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# MANAGING CUSTOMER ISSUES THROUGH A SUPPORT CHANNEL NETWORK

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# Dedication

*This work is dedicated to my children*



Maria



Max



Miska



Mimosa

## **Abstract**

The importance of after-sales service or service in general can be seen and experienced by customers every day with industrial as well as other non-industrial services or products. This dissertation, drawing on theory and experience, focuses on practical engineering implications, specifically the management of customer issues in the after-sales phase in the mobile phone arena. The main objective of this doctoral dissertation is to investigate customer after-sales issue management, specifically regarding mobile phones. The case studies focus on issue resolution time and the issue of corrective actions.

This dissertation consists of a main body and four peer-reviewed journal articles and one manuscript currently under review by a peer-reviewed journal. The main body of this dissertation examines the elements of customer satisfaction, loyalty, and retention with respect to corrective actions to address customer issues and issue resolution time through literature and empirical studies. The five independent works are case studies supporting the thesis research questions. This study examines four questions: 1) What are the factors affecting corrective actions for customers? 2) How can customer issue resolution time be controlled? 3) What are the factors affecting processes in the service chain? and 4) How can communication be measured in a service chain?

In this work, both quantitative and qualitative analysis methods are used. The main body of the thesis reviews the literature regarding the elements that bridge the five case studies. The case studies of the articles and surveys lean more toward the methodology of critical positivism and then apply the interpretive approach in interpreting the results. The case study articles employ various statistical methods to analyze and to interpret the empirical and survey data. The statistical methods were used to create a model that is useful for significantly optimizing issue resolution time. Moreover, it was found that samples for verifying issues provided by the customer neither improve the perceived quality of corrective actions nor the perceived quality of issue resolution time. The term “service” in this work is limited to

the technical services that are provided by product manufacturers and after-sales authorized service vendors.

On the basis of this research work, it has been observed that corrective actions and issue resolution time are associated with customer satisfaction and hence, according to induction theory, to customer loyalty and retention. This thesis utilizes knowledge of marketing and customer relationships to contribute to the existing body of knowledge concerning information and communication technology for after-sales service recovery of mobile terminals. The established models in the thesis contribute to the existing knowledge of the after-sales process of dealing with customer issues in the field of mobile phones. The findings suggest that process managers could focus more on communication and training provided to the staff as new technology evolves rapidly. The study also suggest the managers formulate strategies for how customers can be kept informed on a regular basis of the status of issues that have been escalated for corrective action.

The findings also lay the foundation for the comprehensive objective to control the entire product development process, starting with conceptualization. This implies that robust design should be applied to the new products so that problems affecting customer service quality are not repeated.

The objective will be achieved when the entire service chain from product development to the final user can be modeled and this model can be used to support the organization at all levels.

**Keywords:** Customer satisfaction, After-sales service, Statistical modelling, Quantitative and Qualitative methods, Quality of service

## Tiivistelmä

Tämän tohtorinväitöskirjan päätavoitteena on tutkia huoltopalvelua käyttävien asiakkaiden ongelmien hallintaa. Tuotteita hankkineet asiakkaat huomaavat usein kuinka tärkeä asia on hyvin toimiva huolto. Väitöskirjan lähteinä ovat tieteellinen kirjallisuus, tilastomatematiikan teoria ja väittelijän kokemus. Pääpaino on erityisesti matkapuhelinalan myynninjälkeisen vaiheen asiakkaiden ongelmatilanteiden hallinnassa.

Väitöskirja koostuu yhteenvedosta ja neljästä vertaisarvioidusta lehtiartikkelista, sekä yhdestä arvioitavaksi annetusta käsikirjoituksesta. Väitöskirjan yhteenvedossa tarkastellaan asiakastyytyväisyyden tärkeimpiä osia, kuten ostouskollisuutta ja asiakkaiden säilyttämistä suhteessa asiakkaiden ongelmien ratkaisemiseen ja siihen tarvittuun aikaan. Tutkimusmenetelminä käytetään kirjallisuustutkimusta ja empirisiä tutkimuksia. Viisi erillistä tutkimustyötä antavat vastauksen esitettyihin neljään tutkimuskysymykseen: 1) Mitkä tekijät vaikuttavat korjaaviin toimenpiteisiin? 2) Kuinka asiakkaan ongelman ratkaisuaikaa voidaan hallita? 3) Mitkä tekijät vaikuttavat huoltoketjun prosesseihin? 4) Kuinka viestintää voidaan mitata huoltoketjun sisällä?

Työssä käytetään sekä määrällisiä (kvantitatiivisia) että laadullisia (kvalitatiivisia) analyysimenetelmiä. Väitöskirjan yhteenvedossa tutkitaan kirjallisuutta niiden elementtien osalta, jotka yhdistävät viisi tapaustutkimusta.

Artikkelien tapaustutkimukset nojaavat enimmäkseen kriittisen positivismin metodologiaan ja soveltavat tulkitsevaa lähestymistapaa tulosten tarkastelussa.

Artikkelijulkaisuissa käytetään erilaisia tilastomatemattisia menetelmiä empiristen tutkimustulosten analysointiin ja tulkittamiseen. Havaitaan, että mallintamalla huoltoprosessi tilastomatemattisin menetelmin voidaan ongelmien ratkaisuaikaa optimoida merkittävästi. Tässä työssä termi "huolto" rajoittuu valmistajan tuottamaan sekä valtuutettujen huoltoliikkeiden tarjoamaan tekniseen huoltoon.

Tämän tutkimustyön perusteella on huomattu, että korjaustoimenpiteet ja ratkaisuaika liittyvät asiakastyytyväisyyteen ja täten induktioteorian mukaisesti ostouskollisuuteen ja asiakkaiden säilyttämiseen. Työssä hyödynnetään tietämystä markki-

noinnista ja asiakassuhteista lisäten nykyistä tieto- ja viestintäteknologian tutkimustietoa matkapuhelinten huoltoketjussa. Tutkimus auttaa myös kehittämään menetelmiä, joita käytetään asiakkaiden ongelmatilanteiden hallinnan analysointiin huoltoketjussa.

Työn tulokset osoittavat, että johtamistapoihin pitäisi tehdä useita muutoksia. Huolto-prosessien johtajien pitäisi parantaa viestintää huoltoketjun sisällä sekä lisätä henkilöstön koulutusta, koska uusi teknologia kehittyy nopeasti. Työn tulokset antavat myös pohjan sille tavoitteelle, että koko tuotekehitystä ohjattaisiin järjestelmäsuunnittelusta alkaen siten, että uusien tuotteiden kohdalla samoja asiakaslaatuun vaikuttavia ongelmia ei toisteta. Tavoitteeseen päästään, kun koko huoltoketju loppukäyttäjistä tuotekehitykseen pystytään mallintamaan ja käyttämään mallinusta apuna huolto-organisaation kaikilla tasoilla. Yritysten pitäisi myös kehittää strategioita, joiden avulla asiakkaille voidaan tiedottaa säännöllisesti huollon tai tehtyjen korjaavien toimenpiteiden edistymisestä.

