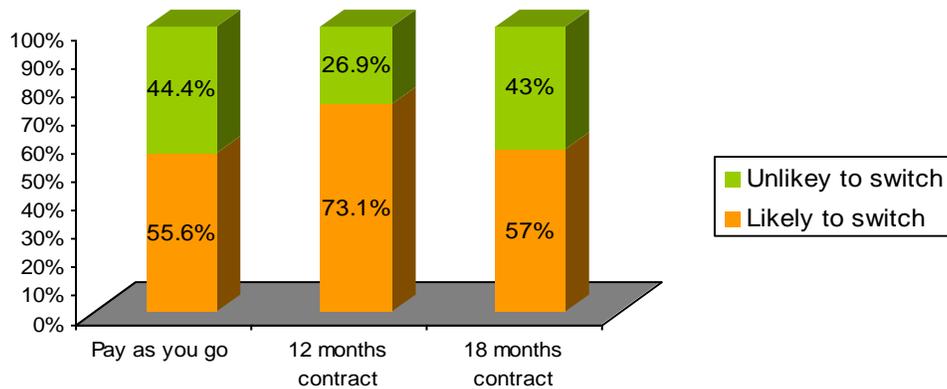
The equations of logistic regression for each segment are presented:

$$P \text{ (Switching Intention} \mid \text{Non-contractual)} = \frac{1}{1 + e^{-(-11.185 - 1.992 X_1 + \varepsilon_i)}} \tag{6.8}$$

$$P \text{ (Switching Intention} \mid \text{Contractual 12-month)} = \frac{1}{1 + e^{-(-7.278 - 1.104 X_1 + \varepsilon_i)}} \tag{6.9}$$

$$P \text{ (Switching Intention} \mid \text{Contractual 18-month)} = \frac{1}{1 + e^{-(-2.223 - .378 X_1 + \varepsilon_i)}} \tag{6.10}$$

Such approach to customer data may help companies to visualise their profitability based on customer equity or the lifetime value (LTV) which is based on customers' churn rate and the likely future purchases. In order to increase customer equity, we need to add more customers, increase customer satisfaction-level, and also encourage customers to recommend the service or product to their friends (word of mouth). Then, as customer equity grows, it enables the service provider to generate more profit. More importantly, when a business loses valuable customers then customer equity plummets to zero or below zero, because they might communicate their bad experience with the service with other existing or potential customers. As a result, if customer equity does not grow or if it begins to shrink, then the business will eventually decline.

More importantly, being equipped with the proposed model, system decision making could allocate resources to assess where maximum yield could be sought. Providing other components of customer equity such as share of wallet, length of relationship and cross-selling can strengthen the decision making process.

The discussions have concluded that the relationship between customer satisfaction and switching intention is asymmetric. Table 6.16 performs the impact of the overall customer satisfaction (low satisfaction and high satisfaction) on switching intentions for each segment: pay as you go (short), 12-month (medium) and 18-month (long). The customer data analysis reveals that the impact of customer dissatisfaction on switching intention is significantly more than customer satisfaction on switching intention. Note that the b-values for low satisfaction is not significant ($P > 0.1$). Moreover, the probability of switching in satisfied customers decreases from the non-contractual to the contractual customer segment. For example, a satisfied customer from non-contractual segment is twice likely to be retained compared to a satisfied customer with 12-month contract. As the factor structure of customer satisfaction is identified, then it is possible to decrease customer switching probability by spending more resources on the appropriate attributes.

Table 6.16: The relationship between customer satisfaction and switching intention across different segments

	Pay as you go contract		12-month contract		18-month contract	
	Low satisfaction	High satisfaction	Low satisfaction	High satisfaction	Low satisfaction	High satisfaction
B	5.247 (*ns*)	-1.625**	13.582 (*ns*)	-0.849**	0.289 (*ns*)	-0.061(*ns*)
Cox and Snell R²	77.155		71.423		132.562	
Nagelkerke R²	0.383		0.164		0.030	
H-L test χ^2	0.514		0.243		0.040	

Independent variables: low satisfaction, High satisfaction.
*** $p< 0.001$, ** $p< 0.05$, * $p< 0.1$, *ns* = not significant

In Section 6, we evaluate the impact of length of relationship in customer satisfaction-switching intention model.

6. The Relationship between Customer Satisfaction, Length of Relationship and Customer Switching Intentions

To evaluate the impact of the type of relationship or length of relationship on the relationship between customer satisfaction and customer switching intentions, with respect to three scenarios to test the overall model significance: scenario 1, with only length of relationship, scenario 2, with one independent variables of overall satisfaction, and scenario 3, with both factors: overall satisfaction and length of the relationship. Tables 6.17 (non-contractual segment) and 6.18 (contractual segment) present the results of the logistic regression analysis. For non-contractual segment, Cox and Snell *R²* and Nagelkerke *R²* of model 1 are very low and there are 0 and 0.001 differences in Cox and Snell *R²* and Nagelkerke *R²* between model 2 and model 3. Importantly, the customer data analysis reveals that the relationship between length of relationship and switching intention is not statistically significant, whereas overall satisfaction has a strong relationship with switching intention.

Table 6.17: The impact of overall satisfaction and length of relationship on switching intention (non-contractual customers) using logistic regression

	Model 1	Model 2	Model 3
Length of relationship	-0.184 (*ns*)		-0.025 (*ns*)
Overall customer satisfaction		-1.992***	-1.997***
Cox and Snell R^2	0.009	0.373	0.373
Nagelkerke R^2	0.012	0.499	0.500
H-L test χ^2	118.442	78.663	78.655

Unstandardised beta coefficient are reported for all models
***P <0.01, **P <0.05, *P <0.1, *ns* = not significant

The results of contractual segment show the similar relationship between length of relationship, overall satisfaction and switching intention (Table 6.18). Cox and Snell R^2 and Nagelkerke R^2 of model 1 are very low and there are 0.003 and 0.004 differences in Cox and Snell R^2 and Nagelkerke R^2 between model 2 and model 3.

Table 6.18: The impact of overall satisfaction and length of relationship on switching intention (contractual customers) using logistic regression

	Model 1	Model 2	Model 3
Length of relationship	-0.052 (*ns*)		-0.018 (*ns*)
Overall customer satisfaction		-0.666***	-0.660***
Cox and Snell R^2	0.002	0.108	0.105
Nagelkerke R^2	0.003	0.149	0.145
H-L test χ^2	222.923	202.722	202.624

Unstandardised beta coefficient are reported for all models
*** $P < 0.0001$, ** $P < 0.01$, * $P < 0.05$, *ns* = not significant

The results show that length of relationship does not really affect customer switching intention. There, H5 can be rejected as it assumes that there is a positive and direct correlation between length of contract and customer switching intention. It is also revealed that the impact of customer satisfaction on switching intention in contractual segment is stronger than non-contractual segment. In this case, contractual customers are less likely to switch than non-contractual customers. In reality, switching barriers

(penalties) increases switching costs and, in turn, do not allow customers to churn easily. Therefore, we can confirm that **H6** (Higher levels of switching costs are associated with higher levels of switching barrier.) and also **H7** (Higher levels of perceived of switching barriers are associated with lower levels of switching intention).

7. The Relationship between Customer Satisfaction, Customer Switching Intention (Retention) and Word of Mouth (Referral)

To measure the relationship between customer satisfaction, retention and loyalty, a multiple regression model was used, using customer satisfaction and customer retention as independent variables and customer loyalty as dependent variable (see Equation 6.13). Thus, multiple regression analysis estimates the degree of influence that satisfaction and retention have in determining customer loyalty (word of mouth behaviour).

$$WOM = \alpha_0 + = \beta_1 Customer\,Satisfaction + \beta_2 Customer\,Switching\,Intention + \varepsilon_0 \quad (6.13)$$

Where:

WOM = word of mouth
CS: customer satisfaction
CSI: customer switching intention

To begin with, Table 6.19 (a) represents descriptive statistics, the mean and standard deviation of each variable in our data set. In addition, Table 6.19 (b) shows value of Pearson correlation coefficient between every pair of variables. For example, there is a large positive correlation between customer satisfaction and customer loyalty (R = 0.613). Second, the one-tailed significance of each correlation is demonstrated. All correlations are significant as $P < 0.0001$. Finally,

Table 6.19 (a): Descriptive Statistics of customer word of mouth behaviour model

	Mean	Std. Deviation	N
Loyalty	3.72	0.900	261
Overall customer satisfaction	5.13	1.364	261
Customer retention	0.62	0.487	261

the number of cases contributing to each correlation (N = 261) is shown. The results also show that there is no multicollinearity between in data as there are no substantial correlations (R > 0.9) between predictors.

Table 6.19 (b): word of mouth model

		Customer loyalty degree	Overall customer satisfaction	Customer switching
Pearson Correlation	Customer loyalty	1.000	0.613	0.386
	Overall customer satisfaction	0.613	1.000	0.318
	Customer switching	0.386	0.318	1.000
Sig. (1-tailed)	Customer loyalty	.	0.000	0.000
	Overall customer satisfaction	0.000	.	0.000
	Customer switching	0.000	0.000	.
N	Customer loyalty	261	261	261
	Overall customer satisfaction	261	261	261
	Customer switching	261	261	261

Table 6.20 shows the customer loyalty model statistics. This shows that by entering one predictor (overall satisfaction), the correlation (R) between predictor and customer loyalty is 0.613. For this model R^2 value is 0.375, which means that customer satisfaction accounts for 41.6% of the variation in customer loyalty degree. However, when the other predictor is included as well (model 2), this value increases to 0.416 or 41.6% of the variance in customer loyalty degree. Therefore, if customer satisfaction accounts for 37.5%, one can deduce that the customer retention accounts for an additional 5%. So, customer satisfaction is the major player in customer loyalty as it explains the large degree of the measured variations.

Table 6.20: Model summary of customer word of mouth behaviour

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.613(a)	0.375	0.373	0.713	0.375	155.642	1	259	0.000	
2	.645(b)	0.416	0.411	0.690	0.040	17.887	1	258	0.000	1.920

a Predictors: (Constant), Overall satisfaction
b Predictors: (Constant), Overall satisfaction, switching behaviour
Dependent Variable: Loyalty

In addition, Table 6.21 contains an analysis of variance (ANOVA) to test if the model is significantly better at predicting the outcome than using the mean values. The F-ratio represents the ratio of improvement in prediction that results from fitting the model. As demonstrated, in each of the models. The sum of squares (SS_M) represents the improvement in prediction resulting from fitting a regression line to the data rather than using the mean as an estimate of the outcome. Residual sum of squares (SS_R) represents the total difference between the model and the observed data. The degrees of freedom (*df*) is equal to the number of predictors (one for the first model and two for the second), and for SS_R it is the number of observations (260) minus the number of coefficients in the regression model. The first model has two coefficients; one for the dependent variable and the other for the constant, whereas the second has three (one for each of the two dependent variables and one for the constant). For the initial model the *F*-ratio is 155.642 ($p < 0.0001$) while for the second model the value of *F* is less (91.839), which is also highly significant ($p < 0.0001$). The results prove that the initial model has significantly improved the ability to predict customer the degree of customer loyalty, but using customer retention did not indicate any significant relationship (the F-ratio is less significant).

Table 6.21: An analysis of variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.045	1	79.045	155.642	.000 (a)
	Residual	131.537	259	0.508		
	Total	210.582	260			
2	Regression	87.574	2	43.787	91.839	.000 (b)
	Residual	123.009	258	0.477		
	Total	210.582	260			

a Predictors: (Constant), Overall satisfaction
b Predictors: (Constant), Overall satisfaction, customer switching
Dependent Variable: Customer loyalty

Finally, Table 6.22 shows the model parameters for both steps in the hierarchy. The *b*-values represent the relationship between the degree of customer loyalty and each of the predictor. If the b-value is positive then there is a positive relationship between the predictor and the independent variable whereas a negative coefficient represents a negative relationship. For these data both customer satisfaction and customer retention have positive relationship with the outcome. So, as customer satisfaction-level increases, customer loyalty increases, and as the customer retention increases customer loyalty also increases.

In addition, the *b*-values demonstrate the extent that each independent variable affects the dependent variable if all the other predictors remain constant.

Therefore in the fist model;

- **Overall customer satisfaction** (B = 0.404): This value indicates that as the overall satisfaction-level increases by one level, customer loyalty degree increases by 0.404 levels. Each *b-value* has an associated error used to determine whether or not the b-value differs significantly from 0. The standard error indicates the extend of the *b*-value with respect to different samples. The *t*-test is a suitable method to measure whether the predictor is making a significant contribution to the model or otherwise. For the first model, overall customer

satisfaction (t (260) = 12.476, $P < 0.0001$) is significant predictor of the degree of customer loyalty (the smaller the value of *Sig.* and the larger the value of *t*). However, the standardised *b-values* are more convenient to interpret. The *b-values* indicate the number of standard deviations that the dependent variable will change as the result of one standard deviation change in the independent variable. In the second model, the standardised beta (β) values for the overall satisfaction and customer retention are 0.545 and 0.212. This demonstrates that the overall satisfaction comparable is more dependent on the importance of the service attribute than customer retention. In case of having different samples, the confidence interval of the non-standardised *b*-values indicate that the boundaries of 95% confidence interval of samples will contain the true value of *b*.

Table 6.22: The impact of overall satisfaction and switching intention on customer referral (loyalty) using multiple regression analysis

Model	Unstandardised Coefficients		Standardised Coefficients	t	95% confidence interval for B	
	B	Std. Error	Beta		Lower Bound	Upper Bound
1 Constant	1.646***	0.172		9.570	1.307	1.985
Overall customer satisfaction	0.404***	0.032	0.613	12.476	0.340	0.468
2 Constant	2.117***	0.200		10.284	1.722	2.511
Overall customer satisfaction	0.360***	0.033	0.545	10.860	0.294	0.425
Customer switching intention	-0.392***	0.093	-0.212	-4.229	0.575	0.210

(a) Dependent Variable: customer loyalty

*** $P < 0.0001$, ** $P < 0.01$, * $P < 0.05$, *ns* = not significant

In the second model, the *b-values* for overall satisfaction and switching intention are 0.360 and -0.392 respectively. But as discussed previously, the t-test and standardised beta value (β) is more significant in the first model. If we replace the b-values from models 1 and 2 into Equation 6.14, then the model can be expressed as:

Customer Word of Mouth = 1.646 + 0.172 × CS + ε   (6.15)

Customer Word of Mouth = 2.117 + 0.360 × CS - 0.392 × CR + ε   (6.16)

In conclusion of this section, it can be confirmed that there is a positive relationship between customer satisfaction, switching intention and word of mouth behaviour (**H8**). The following section provides an analysis of the impact of word of mouth across different customer segments.

8. The Relationship between Overall Satisfaction, Switching Intention and Word-of-mouth (loyalty) across Different Segments

Similar analysis for customers' word of mouth model was also conducted across different customer segments. Such approach shows how customer satisfaction, switching intention and length of relationship may affect word of mouth (loyalty) behaviour within various segments. Table 6.23 presents the statistics of this analysis. The data reveals that the length of relationship is not statistically significant. However, previous literature argues that the length of relationship plays a significant role in word of mouth behaviour. Both customer satisfaction and switching intentions significantly affect the word of mouth. However, switching intention has more impact on word of mouth than customer satisfaction. It was also noticed that the impact of customer satisfaction and switching intention on WOM in 18-month segment is stronger than 12-month segment.

Table 6.23: The impact of customer satisfaction, switching intention, length of relationship on switching intention using multiple regression

	Non-contractual	Contractual	
	Pay as you go	12-month	18-month
Overall customer satisfaction	0.291***	0.291***	0.383***
Switching intention	0.360**	0.321 (*ns*)	0.627***
Length of relationship	0.011 (*ns*)	0.023 (*ns*)	-0.011 (*ns*)

*** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$, *ns* = not significant
Dependent: Customer loyalty

8. Chapter Conclusions

This chapter presented the tests that were conducted to explain the service quality-customer behaviour conceptual model in the mobile telecommunication industry. Based on the empirical data reported in this chapter, the research work drew some conclusions. However, it is important to appreciate the positioning of such conclusions within the context of empirical methodology presented in previous chapter. Table 6.24 represents the conclusions derived from the implantation of various stages of the empirical research presented in this chapter. The empirical investigation indicates that the proposed methods can be used to model the service quality attributes-customer behaviours and (b) could support the decision making. This section has both theoretical and practical contributions.

The study also employed multiple regression analysis with dummy variables to indentify three types of service attributes within mobile telecommunication sector: the basic, the neutral and the exciting attributes. As a result, network performance, customer service quality and value for money are classified as exciting attributes, range of phones and accuracy of billing and payment are classified as basic attributes and service plans categorised as neutral (Objective 1). In other words, exciting attributes generate satisfaction levels and do not impact overall customer satisfaction if the attributes performed poor. While basic attributes make dissatisfaction if they are not performed well and do not affect satisfaction if they are fulfilled well. And finally, neutral attributes do not generate satisfaction and dissatisfaction. As a result, network performance, customer service quality, and value for money are classified as exciting attributes. These findings contradict the traditional assumption that the relationship between service quality attributes and customer satisfaction is symmetric and linear.

Such approach also reveals the fact that researchers and practitioners can apply dummy variables technique to SEM method where it is based on multiple regression analysis. By adding dummy variables, then, SEM can be also used where there is a possibility of asymmetric correlation between variables. In other words, researchers can evaluate the impact of different levels of independent valuables on depend variable. However, the

limitations posed by SEM can be overcome by combining the method with other techniques such as Bayesian networks (not in the scope of this study, but a possible future area for exploration).

Table 6.24: Main findings

Stage of Empirical Investigation	Research Issue	Defined	Applied	Tested	Validated	Findings and Propositions
1	Service attribute classification	✓	✓	✓	✓	Three types of attributes were identified within mobile telecommunication industry: Basic, Exciting and Neutral/Indifference.
2	Importance-performance analysis	✓	✓	✓	✓	- There is a dynamic correlation between importance and performance of attributes. - Attribute importance is a function of attribute performance.
3	Resource allocation	✓	✓	✓	✓	The result of regression with dummy variable applied to the traditional IPA method.
4	Customer switching intention		✓	✓	✓	- Dissatisfied customers are twice likely to switch than satisfied customers. - There is a significant difference among different customer segments in terms of switching intention ratio.
5	Customer segmentation		✓	✓	✓	Customer behaviours may vary based on switching barriers and costs.
6	Word of mouth behaviour		✓	✓	✓	- There is a strong relationship between customer switching intention and word of mouth behaviour.

Comparing the results of methods for measuring attribute importance (direct and indirect) reveals the controversy over the relationship between service attribute performance and overall customer satisfaction (Objective 2). From a theoretical perspective, the use of the regression with dummy variables provided a holistic view of service quality analysis. As a result, the outcomes oppose an assumption of independence between the importance of an attribute and its performance. In other words, attribute importance is an antecedent of attribute performance. The relationship, however, between these two factors change based on the type of service attribute. In addition, the thesis proposed a revised IPA approach that comprises three-factor theory concept and multiple regression analysis with dummy variables. As the outcome of the traditional IPA analysis do not converge with the results provided by the regression analysis with dummy variables. By applying such approaches to real business, managers should be aware that changes to attribute performance are associated with changes to attribute importance since service attributes has a dynamic characteristic.

As a result, the need to develop customer satisfaction that properly account for the non-linear and asymmetric relationship between attribute performance and overall satisfaction is paramount if resource allocation to enhance customer satisfaction is to be correctly prioritised. The revised IPA method that includes the actual importance of customer satisfaction attributes may assist managers in resolving service quality management and customer relationship management (CRM) issues. However, quality improvement is not a guarantee of increased sales or profits. This fact is avoided by previous studies as it assumed that management are keen to improve service quality and customer satisfaction, though this increase will increase costs as well.

The research also investigated the role of customer satisfaction in the chain of service quality-customer behaviour. It is found that customer satisfaction plays as a mediating attitude between service quality performance and customer future intention such customer retention and customer loyalty (Objective 3). As a result, it is found that there is a nonlinear and asymmetric relationship between customer satisfaction, retention and

loyalty. Finally, the study found that the length of relationship does not really affect customer future intention such as switching and word of mouth (Objective 4).

The findings have implications for management strategies and telecommunication policy. The telecommunication industry is facing an accelerated rate of churning among customers since over its market has reached to maturity stage. With intensified competition, non-contractual relationships with customers may not be an effective way to improve customer retention in the future. By using this methodology, companies can set up different strategies for different customer segments to develop and promote various services instead of uniform strategies for all customers.

The main conclusions drawn from the evaluation of customer behaviour (Figure 6.11) in the mobile telecommunication are summarised as below:

- Service quality attributes can be classified into different groups with respect to their impact on customer satisfaction. In this study, we identified three types of factors: basic, exciting, and neutral.

- Attribute importance is a function of attribute performance.

- There is a different relationship between attribute importance and attribute performance with regard to attribute classification.

Figure 6.11: The behavioural and financial consequences of service quality attributes
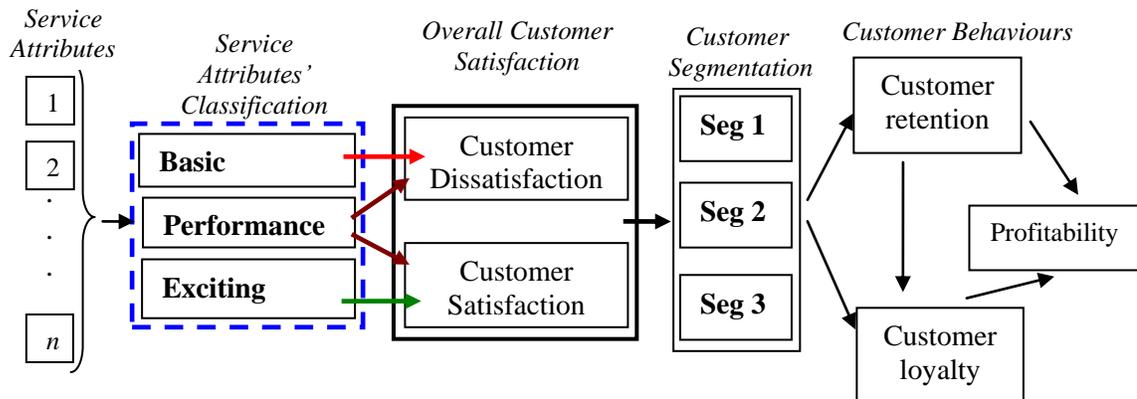
- Customer satisfaction plays a mediating role between attribute performance and customer switching intention and word of mouth behaviour.

- There is asymmetric relationship between overall customer satisfaction and switching intention.

- The length of relationship does not significantly affect customer switching intention in both contractual and non-contractual segment.

- There is a strong and positive relationship between switching costs and customer switching intention. Customers with high switching barriers and costs may have higher switching intention rather than customers from non-contractual segment.

- There is a positive correlation between customer switching intention and word of mouth behaviour.

If the companies were to add up the lifetime values of all existing customers and future customers, the result would be customer equity which presents the net present value (NPV) of all the cash flow that ever will be produced by customers. In other words, customer equity equals to the economic value of business. Activities like retaining profitable customers, increasing cross-selling, word-of-mouth and reducing the cost of services can increase customer equity. Using such analysis really depends on a firm's strategy, where managers can create new value to the business in two different ways or maybe in both ways at once:

1. Generate more profit today, and
2. Generate more customer equity today.

There are still companies that build their strategic planning on earliest return on investment (ROI). Therefore, such approaches can be useful where top management thoroughly believe in that customers are durable assets who make generate profit for the company.