**Avainsanat:** Asiakastyytyväisyys, huoltopalvelu, tilastomatemaattiset menetelmät, huoltopalvelun laatu

## Foreword

*“Ask, and it will be given, Seek, and you will find, Knock, and the door will open”*

Matthew 7:7

Knowledge acquired is a wealth that never disappears or depreciates. Back in the early 1950s, my late father recognized the importance of knowledge when he could not continue studying because of a lack of money to pay school fees. Therefore, before I was even born, he put all his thoughts and energy into preparing resources for me to pursue my studies as far as my capabilities would allow. He made sure that the lack of money would not be a hindrance to my attending school and acquiring knowledge, managing my life, and contributing to the development of humankind. He gave me the name Mawazo, which means “thought” in Swahili, because he had faith in the Lord to give him a baby boy as his first child. It is this strong faith and belief of my father that has always encouraged me to push myself forward even when things did not look as bright as they did in the movies. Earning a doctoral degree is the gateway to the research world and seeking truth in the field of interest. After working in R&D for 12 years, I decided to take a job in aftermarket services, nowadays referred to as “customer care,” to bridge the two worlds in practice. My interest in customer care was to help resolve customer issues in a timely and effective manner and to bring the customer’s voice into R&D to learn lessons for future development. At the core of this thesis is the effort to gain customer satisfaction as well as the customer product or service loyalty provided by an institution, either private or public.

I would like to thank my supervisor, Adjunct Professor Aulis Tuominen, PhD, who supported the work through his activities and, despite the difficulties, continued to believe that it would be completed as long as I played my part. Sincere thanks are also due to my instructor Dr. Arho Suominen, PhD, for helping me tirelessly and expeditiously and for teaching me the scientific way of thinking and seeing the big picture. Thanks also go to Dr. Timo Liukonen, PhD, for his advice, guidance, and encouragement to complete my research



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I have not forgotten the most important people in my life, my late parents, my sisters and brothers, relatives, and friends who spent time just listening to me talking about my research and supported me in many ways during my studies.

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Salo, 12.04.2014

Mr. Andi Mawazo Mwegerano  
MSc (Eng)

## List of original publications included in the thesis

This thesis is based on the following original publications, which are referred to in the text by the Roman numerals I–V:

- I. Anderson Mwegerano, Pekka Kytösaho, Timo Liukkonen, Aulis Tuominen. “Characterization of Resolution Cycle Times of Corrective Actions in Mobile Terminals”. *Journal of Quality and Reliability Engineering International*. Volume 24, Issue 5, pp. 613-621, August 2008
- II. Andi Mwegerano, Jarno Kankaanranta, Ossi Hämeenoja, Arho Suominen. “Perceived after Sales Service Quality: Communication within the Service Chain”. *Journal of Quality Technology and Quantitative Management (QTQM)* Vol. 9 No. 9, pp. 407-419, 2012
- III. Andi Mwegerano, Pekka Kytösaho, Aulis Tuominen “Applying Self-Organizing Maps Method to Analyze the Corrective Action’s Quality Provided to Customers with Mobile Terminals”. *iBusiness Journal* 2012, 4, pp. 108-120
- IV. Jarno Kankaanranta, Andi Mwegerano, Ossi Hämeenoja. “The importance of having Mobile Terminal Samples for Analyzing and Verifying Customer Issues”. *African Journal of Business Management*, Vol. 6 (1), pp. 11088-11094, 7 November 2012
- V. Andi Mwegerano, Timo Hurme, Arho Suominen. “Estimation of Customers Complaints Resolution Times in Mobile Terminals”. Submitted manuscript

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# Abbreviations

<b>CA</b>	Corrective action
<b>ASV</b>	Authorized service vendors
<b>BU</b>	Business unit
<b>CPM</b>	Care project manager
<b>CAP</b>	Corrective action process
<b>CC</b>	Country care
<b>CSO</b>	Country sales office
<b>CRM</b>	Customer relationship management
<b>CS/D</b>	Customer satisfied/dissatisfied
<b>ES</b>	Employee satisfaction
<b>EU</b>	End user (consumer)
<b>EFQM</b>	European Foundation for Quality Management
<b>GENIUS</b>	Global Exchange for Nokia Product Information User Support
<b>HW</b>	Hardware
<b>HRD</b>	Human resource development
<b>ICT</b>	Information communication and technologies
<b>iBU</b>	Issue business impact
<b>iCA</b>	Issue corrective action
<b>iRT</b>	Issue resolution time
<b>iTA</b>	Issue technical area
<b>KPI</b>	Key performance indicator
<b>L</b>	Level
<b>LTE</b>	Long-term evaluation of communication
<b>MT</b>	Mobile terminal
<b>P-QoiCA</b>	Perceived quality of issue corrective actions
<b>P-QoiDeAI</b>	Perceived quality of issue description and additional information
<b>P-QoiDes</b>	Perceived quality of issue description
<b>P-QoiRT</b>	Perceived quality of issue resolution time
<b>PAP</b>	Preventive action process
<b>PC</b>	Program center
<b>QoS</b>	Quality of sample
<b>RC</b>	Regional care
<b>RSO</b>	Regional sales office
<b>R&amp;D</b>	Research and development
<b>RT</b>	Resolution time
<b>SA</b>	Sales area
<b>SC-TAT</b>	Sample collection turnaround time
<b>SOM</b>	Self-organizing map
<b>SL</b>	Service level
<b>SW</b>	Software
<b>SW-P</b>	Software platform
<b>SIPOC</b>	Supplier input process output customer

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# 1. Introduction

*“...to survive in developed economies it is widely assumed that manufacturing firms can rarely remain as pure manufacturing firms, instead they have to move beyond manufacturing, and offer services and solutions, delivered through their products”*

Neely, 2007

In recent years, it has been claimed that we live in a service economy, i.e. that manufacturing should be complemented or replaced by services. Companies are advised to make a transition to service or product-service offerings, which are seen as offering a win-win scenario for all involved. This dissertation investigates the role of aftermarket services in making transitions and developing these offerings. The main focus of the articles included in this thesis is aftermarket issue handling provided for customers of mobile terminal phones. According to the literature, services offered by the aftermarket include providing, for example, spare parts, handling of escalated issues, product training, software upgrade and repair instructions, etc. As an example, such products as washing machines, computers, mobile phones, and medical equipment demand good aftermarket services. There has been notable success in gaining market share through the service business (e.g. KONE and IBM), and overall functioning in service provision is a significant lock-in for

customers. This dissertation restricts itself to technical issues in mobile terminal services that involve resolving customers' after-sales issues through maintenance and other corrective actions. By resolving customers' issues effectively and in a timely manner, lock-in and retention are enabled. The factors and metrics that lead to customer satisfaction, loyalty, retention, and churn are discussed. Beard (2013) defines customer churn as *"when a customer (subscriber, user, client, etc.) ceases his or her relationship with a company. Companies typically classify a customer as 'churned' after a specific time has elapsed since their last interaction. Customer churn is a key component to business growth."* According to Kasper and Lemmink (1989), providing superior services or refining the present level of services to meet customer requirements will minimize the chances of companies losing business due to unsatisfactory services. According to Kasper and Lemmink (1989) and Myrosław (1987), customer services can be used as a competitive tool against competitors. Kasper and Lemmink (1989) state, *"It is vital for a company to know what the customers want and how they perceive the company's offering. The customer's perception of the company as well as the way in which the company views the customer and perceptions are important issues in shaping corporate strategy and marketing strategy."* This chapter introduces the research by presenting the background to the study. It explains the research problem, aims, and contribution of the research. Furthermore, a description of the topology of the dissertation is provided.

## 1.1. Motivation

I have always been of the opinion that if someone is in a position to contribute something useful in any field of human life, he or she should do it. Bearing this in mind, in my daily activities, I try to seize opportunities to contribute to the society we live in. For example, after running many marathons around the world, I thought I could start a marathon race club to organize marathon events in my home town of Salo. In this way, I would contribute to society by organizing races in my town and bringing many other participants from different parts of Finland and the world to Salo. It is a small contribution to society but significant when one considers people's well-being. Furthermore, I believe it is this desire to contribute that motivated me to write two books: *Conversional Ha* for my Ha tribe in Tanzania and *Voice of New Finns*, both of which have been referenced in others' theses. Further, I have

always sought knowledge during my life and have learned to appreciate it, and through knowledge, I have gained a desire to find new knowledge and to share it. Since I have been involved in aftermarket services for 15 years in various capacities as a field technical support engineer, this seemed an ideal place to dig deeper into research that could possibly help create benefits for companies such as Nokia as well as for their customers. I was surprised to discover that, although mobile telephones have now been used intensively for over 20 years, one can hardly find any literature discussing after-sales issues relating to mobile terminal phones. This gave me an even bigger incentive to conduct research in this area. I started by getting the big picture of aftermarket services. As an employee of Nokia, this meant finding out just who the customers are and how best to serve them. I have had many good opportunities with my present employer, and this kind of research would expand my experience beyond my day-to-day activities and help me become more efficient, use more critical thinking, and be even more realistic about myself and the company with respect to how our customers are served in after-sales services.

During the past 15 years working in various capacities, my main task has been to support customers with the issues they have encountered since the products have been in the field. Among the tasks included in my daily work was taking corrective actions for issues reported by customers. With time, I learned the most effective ways to provide customers with issue corrective actions (iCA) and to reduce issue resolution time (iRT) for them. The interaction between customers and our department enriched our understanding of how to deal with and cooperate with customers in a win-win business atmosphere. The customers with whom I dealt in this context were the authorized service vendors (ASV) for the mobile terminal phone manufacturer, as supported in the five study cases included in this dissertation. Among the main reasons for a product manufacturer or service provider to respond fast and effectively to issues raised by customers is to keep them satisfied and loyal and in due course to retain them (Adams, 2013; Caruana, 2002; Hallowell, 1996; Johnson, 2000; Gustafsson et al., 2005; Reichheld and Teal, 1996). Since the main emphasis of the five case studies is on the elements that affect iCA and iRT and how to remedy issues, the main body of this dissertation concentrates on exploring and examining the customer-profit chain. This includes exploring customer services, customer satisfaction, customer loyalty, and customer retention. The main body of the

thesis bridges the case studies presented in this work. The objective of this study will be to provide companies with useful information that will give them the means to increase customer satisfaction and therefore increase customer loyalty and retention, thus ensuring that the company can be more successful.

## **1.2. Research questions**

The purpose of this study is to examine how to manage the customer issues better through the usage of support channel networks. The purpose is further divided into four research questions. It is expected that answering the research questions appropriately will allow us to address the purpose in a coherent manner. The research questions are as follows:

- RQ1:** What are the factors affecting issue corrective actions (iCA)?
- RQ2:** How can issue resolution time (iRT) be controlled?
- RQ3:** What are the factors affecting the issue handling process in a service chain?
- RQ4:** How can communication be measured regarding handling customers' issues within the service chain?

**Table 1:** Tabulation of RQ and their corresponding answering articles.

<b>Research Question</b>	<b>Article/chapter links to the research questions</b>
<b>RQ1:</b> What are the factors affecting issue corrective actions (iCA)?	Articles 2, 3 and chapters 3 and 4
<b>RQ2:</b> How can issue resolution time (iRT) be controlled?	Article 1 and article 5
<b>RQ3:</b> What are the factors affecting the issue handling process in a service chain?	Chapters 2, 3 and 4
<b>RQ4:</b> How can communication be measured regarding handling customers' issues within the service chain?	Article 2

Table 1 illustrates how the research questions are addressed through the articles. The research question is limited to technical issues that are supported by the five published articles included in this thesis as case studies. RQ1 and RQ3 are focused on more in the introductory part of the dissertation—specifically in sections 2 and 3. This creates a context for the publications. In the thesis, the author focuses more specifically on the issue resolution time (iRT), issue corrective time (iCA), and communication in the service chain (RQ2 and RQ4).

In RQ1, with reference to the literature, the author investigates the root causes of the problems that delay customer issue corrective actions and finding remedies. The literature reveals that the components that most frequently cause or can cause delay or hinder the iCA include the following: 1) issue resolvers are not sufficiently trained to deal with the issues and 2) resolvers are not competent enough to handle the products in the field. RQ2 is dealt with in article 1, where CAs provided for customers were analyzed. In addition, activities at various correction levels in the chain model were analyzed, and it was observed that most of the actions took place at levels 2 and 4 in the service chain (L2 and L4) and that these levels were the major contributors to the total issue resolution time (iRT). RQ3 is discussed with reference to the literature in chapter 3 of this thesis. For a firm or a company to establish a customer-focused organization, it must continuously improve the ser-

vices to the customer, in addition to providing issue corrective actions and retaining the customer (Van Ossel et al., 2003; Stauss and Seidel 2005). RQ4 focuses on communication between people working in a chain resolving customers' issues. The discussion section is presented in article 4, which analyzes the importance of communication for achieving good results through corrective actions performed for customers.

### 1.3. Research approach

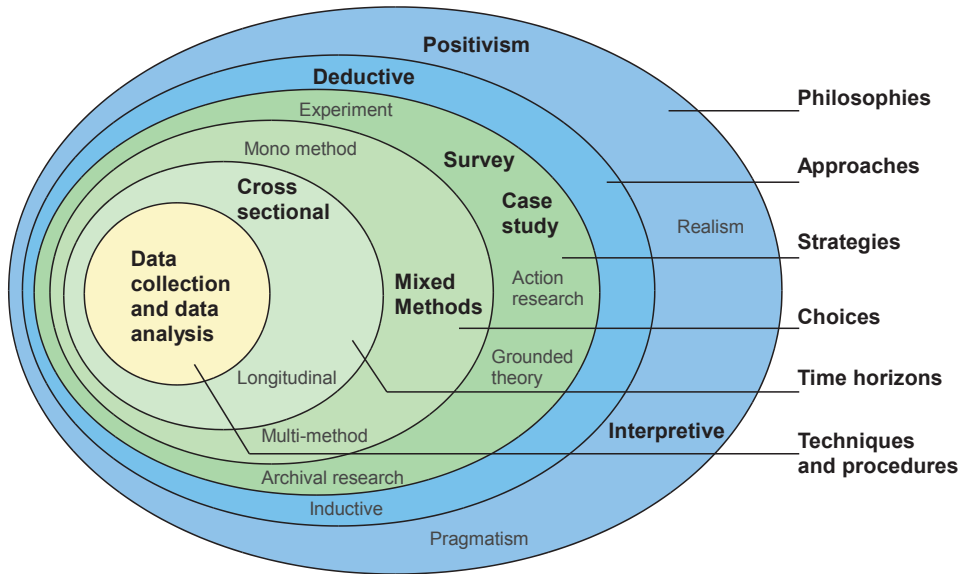
Methodology refers to the overall approach to the research process, from the theoretical reinforcement to the collection and analysis of the data (Hussey et al., 1997). Methodology is simply the systematic way in which the researcher attempts to find answers to the research questions.