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7

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS FOR

FUTURE RESEARCH

This chapter concludes the research reported in this thesis, presents its contribution, and proposes areas of further research. It begins with a summary of the thesis and draws conclusions that are derived from both the literature and empirical research reported in this dissertation. The limitations of the research undertaken are identified and discussed. The chapter concludes by proposing further direction of this research.

1. Summary of the Thesis

The thesis proposes a framework for service quality-customer behaviour. It uses the volatile mobile telecommunication industry case study. The study tests the interrelationship between service quality attributes, customer satisfaction, customer retention of switching and customer loyalty (word of mouth). It attempts to highlight the role of customers in determining the strategies and of service design. When a customer complains, the actual value of business will probably decline, since the expected future earning from that customer may decline. It may be argues that a company's current sales and profit figures may not be the most suitable measure of success of their business. If customers experience high quality of service then they are likely to purchase services from the provider and recommend the service to others. On the other hand, unsatisfied customers may shift to other providers and also based on their experience may also

discourage other to subscribe to the service. More importantly, these value transactions (creation or destruction) can not be captured in simplistic financial analysis.

The factors that drive the effectiveness of customer behaviour modelling can be structured into the following categories:

1. Customer characteristics
2. Product or service characteristics

The key customer characteristic relevant to the effectiveness of service quality attributes-customer behaviour modelling is the skewness of customer value distribution. Depending on the industry, the skewness of the distribution of the customer's value may differ.

The thesis discussed how a business can create new value for shareholders by converting prospects to customers. It linked service quality attributes to three metrics; customer satisfaction, retention and loyalty. In chapter 2, the author reviewed the normative literature of service management and marketing. In Chapter 3 the conceptual model and the hypothesises of the research were discussed. In Chapter 5, reliability and validity analysis for the collected data set was conducted. And finally in Chapter 6 the empirical data derived from the case study was used to test the hypothesis proposed in Chapter 3. The empirical findings confirmed that the relationship between service quality attributes and customer behaviour.

The proposed conceptual model can be easily adopted by a broad range of industries for customer experience management (CEM), customer relationship management (CRM), strategic planning, resource allocation, and decision making processes.

2. Meeting the Objective of this Dissertation

In order to achieve the aim of this dissertation, a number of objectives were defined in Chapter 1 and have accomplished as discussed in the previous chapters. These objectives are summarised in Table 7.1 and analysed in the following paragraphs.

Table 7.1: Meeting the objectives of this dissertation

Objective	Section/Chapter
Objective 1	To understand the notion of quality of service and customer satisfaction.
Objective 2	To understand the relationship between service attribute importance and performance and their impact on resource allocation.
Objective 3	To establish a framework that links service attribute performance to customer satisfaction and then to customer future intentions (customer retention and customer loyalty).
Objective 4	To understand the impact of length of relationship on customer future intention.

Objective 1

To assess the relationship between service attribute performance and customer satisfaction, regression analysis with dummy variables was employed. For these data, we found both positive and negative relationship between predictors and the outcome. This means, when performance level increases then overall satisfaction-level increases and vice versa. As a result, the accuracy of billing and payment (AoBP) and range of phones (RoP) can be classified as basic attributes. Their impact (coefficient) on overall customer satisfaction is high when performance-level is ranked low, while they do not significantly affect overall customer satisfaction when performance-level is ranked high. Customer service quality (CSQ), network performance (NP), and value for money (VFM) can be viewed as exciting attributes. They increase customer satisfaction levels if they fulfilled, while they do not significantly affect overall customer satisfaction when performance-level is ranked high. However, network performance has a higher impact on overall customer satisfaction when performance-level is ranked high comparing to CSQ and VFM. Furthermore, results show that the service plans (SP) is a neutral attribute, as it does not result in either customer satisfaction or customer dissatisfaction. In this study, no performance or one dimensional attribute was identified.

The results show that the relationship between service quality attributes and customer satisfaction is non-linear and asymmetric.

Objective 2

The result from multiple regression analysis with dummy variables accommodates the concept of change in the relative importance of attributes with change in attribute performance as a function of overall customer satisfaction. In other words, there is asymmetric relationship between attribute performance and importance. Considering service attribute classification, importance of a basic or an exciting attribute depends on its performance. Exiting attributes are important if performance is high but are unimportant when performance is low (network performance, customer service quality, and value for money). Basic attributes are important if performance is low, but unimportant if performance is high (range of phones and accuracy of billing and payment).

Such approach contradicts the traditional view that the relative importance of service attributes is adequately represented as a point estimate. If the asymmetries are not considered, the impact of the different service attributes on overall customer satisfaction is not correctly assessed.

Objective 3

The results verify that there is a non-linear and asymmetric relationship between customer satisfaction and customer switching intention. In other words, the impact of customer satisfaction on switching intention varies from negative to positive within the overall satisfaction domain. The results show that the higher levels of customer satisfaction has greater impact on customer switching intention rather than the lower levels. In addition, the strength of the relationship between customer satisfaction and switching intentions are positively increased from non-contractual to contractual.

Moreover, studying the relationship between customer satisfaction, customer switching intention and customer loyalty show that there is a positive relationship between three constructs.

Objective 4

The results show that length of relationship does not impact customer switching intention and word of mouth. It is confirmed that customer satisfaction plays an important role in customer switching intention and word of mouth behaviour. In other words, customer satisfaction plays as mediating attitude between service quality attributes and customer future intention.

3. Main Findings

By applying the methods introduced in this thesis, there is a possibility for companies to:

- Improve sale productivity and effectiveness
- Achieve higher customer satisfaction through better responsiveness
- Increase visibility of service or product in the market
- Better project customer reaction to service attributes

The main findings derived from the work presented in this dissertation are presented below:

Finding 1   By reviewing the normative literature, it was suggested that service quality attributes should be classified based on their impact on customer overall satisfaction. Such classification was applied and proved to help understanding the relationship between satisfaction, retention and loyalty of customers.

Finding 2   The study compared two methods for measuring service attribute importance. These two methods were the direct and the indirect method. The indirect method was chosen as the better method due to the fact that in the direct method respondents may not take into account the current level of attribute performance with respect to satisfaction while in the direct method the importance of the attribute is based on the current level of performance with respect to satisfaction for that attribute.

Finding 3   using IPA method, the impact of service attribute classification on resource allocation process was measured, and as a consequence, the importance-performance analysis was revised.

Finding 4   The literature review indicated that there is limited research in the area of service quality-customer behaviour.

Finding 5   The conceptual model can be used as a tool for decision-making to support organisations, and to allow researchers and practitioners to relate customer behaviours to profitability.

4. Statement of Contribution and Research Novelty

It was proposed that service industries should consider the influence of service attribute classification when designing their services and products. To date, several studies assume the relationship between service quality attributes and customer satisfaction linear and symmetric. Considering the relationship linear can not help managers to understand how to improve performance with respect to customers' opinion, needs and preferences. As a result, it can decrease profitability and also increase switching rate with customers. Understanding the impact of service attributes on customer satisfaction can help decision makers within resource allocation process. A model was proposed interrelating three factors in product and service design, i.e. satisfaction, retention and loyalty. The empirical studies prove that the proposed model can be used to identify customer satisfaction behaviour, customer retention and loyalty. The case was proposed and tested in one of the most volatile service industry, the mobile telecommunication industry.

5. Research Limitations

The empirical study conducted here has a number of limitations. Some of the limitation can be listed as relatively small sample size of customers. This was due to the complexity of survey, and that was direct to measure accuracy of responses. Secondly,

the case studies could have been extended to other sectors such as manufacturing, transportation, healthcare and etc.

6. Further Research

While the findings reported in this thesis go some way to resolving the research problem outlined, much remains unresolved. Accordingly, for broad areas are suggested for future research direction. These research areas are: (1) lifetime value (LTV), (2) cross cultural study, (3) further exploration of hypothesised relationships including new methods of investigation, and (4) test of the models for applicability in other industrial sectors. While customer equity or LTV is an accepted concept in marketing circles, there is little empirical evidence released so far. In addition to study the customer behaviour cross different cultures could provide more in-depth insight. As customers from different cultures have different preferences and expectations.

A third broad approach my involve testing the nature of hypothesised relationships. For instance some previous studies suggested that relationships might be better represented by curvilinear. Finally, researchers could consider testing the relationships investigated in this thesis in different sectors, to find a compromised general model that can be used in all sectors as the basic formulation for projecting changes to customer satisfaction, retention and loyalty where product attributes vary. Based on the case data validated the proposed method, the following propositions have been made for further research:

- Linking structural equation modelling to other techniques such as Bayesin networks can improve its limitations and be highly beneficial for both academy and industry.

- A strong implication to identify exciting attributes within mobile telecommunication service by benchmarking. For instance, recently Vodafone has added a new feature to its services which enables subscribers to transfer their money by their mobile phone. The new attribute should be measured by a new metric which can affect other customer behavioural and attitudinal variables.

- A cross cultural investigation to identify the role of culture in customer behaviour can significantly benefit service providers especially within service attributes design and customisation, as most of mobile telecommunication service providers are multinational.

- Applying product attractiveness theory to service quality attributes. However, the study would take long time but can bring lots of value to the business.

- Applying the presented conceptual model in this thesis to other service industries can identify the gap between major players.

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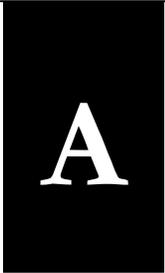
APPENDIX A:

QUESTIONNAIRE AGENDA USED FOR MOBILE TELECOMMUNICATION - UK

Questionnaire Agenda

Dear Respondent;

In this survey, we aim to measure customer behavioural variables, in mobile network, which significantly affect profitability. The survey should not take long to complete (max 4 min). Most questions can be answered with a tick, but there are also opportunities for you to add your own comments.

-Please supply the following information:

Age: ..…………. Occupation: ……………..………………..

-Are you on: Contract ☐   Pay as you go ☐

-Which network(s) are you with:

T-mobile☐   Virgin☐   3☐   Vodafone☐   O2☐   Orange ☐

-In case of contract please specify;

The length of your contract: 12 months☐   18 months ☐   24 months☐

On average how much you pay for your mobile phone bill each month?

Fixed bill = £ ---+ others £----

-In case of <u>pay as you go</u> please specify;

How much on average you top up your mobile phone each month? £ -----

-Please rank just <u>the three most important attributes</u> in order of importance to choose a new mobile network, from 1 (most important) to 3 (least important)?

Network performance (coverage and reception)
Brand image
Range of services (e.g. broadband, voicemail, and video message)
Customer service quality
Service plans (Tariffs and Charges)
Range of phones
Accuracy of billing and payment
Value for money
Entertainment features (e.g. music club)

1	
2	
3	

-Please rank your service provider based on?
(1= Poor, 2=very bad, 3=bad, 4= Reasonable, 5=good, 6=very good, 7= Excellent) and
NA= not applicable

	1	2	3	4	5	6	7	NA
1.Network performance (coverage and reception)								
2.Customer service quality								
3.Brand image								
4.Range of services (e.g. broadband, voicemail, and video message)								
6.Service plans (Tariffs and Charges)								
7.Range of phones								
8.Accuracy of billing and payment								
9.Value for money								
10. Entertainment features (e.g. music club)								
11. Overall performance								

- What is your overall satisfaction level towards your mobile phone and service provider?

1. Strongly dissatisfied ☐   2. Dissatisfied ☐   3.Somehow dissatisfied ☐
4.Neutral ☐   5. Somehow satisfied ☐   6. Satisfied ☐   7.Strongly satisfied ☐

-Do you use the following services?