According to Jonker and Pennink (2010),

*“In order to contribute to a solution the research will need to consist of a combination of theory and (research) methodology that needs to be elaborated into an appropriate and well-reasoned research design fitting the problem at hand. Combining theory and (research) methodology and turning it into research design is certainly not a standard job—it is always tailored to a specific problem. However, if the methodology is good and if the actual process of research is properly conducted a decent piece of research can be expected. Decent means resulting in research that is useful in organizational practice and meets academic standards”*

In this work, both quantitative and qualitative analysis methods are used. The case studies in the articles and surveys lean more toward a critical positivism methodology and then apply the interpretive approach to interpret the results. Some of the research process, i.e. the ontology and epistemology, of the thesis is represented in the “onion” (Sanders et al., 2007) depicted in Figure 1. The research consists of three activities: five case studies composed of empirical data and surveys, literature

research, and merging the empirical evidence with the theoretical framework found during the literature review.



**Figure 1:** The Research “Onion” (Adapted from Saunders et al., 2007).

In my research work, I have employed some part of the research onion (Figure 1, as shown in bold). Data were collected from an in-house database or from survey questionnaires. Mixed methods include quantitative and qualitative methods. The five articles presented in this thesis are case studies.

### 1.4. Positioning the study

Mobile terminals have become a necessary daily working tool, especially in Western countries, but with the rest of the world rapidly following. The Global System for Mobile Communications Association (GSMA) (2012) estimates that, by the year 2020, the number of mobile phone users will exceed 12 billion. As the technology advances for mobile terminals, there will be more challenges in after-sales service recovery. Despite the growth in the number of mobile phones since the early 1980s, little can be found in the information communication and technology



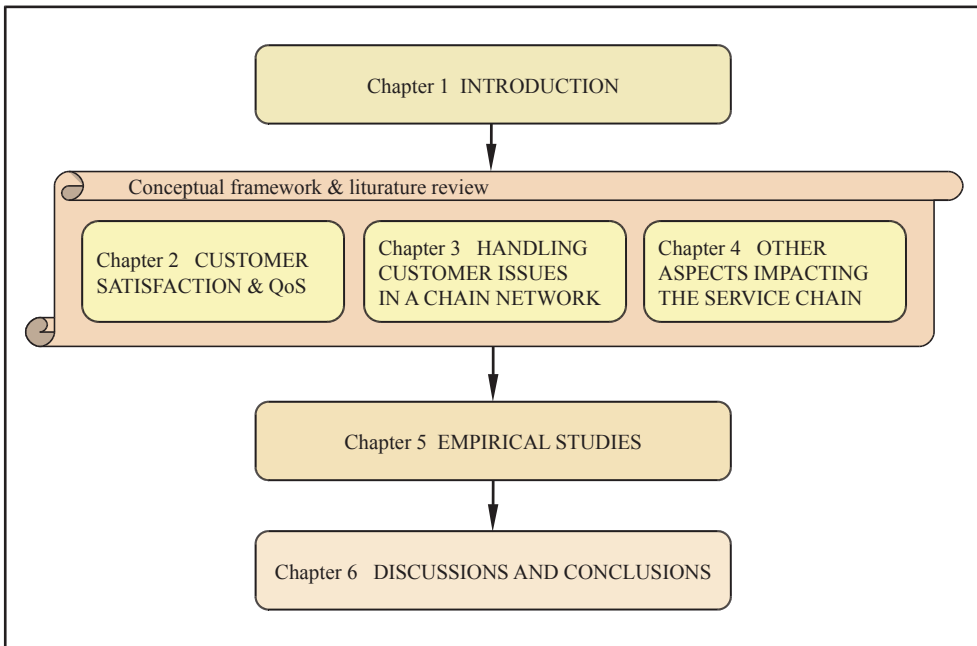
(ICT) literature about how after-sales service recovery is handled or its effects on the business of a mobile terminal manufacturer.

This dissertation draws knowledge of after-sales customer issue recovery from the marketing and customer relationship (CRM) literature and contributes it to knowledge on after-sales customer issue recovery for mobile terminals in ICT. The established models in the thesis contribute to the existing knowledge of the after-sales process of dealing with customer issues in the field of mobile phones. The articles focus on issue corrective actions (iCA) and issue resolution time (iRT) and communication within the after-sales chain that resolves customer issues. The iRT and iCA parameters are regarded by customers as one of the important variables that contribute to customer satisfaction (Kasper and Lemmink 1989, Heskett et al. 1997). There is a strong link between company profit and how customer issues are managed (Johnston, 2001).

## **1.5. Structure of the dissertation**

This dissertation is organized into two parts: (1) the main body of the dissertation and (2) the original case study research articles.

There are six chapters in this thesis. Chapter one is the introduction, which presents the motivation, the research questions, and the research method. Chapter two explores and examines, with reference to the literature, the customer satisfaction-profit chain, which includes customer satisfaction, customer loyalty and customer retention and churn, services, and the concept of quality. The effects of issue corrective actions (iCA) and issue resolution time (iRT) are also explored. Chapter three examines, through theoretical assumptions, the process of handling customers' issues in a chain. A practical example is presented to support the theoretical discussion. Chapter four examines the key factors that relate to customer service and how they affect the service chain, which includes competence, education, the knowledge chain, repair cost, and components. Chapter six discusses the empirical studies and summarizes the publications and stating the contribution and limitation of the thesis. Future research work is outlined at the end.



**Figure 2:** The Structure of the Dissertation.

Figure 2 displays the connection of the elements included in this thesis. Chapter 2, 3, and 4 address the conceptual framework and contain the literature review of the dissertation.

In the second part of this dissertation, the five original articles are attached. For easy understanding, the necessary basic information regarding the original articles is presented in Table 2. The first article deals with optimizing iRT after knowing the root cause of the issues. The second article deals with communication within the chain to optimize the quality of issue corrective actions (QoiCA). The third article addresses the factors that affect QoiCA. The fourth article examines the effect of MT samples with issues reported in the field on perceived QoiCA and perceived quality of issue resolution time QoiRT. The fifth article attempts to predict iRT for new escalated issues from customers in the field.