MMS   Yes ☐   No☐

Would you consider using this service for a lower price/value? Yes ☐   No ☐ Maybe ☐

Internet   Yes ☐   No ☐

Would you consider using this service for better price/value? Yes☐   No☐   Maybe ☐

Roaming   Yes ☐   No☐

Would you consider using this service for better price/value? Yes ☐   No ☐   Maybe ☐

Extra bundle message   Yes☐   No ☐

Would you consider using this service for better price/value? Yes ☐   No ☐   Maybe ☐

Video message   Yes ☐   No ☐

Would you consider using this service for better price/value? Yes ☐   No☐   Maybe ☐

Insurance   Yes ☐   No ☐

Would you consider using this service for better price/value? Yes ☐   No ☐ Maybe ☐

-Please specify number of years you have been using same network? ___

-What are the main reasons for you to stay with same service provider?

1	
2	
3	

-Would you consider switching to a better offer from another service provider?
Likely ☐   Unlikely☐

-Do you have another mobile phone with a different service provider, either pay as you go or contract? Yes☐   No ☐

If yes, on average how much you pay for that each month? £ ------

- Do you use VOIP, Telephone card, Skype? Yes☐   No ☐   how much you spend per month? £------

-Do you recommend your mobile network provider to friends or relatives?

   1. I would highly oppose ☐

   2. If I asked, I would not recommend ☐

   3. I would neither recommend nor oppose ☐

   4. If I asked, I would recommend ☐

   5. I would highly recommend ☐

ADDENDUM - PUBLISHED PAPERS

Importance-Performance Analysis of Service Attributes and its Impact on Decision Making in the Mobile Telecommunication Industry

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Abstract

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 to firstly investigate the asymmetric relationship between performance of service attributes and customer satisfaction. And secondly, 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 is 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 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 causes the highest customer dissatisfaction are the range of phones, the accuracy of billing and payment, and the service plans, whereas the major strengths as source of customer satisfaction are the customer service quality, the value for money and network performance.

Research limitations/implications – The Kano's model of customer satisfaction needs to be extended the 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. This research paper does not include customer retention and loyalty factors.

Practical implications – The methodology employed in this paper 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. This paper in specific investigates the applicability of the model and the key factors in mobile telecommunication industry.

Keywords Decision Making, Kano's model, Customer satisfaction, Importance-performance analysis (IPA), Resource management, Customer relationship management (CRM), Mobile telecommunication industry

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 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, 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, 1998; 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; Varva, 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 model of customer satisfaction (1984). 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; (1) performance and importance of attributes are independent variables (Martilla and James, 1997; Oliver 1997; Bacon 2003), and (2) 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 Table 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).

Table.1 Traditional Importance-performance analysis (IPA) grid

Quadrant I High Importance Low Performance	**Quadrant II** High Importance High Performance	**Quadrant I:** Improvement efforts should be concentrated on the attributes of this cell (major weakness). **Quadrant II:** Keep up the good work (major strength).
Quadrant IV Low Importance Low Performance	**Quadrant III** Low Importance High Performance	**Quadrant III:** Low priority efforts should be spent on the attributes of this cell (minor strength). **Quadrant IV:** Unnecessary to spend present efforts on the attributes of this cell (minor weakness).

Attribute importance (vertical axis label)

Attribute performance

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 (1984) service quality attributes can be classified into three groups; (1) basic, (2) performance, and (3) excitement (Anderson and Mittal, 2000; Matzler *et al.*, 2004; Oliver, 1997), see Fig 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.

- *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.

-
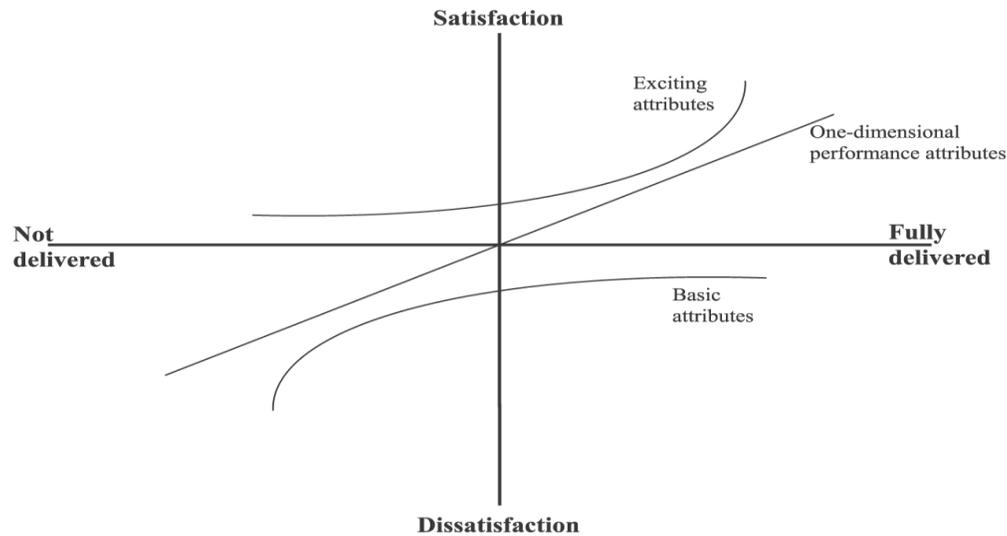
Fig. 1. Three-factor theory (Source: Busacca and Padula, 2005)

- *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.*, 1999; 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; Varva, 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 (see Appendix). 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% percent 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 was 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 2.

Table 2. 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)

R^2 = .480, *F*-value = 34.936,
***P < .01, ** P<.05, *P<.1, *ns* = not significant

Figure 2 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.

Fig. 2. IPA grid
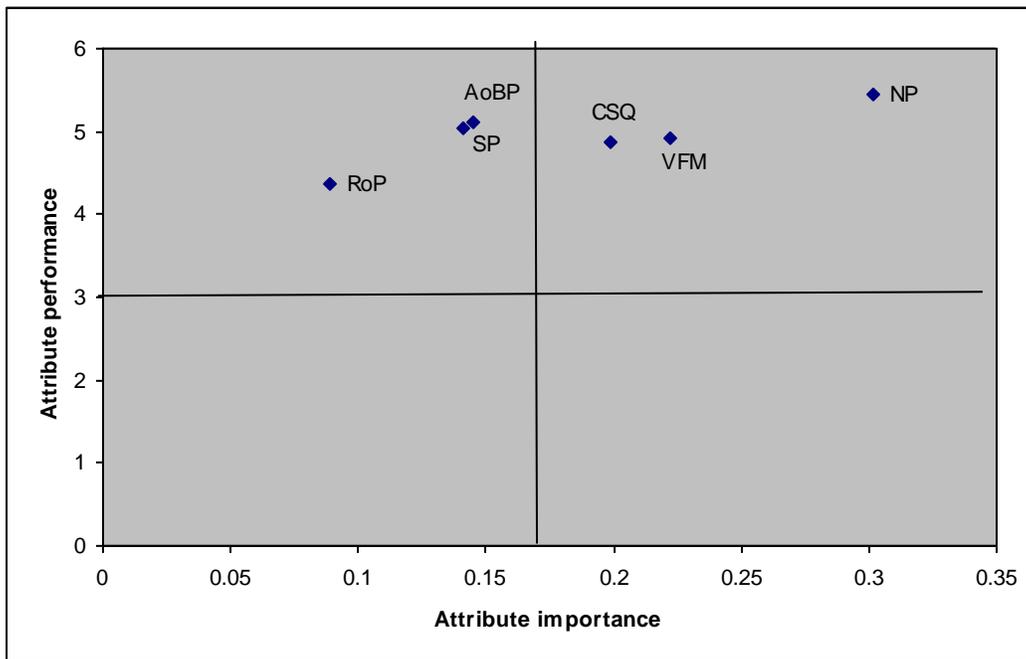
5.2. The Kano model analysis

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 3 and Fig 3).

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

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.

Table 3. 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*)	.366***
Customer service quality	-.001 (*ns*)	.221***
Service plans	-.009 (*ns*)	.068 (*ns*)
Range of phones	-.130 **	-.114*
Accuracy of billing and payment	-.115**	.064 (*ns*)
Value for money	-.012 (*ns*)	.202***

R² = .469; *F*-Value = 15.338

***$P < .01$, ** $P<.05$, *$P<.1$, *ns* = not significant

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 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).

Fig. 3. Quality attributes impact on overall satisfaction
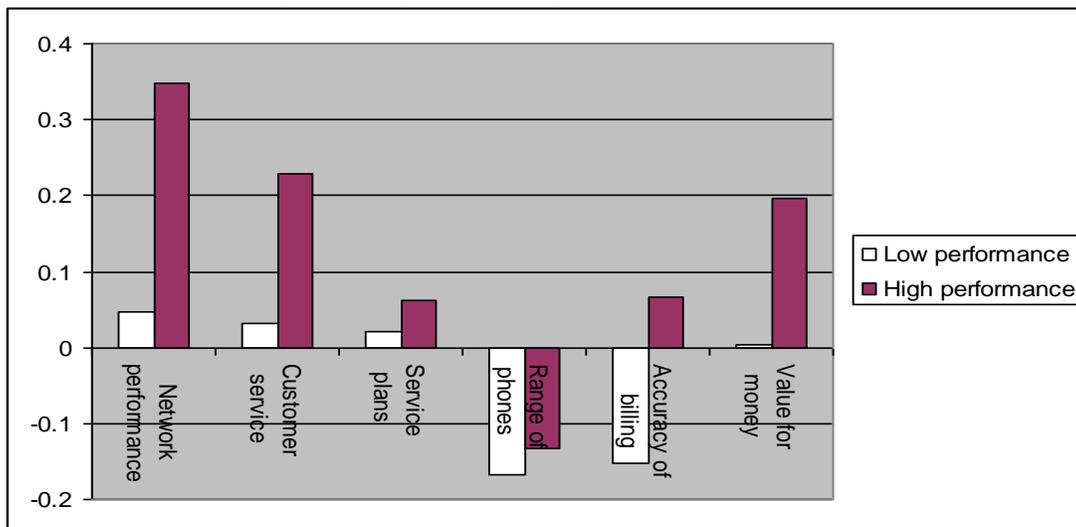
Fig. 4 shows the asymmetric relationship between performance of attributes and their importance as it was proposed in H2. For basic attributes, the importance–levels decrease as performance-levels increase

(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).