**Table 2:** The articles in the dissertation and their themes.

Article	Published	Theme	Sources of Data	Main Focus of the Study
1	2008	iRT of QoiCA in MT	Empirical—in-house database	Optimization of iRT
2	2012	QoiCA Communication in the chain	Empirical and survey data	Communication in the chain handling customer issues. Effect of quality of issue description and additional information (QoiDesAi) and QoiRT on QoiCA
3	2012	QoiCA	Survey	Factors that affects QoiCA
4	2012	Sample of the MT	Empirical data in-house database	Effect of MT samples with issues reported for verification the issues.
5	Under Review	Estimation of iRT	Empirical data and in-house database	Predicting iRT for issues escalated by customers.

All the articles have been peer-reviewed except article 5 (estimation of iRT), which was under review when the dissertation was submitted for public examination.

# 2. Customer Satisfaction

This chapter explores the theoretical immensity of knowledge associated with customer satisfaction in the product and service industries and in the aftermarket sales period. This chapter is meant to bridge the study case articles, which suggest that, when companies provide excellent customer-perceived quality of issue corrective action (P-QoiCA) and quality of issue resolution time (P-QoiRT), this leads to customer satisfaction, loyalty, and retention. Hence, this chapter examines with reference to the literature and other empirical studies the customer, customer satisfaction (CS), loyalty, retention, churn, quality and perceived quality, services and perceived quality of service (P-QoS). The chapter goes further with reference to the literature and empirical studies, exploring the impact of QoiCA and QoiRT on the defining elements leading to CS. Briefly, this chapter focuses on theories regarding the satisfaction-profit chain (Anderson and Mittal, 2000). This chapter links attributes to CS, CS to loyalty, and the concept of quality to CS. The connection between service performance and profitability is made by studying these individual elements of the satisfaction-profit chain. Anderson et al. (1994) have found that *“improved CS is expected to lead to great customer loyalty, which in turn leads to*

*greater profitability. All this is not often evident, as the links in the satisfaction-profit chain are asymmetric and non-linear.”*

This chapter begins by defining the customer and proceeds to address customer satisfaction and service-profit chains.

## **2.1. Who is the customer?**

The word “customer” is derived from the root “custom.” According to the *Oxford English Dictionary*, the word is defined as follows:

*“To render a thing customary or usual and to practice habitually.”*

According to Griffin (1995), *“a customer therefore, is a person who becomes accustomed to buying from you. Custom is established through purchase and interaction on frequent occasions over a period of time. A true customer is established over time.”*

The terms “customer” and “consumer or end user” are often used interchangeably. Parasuraman and Grewal (2000) differentiate these terms as follows: *“An individual or business entity that buys the product or service and pays for it, while the consumer or end user is a person who consumes or uses the product.”*

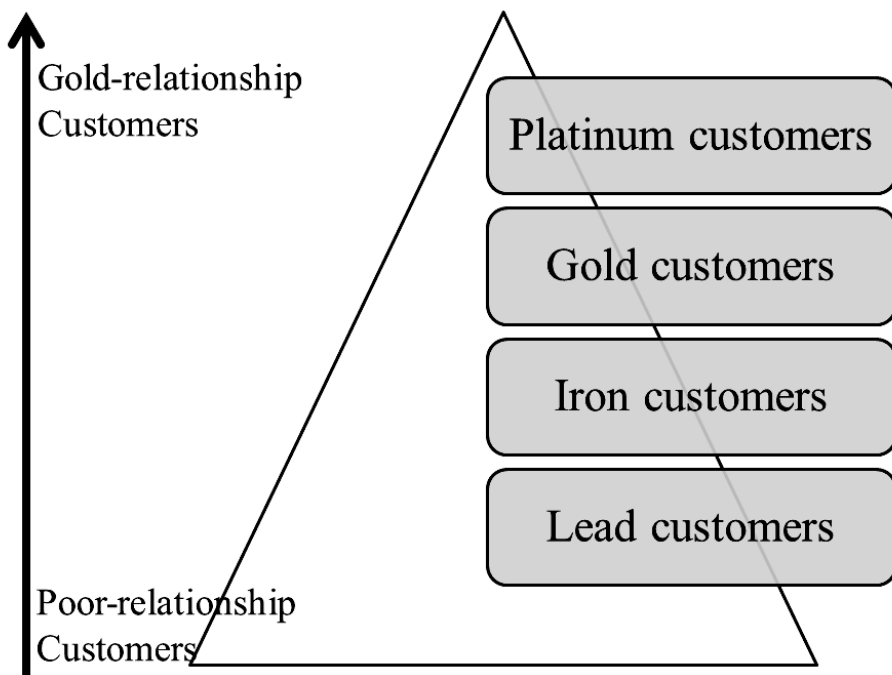
Zeithaml et al. (2001) identify customers in four different categories according to profitability tiers. Customer tiers can be developed based on diverse levels according to profit contribution and needs (including sensitivities to variables such as price, comfort, and speed). Figure 3 demonstrates the different profiles of customers as viewed by a business owner.

Lovelock and Wirtz (2007) define customers as follows:

- 1) Platinum customers. This group constitutes a small percentage but contributes a large share of the firm’s profit. This group is the least sensitive to price, but they expect superior service from firms.
- 2) Gold customers. This is a larger group than the platinum, and it is more sensitive to price and less devoted to the companies or firms.

3) Iron customers. This group provides the majority of customers. This customer group gives the company economies of scale, which in turn are used to build and maintain a certain volume level and the foundation required to serve the gold and platinum customers. This group of customers is often only marginally profitable.

4) Lead customers. This group usually generates low revenue for a firm. Lead customers require the same level of services as the iron group, which is seen as a loss-making segment from the firm's point of view.



**Figure 3:** The Customer Pyramid (Adapted from Lovelock and Wirtz, 2007, p. 369).

For mobile terminals, the customers can be divided into nine segments as listed below in Table 3.

**Table 3:** Customer segmentation in mobile terminals (Adapted from the case company 2014).

<b>Customer Segment</b>	<b>Definition</b>
1. Core Consumers	Core consumers are highly influential, technically knowledgeable individuals who use mobile devices for everything everywhere. As image is key, they love to try out the latest innovations. Entertainment, social networking, music, and the internet are used constantly.
2. Strivers	Strivers are busy and ambitious urban professionals who strive for the best in both the work and private spheres. They desire stylish, efficient, and low-cost devices.
3. Populars	Populars are sociable people who love their devices to access the Internet and social media and to share pictures with friends. As a social image, design and fashion are close to their hearts, so the device needs to reflect their style. Social image is more the driving force than simply new technology.
4. Affectionates	Affectionates are driven by their ties to other people. Due to the need to stay connected, mobile devices are indispensable. They are slow to take risks with new technologies.
5. Balancers	Balancers are hardworking individuals who cherish their free time. They like to invest in quality relationships. Contactability is key to this group. They are usually not among the first to buy the latest technological innovations.
6. Independents	Independents are individualistic venturers who love to use their devices for entertainment. Taking pictures and listening to music is at the top of the list. The right kind of device is important for them.
7. Serenity Seekers	Serenity seekers are independent people who appreciate their privacy. These moderately engaged consumers mostly use their devices for basic and practical purposes.
8. Nurtures	Nurturers are family-centered individuals who prefer to lead a settled life. Devices offer a means to connect to an active social and family life. Technology, image, and trends play a minor role in their lives.
9. Essentials	Essentials are stable people, many of whom have already retired from working life. They use their devices to call or text, preferring easy-to-use, no-frills devices over multifunctional ones.