Network performance

Customer services quality

Value for money

Range of phones

Accuracy of billing and payment
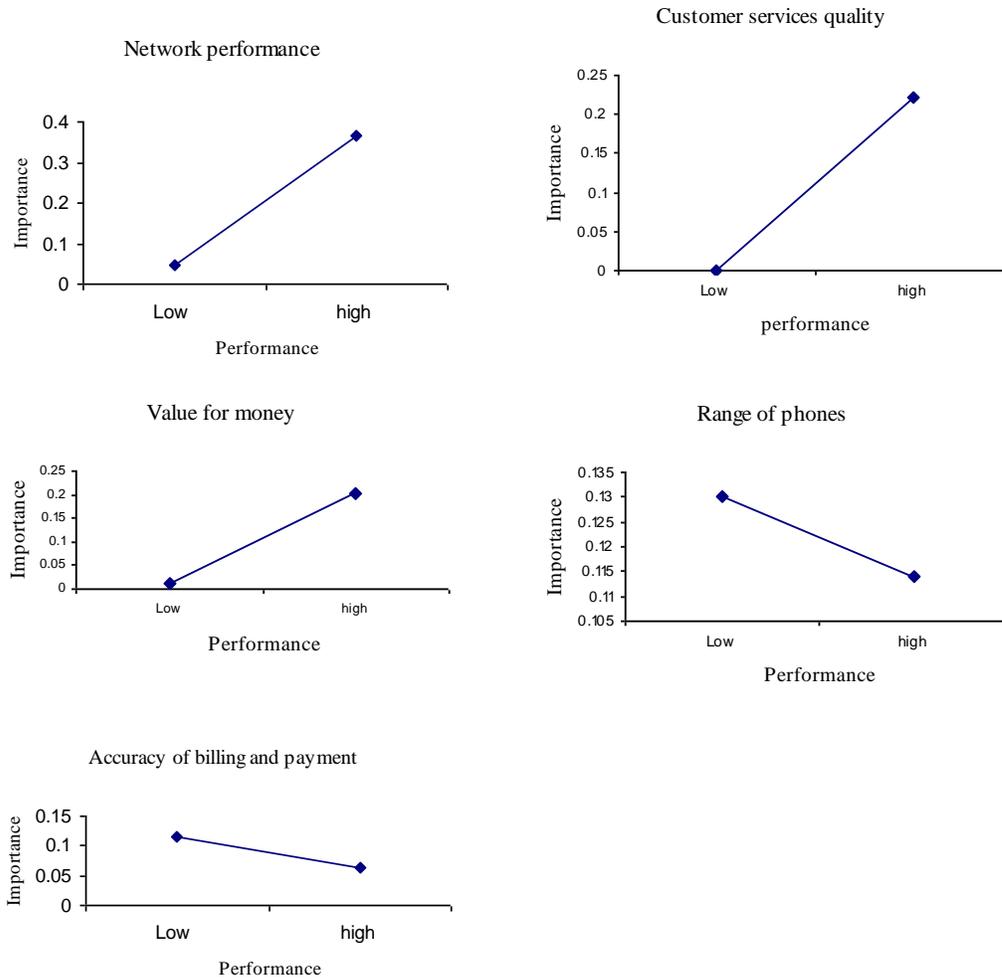
Fig. 4. Relationship between importance and performance

The application of the traditional IPA matrix for two groups of satisfied and dissatisfied customers (Figs. 5 and 6) 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 3), 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 Fig 4.
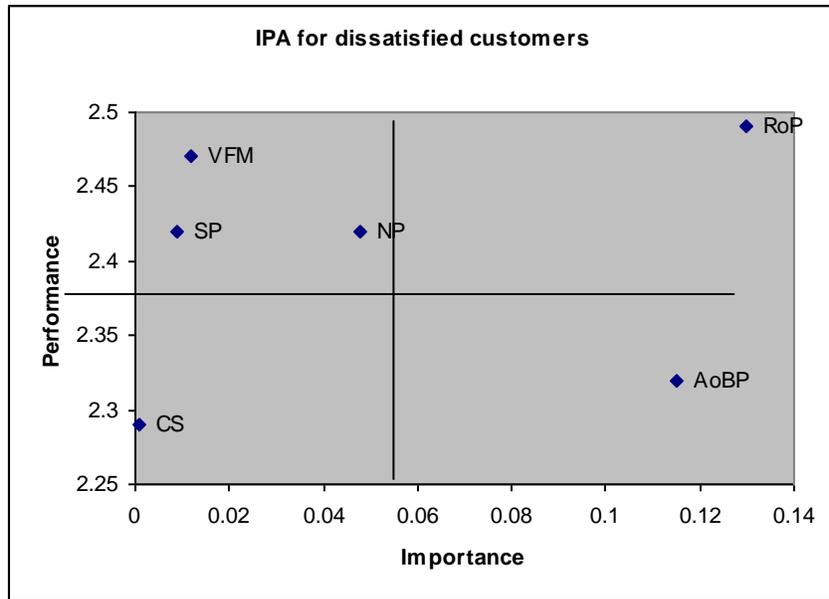
Fig. 5. IPA for dissatisfied customers

Figure 6 shows a similar case for satisfied customers.
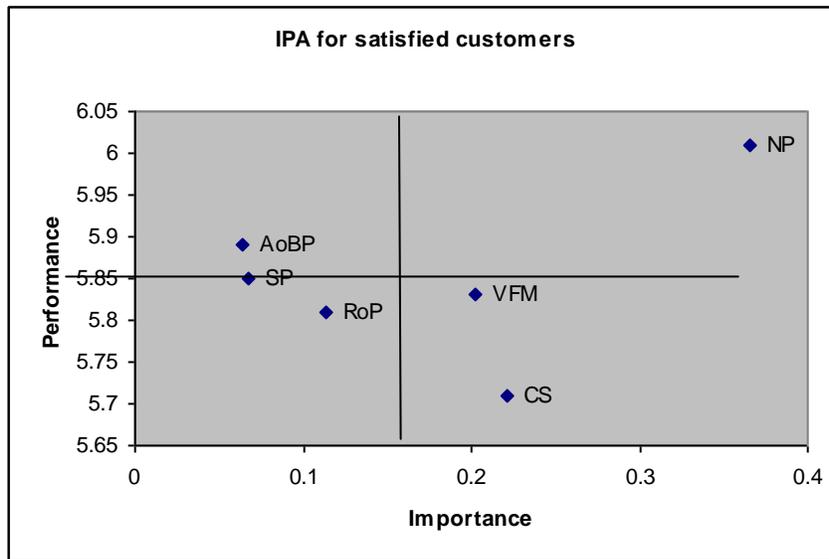
Fig. 6. IPA for satisfied customers

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.

Finally we suggest a simplified diagram which shows the relationship between service attributes and customer behaviour (see Fig. 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.

Fig. 8. Customer behaviour modelling
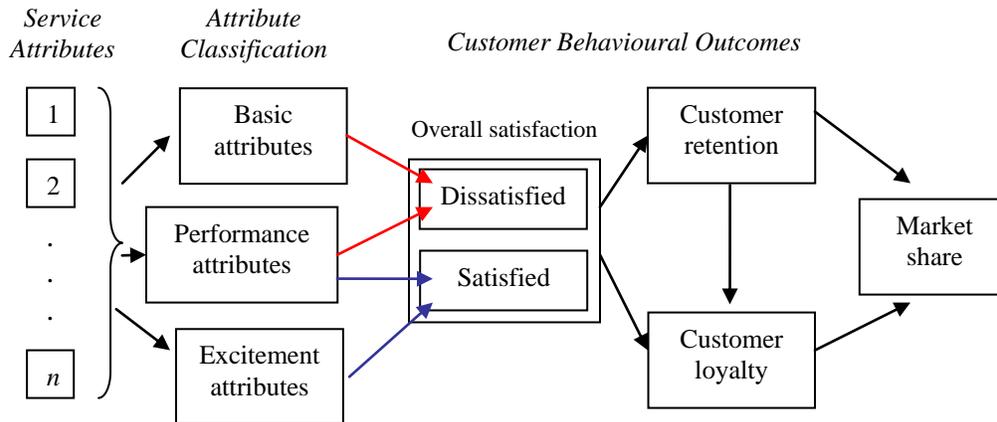
Appendix

Mobile network attributes

1	Network performance
2	Customer service quality
3	Service plans
4	Range of phones
5	Accuracy of billing and payment
6	Value for money

-Please rank your service provider performance based on the following attributes?
1=Poor, 2=very bad, 3=bad, 4=Reasonable, 5=good, 6=very good, 7=Excellent, NA=not applicable

	1	2	3	4	5	6	7	NA
1.Network performance								
2.Customer service quality								
3.Service plans								
4.Range of phones								
5.Accuracy of billing and payment								
6.Value for money								
7. Overall performance								

- What is your overall satisfaction level towards your mobile phone and service provider?
1. Strongly dissatisfied ☐   2. Dissatisfied ☐   3.Somehow dissatisfied☐   4.Neutral☐
5. Somehow satisfied☐   6. Satisfied☐   7.Strongly satisfied☐

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Service attribute importance and strategic planning: An empirical study

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Abstract

There is growing evidence that attribute importance is a function of attribute performance. Several studies reported that service quality attributes fall into three categories: basic, performance, and excitement. Thus, the identification of attribute importance is significantly important as a key to customer satisfaction evaluation and other behavioural intentions. According to customer behaviour literature, attribute importance can be measured in two ways: (1) self-stated importance, and (2) statistically inferred importance. The article evaluates two methods according to their impact on overall customer satisfaction measurement and, managerial implementation. A case study is conducted on the telecommunication industry for analysis.

**Keywords: Customer satisfaction; Importance-performance analysis (IPA); Strategy.**

1. Introduction

The importance of service attributes to customers is a central element to the management within the context of customer behaviour analysis, resource allocation process, and organisational behaviour. According to service marketing literature, there are two key characteristics of service quality attributes namely *importance* and *performance*. Using these two dimensions together facilitates the prescription of prioritising customer attributes when enhancing service quality and customer satisfaction [1]. In other words, measuring attribute importance and performance certainly draw a clear image for top managers to best deploy scarce resources, using importance-performance analysis (IPA).

There are several methods for measuring attribute importance in behavioural sciences such as free-elicitation method, direct rating method, direct ranking method, analytical hierarchy process, and information-display board, multi-attribute attitude methods. However, there is a lack of convergent among and nomolological validity of different methods [2]. These issues can cause inconsistent outcomes among methods. Previous research argues that the main reason of the lack of validity among methods is multi-dimensionality of attribute importance [3]. As a result, all inconsistency among methods can be interpreted by the fact that different methods measure different dimensions of importance. According to literature, key dimensions of attribute importance can be classified into three groups: (1) salience, (2) relevance, and (3) determinance [4], [5], see Fig 1.

In this article, we investigate the validity of two existing methods that are proposed to measure the determinance of service attributes in overall customer satisfaction in the mobile telecommunication industry, using statistical inferred importance and customers' stated importance. The findings show that the type of importance measure and the dynamic nature of importance to response influence management decision making. As a result, there are significant differences in nomological validity- the relationship between the importance of service attributes and overall customer satisfaction.

Fig. I.
The three dimensions of attribute importance (Adopted from [3])
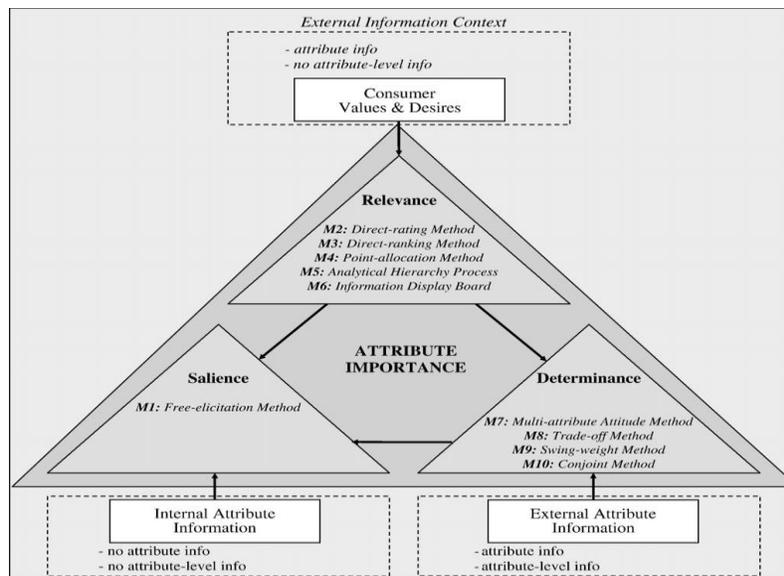
We begin by describing the impact of attribute importance on customer behaviour and the methods we compare. We examine two different statistical methods for driving importance measures including multiple regression and regression with dummy variables. An empirical analysis of three data sets highlights interesting results.

2. Service attribute importance

Indentifying the importance that consumers place on the service attributes that affect customer satisfaction, customer retention (e.g., repurchase intention), and loyalty (e.g., feedback, and word-of-mouth) is an important element for resource allocation process. Thus, the study of importance of service attributes has been a central topic in consumer behaviour and market research for decades. Most importantly, the focus of attribute importance has shifted from traditional evaluations of service concepts within controlled settings, such as conjoint analysis [6] and choice modelling [7], to understanding the determinants of behaviours intentions [8], [9].