## 2.2. Definitions of customer satisfaction

In the scientific literature, for example, in Solomon, Bamossy, and Askegaard (1999), customer satisfaction is often referred to as “*post-consumption consumer satisfaction/dissatisfaction (CS/D), which is usually determined by the overall feelings or attitude a person has about a product after it has been purchased.*” Oliver (2000) defines customer satisfaction as “*attitude-like judgment following a purchase act or series of consumer product interactions. Most studies are based on the theory that confirmation/disconfirmation of preconception expectations is the essential determinant of satisfaction.*” In short, if customers get what they want, they are satisfied. If the customer’s requirements are not met, they will not be satisfied. Hill, Brierley, and MacDougal (1999, p. 7) give customer satisfaction a straightforward definition as a measure of the company’s “total product” performance in relation to a set of customer requirements. This definition tells us something fundamental about customer satisfaction—it is not an absolute concept but a relative one. A wider definition is provided by Oliver (1997, p. 13). He defines customer satisfaction as the customer’s fulfillment response: the “*response is the product or service pleasurable level of consumption-related fulfillment for the customer, including the level of under- or over-fulfillment.*” Evaluation of the fulfillment is subjective and must therefore be based on the customer’s perspective. The outcome of the evaluative process is a perceived judgment based on a comparison of the prior expectation and actual performance. However, the term “pleasurable fulfillment” does not necessarily relate to anything tangible (Woo and Fock, 1999, pp. 163-164).

Kotler (1994, p. 40) emphasizes the customer’s expectations in his definition:

*“Satisfaction is the level of a person’s felt state resulting from comparing a product’s perceived performance (or outcome) in relation to the person’s expectations.”*

In other words, one’s satisfaction level depends on the difference between perceived performance and expectations. Expectations are built on consumers’ past buying experience, comments from their peers, and promises made by the marketer or its competitors (Kotler, 1994, p. 40). A recent definition from Kotler (1997) is as follows:



*“Satisfaction is a person’s feelings of pleasure or disappointment resulting from comparing a product’s perceived performance (or outcome) in relation to his or her expectations.”*

According to Brown (1992), customer satisfaction is defined as follows:

*“The state in which customer needs, wants and expectations through the product or service’s life are met or exceeded, resulting in repeat purchase, loyalty and favorable word-of-mouth.”*

Jones and Sasser (1995) identify the four main factors, among others, that affect customer satisfaction as follows:

- 1) Basic features of the product or service
- 2) “Must-be” support, i.e. the minimum support expected
- 3) Corrective actions taken to counteract a negative experience
- 4) Unexpected or surprising good service offered

Jones and Suh (2000) differentiate between “*transaction-specific satisfaction*” and “*overall satisfaction*.” Transaction-specific satisfaction is based on a single incidence of service; overall satisfaction is based on the accumulation of past service experiences and may include transaction-specific experience (Teas, 1993; Parasuraman et al., 1994). Jones and Suh, (2000) concluded that “*overall customer satisfaction is the better indicator of a customer’s repurchase intentions than transaction-specific-customer satisfaction.*” In the best scenario, overall customer satisfaction and transaction-specific satisfaction should be evaluated separately as strong indicators for repurchase intention. Transaction-specific satisfaction is important, especially at the beginning of a customer relationship with the service provider (Jones and Suh, 2000), as at this junction, overall satisfaction has not yet been established or matured.

Koskela (2002) states that “*a consumption system that involves a group of goods and services that are consumed over time in different consumption phenomena is conceptualized in terms of three constitutive elements: 1) Attribute level evaluation, 2) Satisfaction, 3) Behavioral intentions. Transaction-specific and overall*

*satisfaction involve a series of encounters between the consumption system and the consumer.*” Mittal et al. (1999) point out as an example that products and services are the main subsystem of the consumption system for automotive consumption. The attribute level and overall satisfaction have a crossover relationship between a service and a product as they mature. In the early stage, the attribute level is significant for the customer, while as time passes, the product becomes more important to the customer (Barsky, 1995; Mittal et al., 1999).

Mittal et al. (1999) note that, as customers learn more about the features of a service or a product, the weight they give the overall satisfaction score might change with time. The more the customer learns about the product attributes, the more likely it is that the overall satisfaction will be high. Clear and intuitive instructions about how certain features and attributes function are important for the customer to be satisfied in the long term.

Parasuraman (1997) questions whether the customer satisfaction experience gained through learning the attributes of the products or services could also be drawn from the product or service directly. Parasuraman et al. (1994) argue that *“the relationship between service quality and customer satisfaction is an unresolved issue.”* Woodruff (1997) suggests that a strong relationship exists between customer value and customer satisfaction. Furthermore, Parasuraman (1997) suggests that, to create superior value continuously for a customer, the service or product provider must understand the customer’s entire value chain. Initial attributes that motivate a customer may differ as time goes on (Woodruff, 1997). Reichheld (1996) deduces that *“elements or things that satisfy customers may not always be the same as those that create customer loyalty.”*

Zeithaml et al. (1996) suggest that, to understand the effect of service quality on the customers’ response, they should be asked the following questions:

*“What is the level of quality a supplier must deliver in order to keep the customer?”*

*“What would encourage the customer to recommend the supplier?”*

*“What factors would reduce the likelihood of a customer spreading negative word-of-mouth?”*

*“Should the supplier focus on proactive service improvements or on complaint handling in order to keep the customer?”*

Oliver (1993) argues that *“the negative and positive effects have independent effects on customer satisfaction. Product quality tends to relate to customer dissatisfaction, while service quality is more closely related to customer satisfaction.”* In general, two categories of factors exist that explain the product and service relationship: hygiene and satisfier attributes. According to Oliver (1993), the hygiene factors are related to customer dissatisfaction, while the satisfier contributes to customer satisfaction. Naumann (1994) finds that, *“in order to delight customers, the provider’s performance in hygiene factors must be high enough and must be combined with high performance in satisfiers.”* This idea is supported by Peck (1997).

According to Finkelman and Goland (1990), to satisfy customers, product or service providers need to understand *“the customer’s expectations in each stage of their ownership experience, develop supporting procedures and establish evaluation and incentive systems.”* Wellington (1995) divides the elements of customer satisfaction into product, sales, after-sales, location, and culture. The after-sales satisfaction factors include maintained interest and issue handling. Issue handling should be made easy for the customer and build mutual respect and understanding.

Deming (1986) recognizes the importance of delight in the quality area, and his contribution is well known and respected. Deming encourages product or service providers to go beyond merely satisfying customers. The meaning of product and service features to the customer is divided into product attributes, satisfiers, and delights. The product qualities are basics that a customer expects to encounter, and the customer becomes dissatisfied if these attributes are missing. Satisfiers go beyond the product attributes. Delights are surprises that are liked. Here, two kinds of delight are paramount: 1) those that raise customer expectations and 2) those that the customers appreciate once and forget after a while. A delight referred to as an assimilated delight is likely to raise customer expectations, while the benefit of a transitory delight is marginal because the delight is not remembered for a long

time. Farson (1997) states that, “*if expectations are raised after a delight experience, delighting the customer will be more difficult in future.*”

According to Friday and Cotts (1995), customers are delighted when services exceed their expectations, and customers make buying decisions regardless of whether their demands or expectations are unrealistic. Customers’ expectations can be exceeded in two ways: first, when the consumer perceives that the product was better than expected, but not surprisingly so, and second, when the level of performance is significantly encouraging.