In this study we focus specifically on the impact of service attribute on cumulative customer satisfaction, defined as an overall evaluation of a customer perception of service performance to date [10], [11]. As previous research reported, customer satisfaction has significant impact on other customer behavioural intentions in the form of retention and loyalty. In other words, it plays as mediating attitude between service quality or attribute performance and other behavioural variables. Thus, indentifying the determinants of customer satisfaction can help managers within their long term business planning.

3. Methodology

Most research studies which have investigated the importance of service attributes in customer behaviour employed two methods: *customers' self-stated* or *explicitly derived importance* (direct method), and (2) *implicitly derived importance* or *statistically derived importance* (indirect method). By using explicitly derived importance, customers are asked to rate a list of service or product attributes according their importance (e.g. rating scales, constant sum scales, etc.). As a result, basic attributes usually receive the highest rating levels as they are naturally expected by customers (minimum requirements). However, they have literally no impact on overall customer satisfaction and future intentions even if they performed at a satisfactory level. For instance, consider an airline safety. Most customers would rank safety as highly important attribute. But in reality it does not contribute significantly to the prediction of airline choice, since it is more of a minimum requirement (basic attribute). So, do we need to take resources away from this kind of attributes?

It is argued that direct methods do not effectively measure attribute importance [12], [13]. The main issue with this method is that respondents may not take into account the current level of attribute performance. Moreover, there is an asymmetric and nonlinear relationship between attribute importance and performance [12], [11], [14], [15]. Therefore, the customer's self-stated importance is not the actual value for attribute importance.

Importance performance analysis (IPA) is widely used technique indentifying the relative importance of service attributes with associated performance of service attributes [16]. The technique determines where a company should focus its resources to produce the greatest impact on customer satisfaction and subsequent behavioural intentions like retention and loyalty.

3.1. Self-stated importance

For the purpose of the evaluation of service attribute importance (explicitly derived), we employed methodology from previous study [17]. Respondents were asked to rate just the three most important attributes; from "1=most important" to "3=least important". In order to assign each attribute (i) an importance value (P_i) lying between 0 and 1, we integrate the ranked assigned by respondents, using Equation 1, to a ranking score (h_{ij}) using Equation 2. Table I lists the frequency of ranks 1, 2 and 3 for each attributes and also the aggregate importance value (using Eq. 2).

$$h_{ij} = \begin{cases} (k - g_{ij} + 1)/k \\ 0 \end{cases} \qquad (1)$$

$$P_i = (n^{-1} \sum_j h_{ij})^{k/s} \qquad (2)$$

3.2. Multiple regression analysis (MR)

There are various statistical methods for measuring attribute importance such as multiple regression (MR), structural equation modelling or partial correlation [18], [19], [20]. Several researchers have suggested multiple regression analysis as a suitable tool for measuring attribute importance. The method simply regresses the relative performance ratings of service attributes against dependent variable (overall customer satisfaction) to generate significant-level for individual attribute. This approach is the easiest to implement statistically. One of the advantages of regression analysis is that the method provides a model of all attributes to form the overall rating. As a result, multiple regression analysis estimates the degree of influence that attributes have in determining customer satisfaction (shown in Table I). The primary problem with this approach is multicollinearity among the independent variables.

$$Sat_{total} = \alpha_0 + \alpha_1 X_1 + ... + \alpha_n X_n + \varepsilon \qquad (3)$$

3.3. Regression analysis with dummy variables

In order to identify the asymmetric impact of attributes' performance on attribute importance, a regression analysis with dummy variables was used [21], [22], and [13]. 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 (shown in Table I and Fig II).

$$Sat_{total} = \alpha_0 + \alpha_{1Att.1} \times dummy_{1Att.1} + \alpha_{2Att.1} \times dummy_{2Att.1} + ... +$$
$$\alpha_{1n} \times dummy_{1Att.n} + \alpha_{2n} \times dummy_{2Att.n} \qquad (4)$$

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.

4. Survey methods

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% percent of the respondents were under 27 years old. In this study, market segmentation is highly considered in order to avoid the risk of displacement and strategy application bias.

Respondents were asked to indicate the most three important service attributes in the mobile service with the anchors of "1=Most important" to "3=Least important". In second part, the performance for each service attribute was rated using a seven-point Likert scale from "1=Poor" to "7=Excellent". Finally respondents were asked to rate overall satisfaction using a seven-point Likert scale from "1=Strongly dissatisfied" to "7=Strongly satisfied".

4.1. Findings

Table I presents the results of three methods for perceived importance. Applying the results of two methods (indirect and direct) into IPA grid shows a change in strategic outcomes for service attributes. The difference between two IPA models emphasises the influence of measurement on managerial implementation [23].

Table I.
Attribute importance analysis

Attribute	Ranking order			Explicit derived	Regression coefficient	Dummy-variable regression coefficient (b)	Attribute performance
	1	2	3				

					(a)	Low performance	High performance	
Network performance	82	51	52	0.81	0.302***	0.048 (*ns*)	.366***	5.44
Customer service quality	9	27	38	0.54	0.199***	-.001 (*ns*)	.221***	4.88
Service plans	87	47	31	0.79	0.141*	-.009 (*ns*)	.068 (*ns*)	5.05
Range of phones	9	22	30	0.51	-0.089*	-.130 **	-.114*	4.36
Accuracy of billing and payment	6	19	18	0.46	0.145**	-.115**	.064 (*ns*)	5.11
Value for money	56	62	43	0.76	0.222**	-.012 (*ns*)	.202***	4.92
Total	253	252	249					

(a) $R^2 = .480$, *F*-value = 34.936,
(b) $R^2 = .469$; *F*-Value = 15.338,
***$P < .01$, ** $P < .05$, *$P < .1$, *ns* = not significant

More importantly, the results from regression with dummy variables accommodates the concept of change in the relative importance of attributes with change in attribute performance as a function of overall customer satisfaction, see Fig. II. Since changes to attribute performance affects the relative attribute importance, therefore, the self-stated importance is not appropriate method. However, multiple regression analysis can be an inappropriate if multicollinearly exists within independent variables [14]. In the case of multicollinearly, partial correlation analysis with dummy variables and multiple regression with natural logarithmic dummy variables are more suitable [24], [14], [22], [21], [25]. By using regression with dummy variables, we also found two types of service attribute within the mobile industry: Basic and Exciting [12].

Fig. II.
Relationship between importance and performance

Accuracy of billing and payment
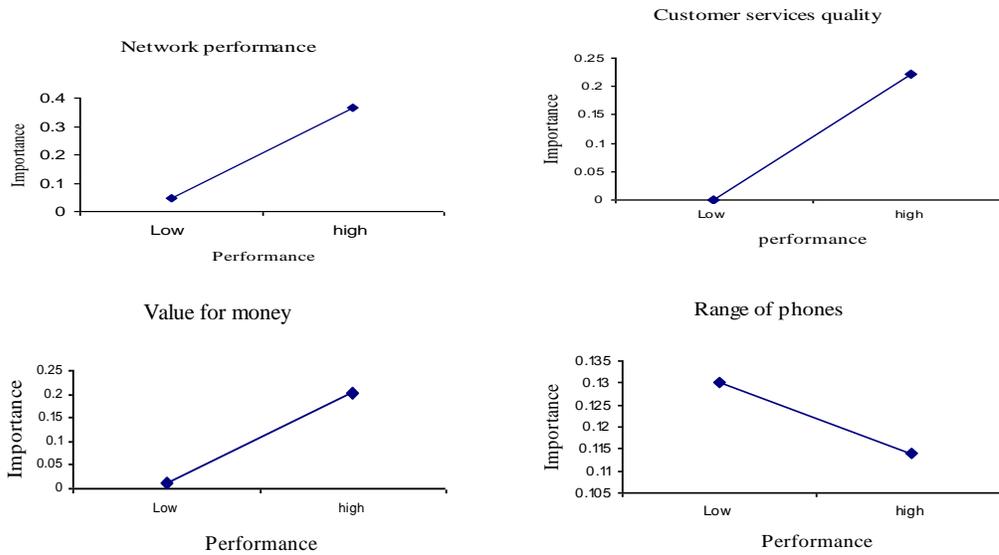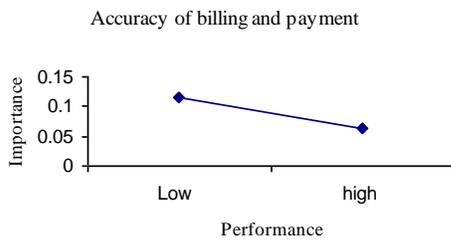
Fig III demonstrates two IPA models. There are some differences between two methods as some attributes located in different quadrants. However, managers must consider the relationship between importance and performance since changes in performance will affect attrite importance-level.

Fig. III.
IPA models

Statistically importance derived   Customer self-stated importance

5. Conclusion and management implications

This article evaluates the effect of importance measurement variation on outcome strategy variance, using IPA technique. The comparative analysis of outcomes from different IPA analysis demonstrates the influence of respective importance measures. In addition, the results of regression analysis with dummy variables highlight the dynamic nature of importance relating to response variance. As a result, managers should consider the fact that changes to attribute performance are associated with changes to attribute importance since quality attributes have impact on customer satisfaction [12]. Differences between two methods of direct and indirect are particularly marked. From managerial perspective, there is absolutely no assurance that increasing scores on attributes with the highest self-stated importance will provide maximised increase in the overall measure [26].

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International Computer and Industrial Management (ICIM)

Profitability through Customer Relationship Marketing

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Abstract

The purpose of this literature study is to review and summaries the previous work on relationship marketing based on the relationship between satisfaction, loyalty and retention.

The framework of relationship marketing is described within relationship between customer satisfaction, customer loyalty, and customer retention. For today's savvy managers, Relationship Marketing is hardly a new concept. The firms have already focused on understanding the customer's needs and building a marketing strategy around those needs. But it is critical that the main underlying principals (satisfaction, retention, and loyalty) are understood before an organisation starts to develop a relationship marketing strategy. In this literature study, we aim to understand that high levels of each of relationship marketing principals do not always yield high levels of the others and so as increased sales even though the relationship is positive.

This paper intends to discuss previous research findings, and an exploration of the theoretical and managerial implications.

Introduction

In order to determine the success of a product within the context of customer relationship marketing (CRM), three main factors need to be observed. These factors can be defined as: Customer Satisfaction Level (CSL), Customer Retention Probability (CRP) and the Degrees of Customer Loyalty (DCL). In recent years there have been substantial literature dedicated to evaluating CSL (CORE, QFD, ServQual, and Mass Customisation). Similarly, CRP and DCL experts have produced substantial research into these subjects (Hansemark and Albinsson 2004; Ranaweera et al., 2003). However, there seems to be a lack in comprehensive and practical solutions to relate CSL with CRP and DCL.

In this article we tend to investigate the latest literature regarding these relationships, and later provide an outline proposal to find a relationship between customer satisfaction, retention and loyalty and their impact on product/service design cost.

In essence we propose a marketing and process analysts tool that enable marketing and process analysts focus investments on product features that ensure the highest return of investment (ROI).

Relationship marketing attempts to improve profitability within two main dimensions; cost effective and time manner. The aim of this study is to consider two central constructs, satisfaction and retention, which may result loyalty. Therefore, it helps understanding clearly the process of generating leads resulting in higher revenue through a clear set of principles, and definition for attracting and sustaining customers.

The concept of relationship marketing is not new, as W. Edwards Deming commented:

> Profit in business comes from repeat customers, customers that boast about your product and service, and that bring friends with them [1].

Based on a recent literature review, we define marketing relationship as a process includes three main stages (Figure 1).