The customer delight phenomenon can be one of the winning factors for a product or service provider over a competitor as long as the delight element is not copied. If the original delights are copied, then this results in a decrease in profit and sustainable gain. According to Rust and Oliver (2000), once customer expectations have been raised, the product or service provider should not go back to the original situation, as this will cause the customer to become disenchanted and hence not to buy the product or service, causing losses to the service or product provider.

Because customer expectations have risen and enterprises have failed to pay attention to the needs of customers, the level of customer satisfaction has not risen despite many efforts. A system for gauging how customers perceive value and how they perceive competitors is known as customer value measurement. Several researchers (Barsky, 1995; Wellington, 1995; Farson, 1997; Daniels, 2000) have attempted to develop ways of gauging customer satisfaction in terms of the key buying factors that customers value and how important they are to the customers. The resulting index of customer value can be used to learn about how customers see a company compared to their competitors.

### **2.3. Operationalization of Customer Satisfaction**

According to Wellington (1995) and Farson (1997), customer expectations keep growing when it comes to the perceived quality of products or services and reaches a point where the providers cannot sustain the customers’ demands or expectations; in other words, perfection is impossible (Wellington, 1995, Farson, 1997). According to Ford et al. (1989), different companies should not be seen as a single market

but instead should be treated as individual companies with individual offerings in terms of experience, commitment, and interactions. Companies or product and service providers should implement customer satisfaction value by identifying the customers in terms of their needs and expectations and measuring their perceptions (Sternberg, 1997). Some companies have failed to understand the alternative ways in which a customer can be satisfied (Rothschild, 1984). It is important for employees of the enterprise to be in contact with customers continuously to determine customers' expectations and requirements (Mwegerano et al., 2012). A mutual relationship between the employee and customers indicates a caring relationship (Chase and Garvin, 1989; Stonebraker and Leong, 1994). When service or product providers work well with customers, this will increase profitability and increase the margin opportunity (Wellemin, 1984; Cannie, 1994; Grant and Schlesinger, 1995; Heskett et al., 1994). According to the existing literature on determining what the customer wants, the following steps can help: 1) market exploration, 2) customer questionnaires, and 3) understanding customer concerns or involving customers in the strategy of services and service provision. According to Järvelin et al. (1992), customers should be asked about their expectations and how satisfied they are to improve the services or product features. During customer satisfaction survey research, poorly collected data can lead to incorrect decisions, which in turn may indirectly cause customer expectations to rise in vain (Naumann, 1994). When the customer's expectations are raised and the service or product provider's execution stays unchanged, the customer's satisfaction will dwindle.

However, measuring is challenging. According to Heskett et al. (1997), there is a logical explanation for why a customer chooses grade "4" (in a Likert scale of 1–5) in customer satisfaction surveys. Although these customers select a high satisfaction grade out of politeness, they are not loyal customers. Their perceived expectations are not fulfilled by the service or product provider. Constant surveys of customer satisfaction can enable service and product providers to make a good guess at how they should respond to customer expectations. By keeping records of the customer satisfaction survey responses, companies can identify the somewhat over-estimated level of perceived customer value and be able to predict customer purchase potential with better accuracy (Jones and Sasser, 1995; Heskett et al., 1997).

Feedback and complaints are a good source of information for enterprises to work on for improvement and development. Unfortunately, feedback and complaints are

not consistent and frequent, and hence, they cannot be relied on alone. Market survey questions asking the customers why they switch from one provider to another can provide insight into where service recovery should begin to retain customers (Heskett et al., 1997; McKenna, 1997).

As an example, Mwegerano et al. (2008) point out that the more complex a service or product is, the more issues will arise in the field, giving the provider more opportunities to meet with customers and hence learn more about the service they provide and improve upon it. Danaher and Mattson (1998) find that customer satisfaction and loyal attributes are not the same. This implies that properties that satisfy a customer are not the properties that make a customer loyal. Danaher and Mattson (1998) state that ways of satisfying a customer in one service process do not necessarily function in another service process. Hence, all service processes should be analyzed individually and tailored to the attributes that will satisfy the customer.

As an example, Nortel (Bowden, 1998) stresses the importance of having satisfied customers by taking into account the following elements in their customer satisfaction process: language, culture, and “*respondent influence within recipient organization.*” Through a process-based business model, continuous improvement can be implemented by identifying the needs and expectations of the customers to keep them loyal and win against competitors.

Customer satisfaction can be operationalized through constant contact with customers and determining what customers want through feedback, such as surveys, listening to customers’ voices and the issues raised by them. In addition, customers can be involved in the phase of the design of products, services, and deliveries (Mwegerano et al., 2012).

## 2.4. A Model for Customer Satisfaction

To satisfy customers, the provider must supply them with the desired and expected services (Davidow, 1986). Customer satisfaction can be generalized by the formula given below (Davidow 1986):

$$CS = CP - CE$$

where CS is customer satisfaction, CP is customer perception, and CE is customer expectation. The equation tells us that, if the customer sees a service or product attributes in a particular way but expects less, then the customer will be satisfied. To minimize uncertainties and risks and to secure the importance of the deal, some organizations and customers are ready to pay high fees for professional services to ensure that they get the right attention when required. Service companies that are able to practice a caring image and to back the image with actions are likely to succeed (Maister, 1997).

Customers usually have some expectations about the services that a firm is to deliver, and these expectations are known as company-controlled expectation creators. Competition and word of mouth (WOM) are known as uncontrollable creators. In the long run, customer standards are formed when the controllable and uncontrollable expectation creators are merged together. According to research, (Barsky, 1995; Friday and Cotts, 1995; Oliver, 1993), customers compare their expectations according to their experiences, but it is not always possible for those previous experiences to relate to the services that are being offered.

According to Ames and Hlavacek (1984), service managers should have insight into how customers buy the services they provide and what makes them delighted. By knowing this, managers could place themselves in the customers' shoes and have a more or less accurate perception of what the customers require from them. It is also important not only to manage the technical side of the services but also to give equal importance to the social side. Barsky (1995) notes that customer satisfaction is a feeling and that it can affect the attitude toward buying a service or product. In a multi-location environment, it is the people who get involved that keep the business going (Maister, 1997).