Figure 1
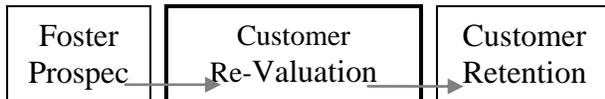
At foster prospects, companies try to encourage customers to purchase their products by providing the essential and desirable requirements. These requirements must be supplied through purchasing cycle and also with exchanging information. During this stage we are needed to make a decent trial within moral *incentive*, *encourage consideration* and *awareness* due to attract more customers. This stage is a critical phase always to a business. They need to make wise choices about which lead generation tactics they pick and choose for investing their marketing dollars to gain higher revenue (for instance; relationship-building, demonstrating expertise, building trust and creating value within purchasing cycle).

The second stage includes the construction of long-term and profitable relationship based on

repeat purchases incentive. Finally, in the last stage the firms attempt to classify customers and sustain the customer by re-engineering products and services.

It is important to note that a company implementing the process of marketing relationship should design its strategies and tactics based on the industry.

We continue the paper by introducing the relationship marketing significant principals (satisfaction, retention, and loyalty) across the format illustrated above. We then present the results of the study and discuss their significance.

Customer Satisfaction

"Satisfaction is defined as an emotional post-consumption response that may occur as the result of comparing expected and actual performance (disconfirmation), or it can be an outcome that occurs without comparing expectations" [2].

Customer satisfaction is a substantial issue in relationship marketing, particularly those in services industries. Keiningham et al. (2005), state that it is a significant affiliation between customer satisfaction, purchase intentions, and consequently financial performance [3]. The value of satisfaction has been more high-lighted through some past studies. Researches reveal that customer could defect at a rate of 10-30 per cent per year and meanwhile "a decrease of only 5 per cent in customer defection can increase profits up to 95 per cent, depending on the industry "[3]. Therefore, Satisfaction should always be a permanent goal for all businesses in the purchase cycle. But, it is important to realize that satisfaction may not necessary lead to high levels of customer retention and loyalty.

In fact in many cases, measuring satisfaction becomes difficult due to its fuzzy nature obtaining customer satisfaction may not be

straight forward. For this reason, some believe that there is a weak relationship between customer satisfaction and retention. For example; there may be cases where the product enjoys customer satisfaction by due to other factors they may shift to other similar products such as changes in competitors' offerings, new requirements of customers or other unknown intervention like changes in personal characteristics (e.g. demographic variables). Fredrick F. Reichheld (1994) states that "in most businesses, 60%-80% of customer defectors said that they were "satisfied" or "very satisfied" on the last satisfaction survey prior to their defection! In the interim, anything can happen and often does" [4]. Also, Bennett and Rundel-Thiele (2004), reveal in their research that there are different myriad factors (including latent and overt) influence the strength of satisfaction-retention and satisfaction- loyalty relationship [2]. Therefore, we cannot assume that high levels of satisfaction will certainly lead to increased sales.

Although satisfaction is an important factor in assessing the success of the product in the market, it may not be the sole factor to determine market value.

As a result, satisfaction is an effort to measure sate of mind. So, it may not always be reliable.

Yet, it is believed that high levels of attitudinal loyalty are an outcome of high levels of satisfaction. In short, it is important to understand that the link between satisfaction and profitability is not simple and straightforward as typically assumed.

Customer Retention

Retention can be defined as "a commitment to continue to do business or exchange with a particular company on an ongoing basis" [5]. Also, "The direct retention effect is based on the customer benefit effect". [2]

In today's highly competitive markets, companies strive to build professional customer retention management system alongside common strategies like process re-engineering and employee redundancy exercises. There are two central reasons for doing so, the first is the intensive *cost* of gaining new customers in competitive markets which is claimed that attracting a new customer costs five to six times more than retaining one [6]. It is therefore safe to know that profitability gained by a sustained customer is much higher than new customer attendant. Second, it is a considerable profitability gained by a sustained customer is much higher than new customer attendant during the duration of business relationship. This was confirmed by Jamieson (1994) states that a two per cent improvement on customer retention has the same impact on profit as a ten per cent reduction in overheads [7]. The main questions that need to be addressed in customer retention are about customer satisfaction drivers? What are customers' expectations? What are of their towards product attributes? And how much effort needs to be invested to improve their attributes?

It is recognized in this literature study that customer satisfaction has a good feedback to the firms to answer following questions in terms of customer needs. It is also confirmed that retention issues are initially based on customer satisfaction. As Bennett and Rundle-Thiele argue [2], customer retention is central to the development of business relationships with respect to satisfaction. While some surveys and researches confirm satisfaction as a profitability driver and state that a satisfied customer is a sustained customer [5], [2].

Customer retention brings some remarkable benefits such as lower price sensitivity, higher market share, positive word-of-mouth, lower costs [4], higher efficiency, and higher

productivity [5]. Furthermore, customer retention has often been assumed as a sign of the customer loyalty. We also have to consider this fact that the factors have found to increase retention differ widely such as chemistry between people, presentation of changes and so on.

There is some factors help measure retention, such as annual retention rate, frequency of purchases. They aim directly at the real target: does customer's behavior show that they are being convinced to maintain their stake in the firm? Do they buy the value proposition of the company, i.e., are they coming back for more?

Customer Loyalty

"In a business context of loyalty has come to describe a customer's commitment to do business with a particular organization, purchasing their goods and services repeatedly, and recommending the services and products to friends and associates". [8]

The aim of loyalty in all successful firms is based on long term beneficial relationship between the customer, and enterprise. "When a company consistently delivers superior value and wins customer loyalty, market share and revenues go up and the cost of acquiring new customers goes down". [9]

The nature of the relationships between satisfaction and loyalty is complex. Anyway it has emphatic influence in cash flow terms because of the link between loyalty, value, and profit [4], [2].

Loyalty depends on industry, culture and market behavior. For instance, management consultant KPMG has defined three ways in which retail loyalty strategy works; (1) pure loyalty, (2) pull loyalty and (3) push loyalty. But the ultimate goal of all firms is to make the intention in their customers to make future purchases. The relationship between loyalty and satisfaction is not simple. It is assumed

that loyalty is an outcome of high levels of satisfaction. But, there are some instances that show the prerequisite for loyalty is not always high levels of satisfaction. For instance, a study on 4 Australian big banks demonstrate that banks have 23-32 percent dissatisfied customers while their profits are in the top six public companies in Australia [2]. This shows that dissatisfied customers can remain loyal.

By this we mean a highly satisfied customer may not be a loyal customer.

Customer loyalty schemes bring some long term advantages and benefits through premium prices, decreasing costs, and increasing volume of purchases.

If the customer feels a stronger identification with the corporation, he or she will remain [2]. This can be due to other factors such as price, demand experiences and habits. For instance, "Waitrose management stress that it is the total customer experience that creates loyalty, not promotions". [10]

Proposal

Our findings to date show that, there is little evidence of practical demonstrator for determining the relationship between CSL, CRP and DCL. We propose that CSL evaluation (Mousavi et. al., 2001) to be the intermediary between CRP/DCL and product key attributes (Figure 2).
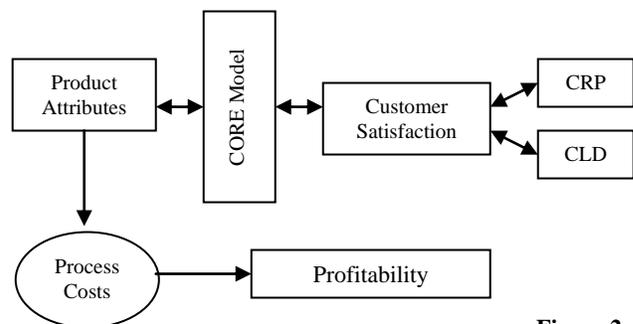

Figure 2

For example, assume that, CSL for a specific product attribute is 55/100, and CRP is 60%, and DCL is average. The company may need to invest £100 on modifying the attribute to increase the CSL to 75/100, this increase may increases the CRP to 65% and customer loyalty may stay at average level. This investment results in 5% improvement in CRP that may affect profitability by 25% to 85%. This analysis can only be viable if and only if we are able to find the relationship between the three CRM factors. Our next step is to investigate this relationship and possibly provide a model represent this relationship.

The aim will be to measure the influence of satisfaction levels on CLD and CRP, and their impacts on profitability of product or service.

We employ CORE model [12] to measure satisfaction levels, which is based on product/ service attributes.

In the next step, the impact of changes in satisfaction levels on customer retention and loyalty will be measured.

In this model, we aim to maximize profitability through identifying the sources of customer dissatisfied towards a product or service attributes. This may then become a practical tool to make the proper decision on investments and quality improvements. For example if the company invests on redesigning of their product, the customer satisfaction will increase, and the probability of customers wanting to purchase the product will also increase. Therefore my investment will be returned with a profit will be made.

Discussion and Conclusion

In this paper we tried to argue the case for profitability modeling based on three CRM main principals. We reviewed the latest relevant literature to outline the relationships between these three key factors

The ultimate goal here is to obtain experimental analysis to prove the concept.

The focus of this study has been on understanding client profitability through key issues relating to relationship marketing (satisfaction, loyalty and retention). This research reveals that customer needs must be defined as a continuous process improvement.

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Exploring Sources of Profitability in Customer Relationship Management (Service Industry)

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ABSTRACT

This study aims at demonstrating the interrelationship between service attributes, customer behaviours, and customer profitability. The proposed framework attempts to apply the customer segmentation concept to profitability analysis. The four important measures of *customer outcomes*: customer satisfaction, customer retention, customer loyalty, and profitability need to be mapped against service attributes. We will further elaborate on methods to help address the shortcomings prevailing current customer relationship management (CRM) in service industry.

In order to have a successful CRM, an organisation needs to fully understand customer needs through a well-defined customer knowledge management (CKM). A well-defined CKM requires an in-depth knowledge of customer segmentation, customer satisfaction (CS), customer retention rate, and degrees of customer loyalty. This can be achieved by designing a customised relational database that contains the necessary information coupled with the logical and mathematical relationship (Business logic) that relates to profitability.

In this paper, we will introduce the latest developments in customer data acquisition and proposed profitability models to demonstrate the shortcomings and offer an outline to bridge the gap.

Keywords: Customer Relationship Management (CRM); Customer Segmentation; Customer Profitability

JEL Classification: Economics and Marketing

1. INTRODUCTION

In the last few years, businesses gained many insights into customer relationship management (CRM). Companies experienced what they have to focus on more, and what they should not have done. Consequently, it is learnt that there is no universal recipe for managing customer relationship profitability. Nowadays, CRM has become the major part of the fabric of marketing ecosystem. It is confronted with global challenges and marketing opportunities. It supports firms to manage their customer relationships by targeting specific customers for specific product or service offerings. However, there have been reports on unsuccessful CRM due to lack of attention to the customers.

The real competition is based on the speed of responding to the market demands with customised and innovative services and products. This can not be achieved unless enhanced customer relationships (Roh *et al.*, 2005) are achieved. An appropriate relationship with customers could easily lead to customer loyalty. Due to marketing shift towards customer orientation, the knowledge about customer behaviours and customer segmentation are becoming extensively important. Hence the shift from supplier power to the power of buyers.

Accurate information about customers helps companies design and produce products that meet customer needs and desires. It is also indicated by a number of researches (for example; Bose, 2002; Ahn *et al.*, 2003) that companies willing to gain more market share, need to shift to customer orientation instead of mass marketing.

All companies have to identify profitable customers, satisfy them, expand existing relationships, and eventually invest on loyalty programmes. In today's business world, it is learnt that profit comes from customers, not from products. And the sole purpose of any business is to create and retain customers (for example loyalty schemes). Customers are the most important asset of an organisation (Reichheld & Kenny, 1990). Once the importance of building customer relationships has been recognised in a company, then it is necessary to decide with which customers a closer relationship needs to be built. In order to do this, the company must value his customer relationships. The main reason behind valuing a relationship is to put appropriate marketing strategies in place. As a result, the most valuable relationships have to receive priority and more attention. Also the less valuable customer relationships have to be studied in order to see how their returns can be improved.

We discovered that only a few number of scientific works have focused on the measurement of customer behaviours' impacts on profitability through CRM systems. While the question "Which factors would improve customer relationship and what are their contributions to profitability?" remains unresolved. There is still a question for all managers that how much our customer relationships are worth to us, otherwise how we can make rational decisions about how to serve our customers? Even though findings clearly show that the link from customer behaviours to profitability is not as straightforward as usually proposed.

In this paper, we investigate customer profitability based on customer segmentation. As such we would be able to analyse the direct relationship between a segment of customers' explanatory and numerical variables (customer behaviours) and its generated profits. The remainder of the article is organised as follows. It first reviews the literature on customer relationship management, identifying key areas. It continues by bringing together different concepts which contribute to the successful implementation of CRM, in the form of the relationship management assessment tool. Also, the paper suggests which factors could have priority for CRM implementation.

2. Evolution of Management and Marketing Approach

Customer relationship management (CRM) terminology has emerged in the market after fall off enthusiasm of ERP, in 1990s, in the light of developing the concept of customer orientation. CRM concept attempts to optimise the relationship between customers and organisations. CRM systems are considered as an essential requirement and tool for profitability these days (Meyer, 2005).

One of the main issues with businesses' chief executives at the moment is that they still do not know their return of investment (ROI) within customer relationship? Customer relationship has passed its maturity period, since its beginning in 1960s with "Customer Orientation Concept" (General Electric). CMR is much more than collecting customers' information, advertising, and offering new products. CRM has moved to the centre of corporate strategy as a process of learning and understanding the customer needs and values, and consequently make it easier for customers to do their business with the company.

In fact, the whole concept of CRM is an evaluation of relational marketing. Nevertheless, CRM covers and support more areas in order to decrease the gap between the company and its customers by integrating sales, marketing, and the customer-care service. In the other word,

CRM attempts to manage more effectively customers are acquired, retained, and can be grown in value over time. The following improvements can be observed by CRM implementation:

- Improving customer relationships (greater customer satisfaction, retention, and loyalty),
- Providing and distributing customer information across the enterprise,
- Helping in customer segmentation,
- Efficient operation (low expenses, and competitive price)

As a result of these benefits, companies invested over $2.3 billion in CRM software in 2003, and it is predicted to reach to $2.9 billion by 2007 (Topolinski, 2003), while the total annual market is expected to reach to $14.5 billion in 2007. Further, government sectors are rapidly adopting and adapting CRM ideas as well. Thus, investment in CRM systems is expected to establish the mutual collaboration between an organisation and its customers.

3. Customer Behaviours

From a business perspective, CRM is considered as an organisational strategy concerning the understanding and predicting customer behaviour, customer segmentation, marketing, and purchasing analysis. All these show the need for organisations to know who the customers are and what they actually need. That is why the management of customer relationships becomes a fundamental issue. Considerably, the success of CRM concept requires accurate measurement of relationship among initiatives (process), intrinsic (customer satisfaction, retention, loyalty), and extrinsic (profitability).

Customer satisfaction is an essential factor for building strong relationships and profitability. It is as much as necessary to business as people can not live without food (Gould, 1995). It is revealed that customer satisfaction is improved by improving the quality of the product or service. Marketing ecosystem nowadays has changed and a lot of new concepts have replaced. Customer satisfaction was a part of this transformation. According to American customer satisfaction index (ACSI), which is prepared by university of Michigan business school, customer satisfaction level has been steadily declining since 1994, while companies' profitability has been increasing. Then, we may conclude that customer satisfaction can not solely bring profit but it contributes to financial performance through its effect on *retention* and *loyalty*.

Marketing strategy has transformed from offensive marketing to defensive marketing during the last decade (Storbacka *et al.*, 1994). Marketing ecosystem changed direction from obtaining new customers to minimising customer turnover.

There are three main financial benefits from Customer Retention. (1) customer acquisition cost, (2) customer price sensitivity, (3) cross-selling (Gould, 1995). In fact, gaining new customer is far more expensive than keeping existing customer. The findings show that a new customer roughly costs 20 times more than retaining the remained customer (Pegler, 2004). The cost includes all aspects like marketing, customer training, and so on. Also, it is reported that 20% of customers provide organisations with 80% of profit, which highlights the importance of customer retention and long-term relationships with profitability. Thus, companies have focused their strategy more on retaining existing customers rather than some approaches such as cutting costs, in order to increase profitability.

The establishment of trustful relationship between the suppliers and the customers leads to loyal behaviour. Even though, it can not be achieved apart from positive experience (Bernd and Wolfgang, 2004, page 3).

It is important to an organisation to have the knowledge of its Customers' loyalty (Buckinx *et. al.*, 2006). Buckinx *et.al.,*(2006) explain the importance of loyalty concept (in banking and finance sector) by an example; "It would be most likely be more lucrative to offer an additional savings product to a customer who has a high balance at the focal bank and at the same time has large amounts invested at other banking organisations, than to offer the savings product to a customer that has an equally high balance, but where all his/her money is invested at the focal bank." (Buckinx et. al., 2006).

The knowledge about customers has become an important part in marketing. However, the previous research shows that only 7.5% of companies collect customer purchase behaviour data (Verhof *et. al.*, 2002).

4. Customer Segmentation Profitability (CSP)

Nowadays, firms constantly focus to differentiate and customise their products for distinct market segments in order to establish better relationship with customers. The concept of customer segmentation is playing a critical role in marketing (Jonker *et. al.*, 2004) and customer profitability. The main target of segmentation is to lead marketing resources and activities towards the profitable segments. This can help firms to improve their knowledge about their

customers, and customer relationships. For instance, there is a relationship between customer satisfaction and profitability, while some customers will never be profitable or may not be satisfied given the product attributes and prices. For that reason, all companies would be wise to discriminate and target the segment of customers whose needs can be meet better than other competitors in a profitable manner (Hwang *et al*., 2004). In addition, different customers use resources very differently (e.g., customer service). More interesting, some customers may not be profitable at the beginning of their relationship with a company (for example, frequency of purchasing), and identified as unprofitable customers and in reverse, any long-term relationship is not a sufficient prerequisite for profitability (storbacka, 1994b). But it must take into account that the relationship may be developed concerning future profit potential (Ryals, 2002). This information insight in customer behaviours generate new opportunities for companies as following: cost management, revenue management, and strategic marketing management (Hwang *et al.,* 2004).

There are different methods to segment the customers which from business to business it would be different. For instance, Dyche and Dych (2001) indicate that companies can segment customers based on "profitability", "expectations", and "behaviours" (Hsieh, 2004).

5. Research Model

There were three main topics at the centre of this article: (1) customer behaviour, (2) customer segmentation, and (3) profitability. Our research to-date shows a gap that needs to be addressed. Most companies still cannot measure their CRM efficiency. So, the need for a generic model that relates different areas of customer relationship with other activities of the firm is needed. As a result, within any given customer base (satisfaction level, retention rate, and loyalty degree), there will the revenues customers generate (relationship revenue) for the firm and in the costs the firm spends (relationship costs) base on the customer segment (storbacka, 1994b). This line of information can help companies to extend their strategy horizon from current customers to potential customers and eventually to where the most profitable new customers can be acquired. In our model, customer relationships are configured base on product attributes (content), Figure 1. As Storbacka *et al.* (1994) introduces "episodes" in customer relationships which differ as to content, frequency, duration, etc. Configuration of episodes in different customer relationships believed as a key explanatory factor that drives relationship costs and thus affects customer relationship profitability (Storbacka *et al.,* 1994).

	E1	E2	E3	E4	E…	Em
CR1		■				■
CR2					■	
CR3			■	■		
CR4	■	■				
CR…				■		■
CRn	■		■			

Figure – 1: Adapted from Storbacka (1994)

In each customer relationships (CRi, i = 1, 2, … , n), customer satisfaction level (CSL), retention rate (CRR), and loyalty degree (CLD) must be measured. We propose that profitability can be a function of customer behaviours, Profitability = f (CSL, CRR, CLD) (Figure 2). As it illustrated, customer satisfaction and retention are measured from 0 to 100, and customer loyalty degree is between 1 and 3.
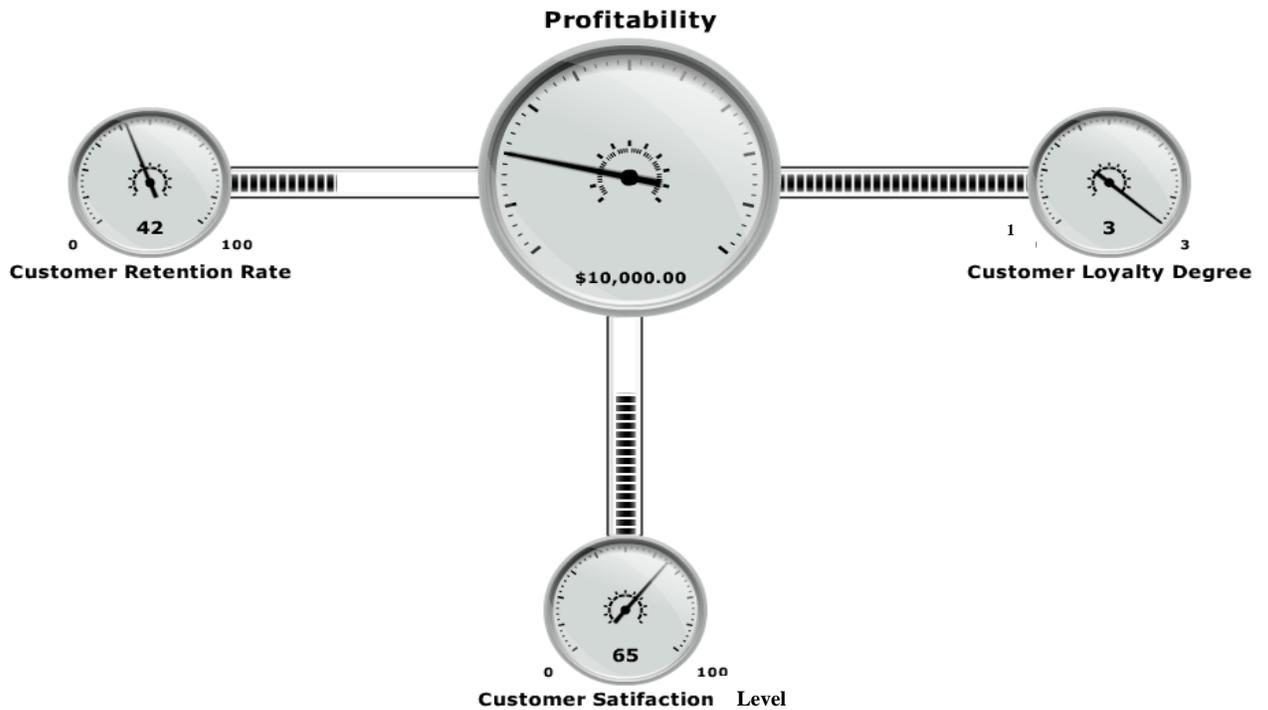
Figure – 2: Customer profitability measurement

In this model, we aim to maximise profitability through identifying profitable segment of customers. This leads managers in their organisation strategy and CRM implementation not only to retain profitable customers but also make unprofitable customers profitable. In order to find the relationship between customer behaviour outcomes (CSL, CRR, CLD), we will use a fuzzy logic model.

Conclusions

In this study, we attempt to provide a framework that makes CRM a more tangible asset for the managers. It can lead relationship management in its contribution to strategy and organisation performance. The consistency between information technology and marketing strategies is the key success for CRM implementation. Lately, the value of this kind of researches will only become apparent while companies maintain transactional database that includes all details on any of a given customer and also the amount of products that he purchases. In next stage, we aim to experience our CRM model in car rental industry.

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