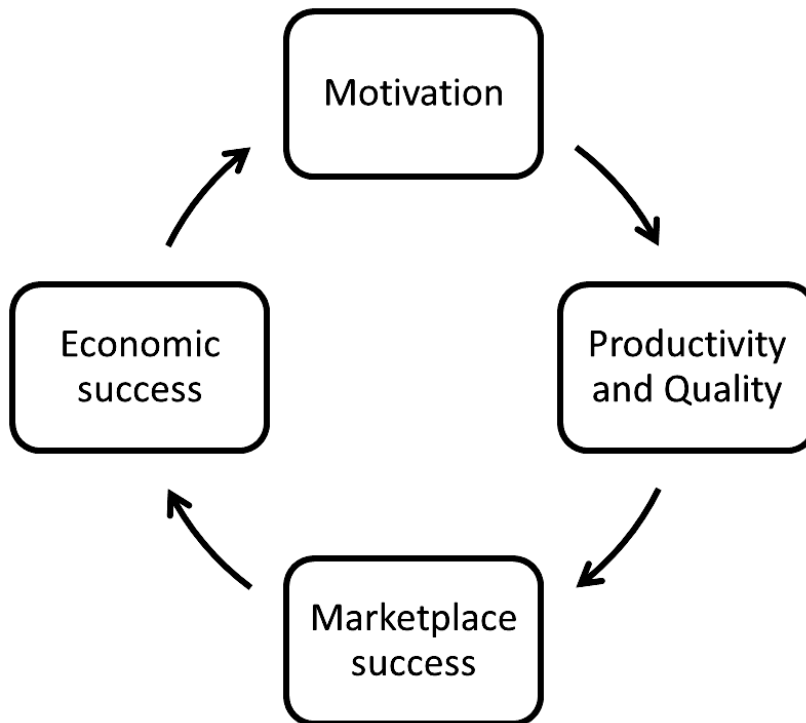
Innis and Londe (1994) argue that there is a formidable link between attitude and conduct. The most common model expressing the complex attitude of customer satisfaction is defined by Innis and Londe (1994) in the following equation:

$$A_{jk} = \sum (I_{ik} X B_{ijk})$$

*Where I is an attribute or product characteristic, j is a brand, k is a customer or respondent, A<sub>jk</sub> is customer k's attitude score for brand j, I<sub>ik</sub> is the importance weight given to attribute*

*I by customer k, and  $B_{ijk}$  is customer k's belief about the performance on attribute I by brand j."*

The customer satisfaction model is not complete if consumer perceptions alone are used. Heskett et al. (1990, 1994, 1997) find a relationship between employees (of a service or product provider company) being satisfied and the service they provide to the customers. It has been established that, when employees are satisfied with their employer and with the work they do, the customers are also satisfied with the services they receive. A satisfied employee therefore enriches the company. The measurement of employee turnover should include not only the cost of hiring and training but also the reduced productivity of the company's workforce and the decreased customer satisfaction resulting from these factors. Figure 4 demonstrates the "motivational spiral" (Maister, 1997) as a relationship between employee enthusiasm and accomplishment. High self-esteem yields financial achievement. In contrast, an unsuccessful marketplace leads to low self-esteem (Heskett et al., 1990; Maister, 1997).



**Figure 4:** Motivational Spiral (Adapted from Maister, 1997).



Since people are an asset to a company and time should be taken to invest in them by encouraging personal development, providing them with authority over their work and rewarding them in accordance with their performance (Griffin, 1995; Heskett et al., 1997; Grant and Schlesinger, 1995). Companies should provide the right tools and a good atmosphere for the employees to accomplish their assignments on time and satisfy the customers' expectations (Riggs, 1983; Wellemin, 1984; Brown, 1992; Järvelin et al., 1992; Heskett et al., 1997; Petrozzo and Stepper, 1994; Barsky, 1995; Griffin, 1995; Morris, 1996; Maister, 1997; Reichheld, 1997).

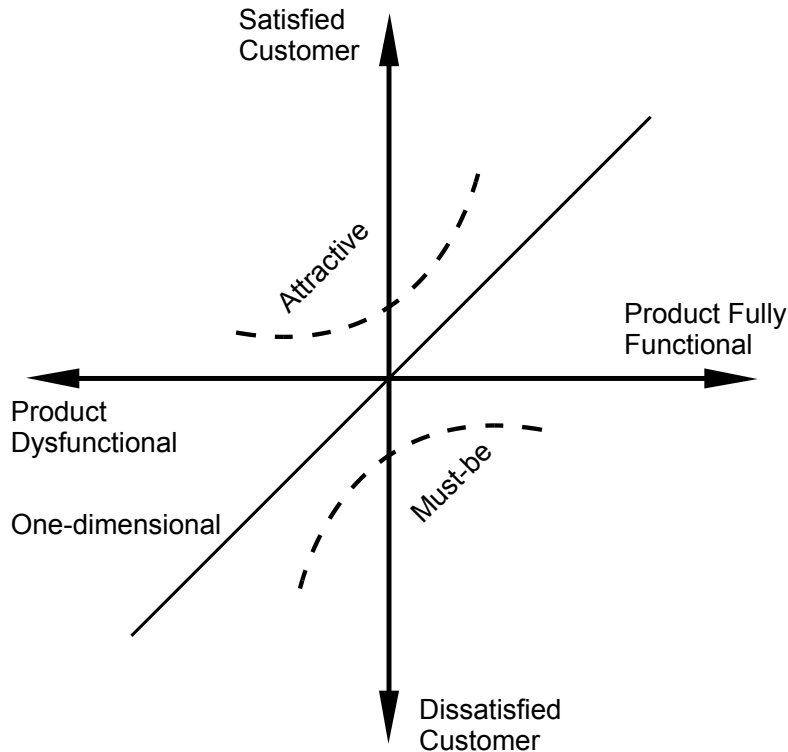
Customers and employees assess a firm's achievement equally according to principles that are vital for the customers, i.e. 1) how easy it is to do business, 2) the competence level of the employee, 3) the principle of services available 24/7, 4) service employee availability, 5) and the enthusiasm of the employee in helping customers. The employees are in a position to collect feedback data from the field and turn it into knowledge (Heskett et al., 1997). According to Brown (1992), frontline workers are able to forecast customers' issues and the corrective actions needed at a level of 90 percent.

## **2.5. Noraki Kano model for customer satisfaction**

Noraki Kano has developed a model for customer satisfaction, where quality dimensions are divided into three main categories: must-be requirements (unspoken) category, one-dimensional requirements (specified) category, and attractive requirements (delighter unspoken) category, as illustrated in Figure 5.

The meeting of basic needs is almost unconsciously expected by the customer. Lacking basic requirements will lead to customer dissatisfaction. One-dimensional requirements are the expectations that the customer has of the product or service provided. Expected needs are needs that the customer is aware of and wants to have satisfied, even though they are not always absolutely necessary. The attractive requirements (delighter unspoken) are exciting experiences invented by the product or service provider. The delighter unspoken requirements are surprises to the customer, who cannot imagine them. According to Bergman (1994, pp. 282-283), *“the degree of customer satisfaction depends on the correlation between the customer's*

expectations and his/her experience; but is also influenced by such things as the image of the company.” On the basis of publications relating to Kano’s model, Matzler and Hinterhuber (1998) summarize the following benefits of the model:



**Figure 5:** The Kano Model (Adapted from Kano, 1984).

*“Kano’s model promotes understanding of product or service requirements. The attributes that have the greatest influence on customer satisfaction can be identified. It provides valuable guidance in the following trade-off situation. If two product attributes cannot be promoted simultaneously for technical or financial reasons, the attribute that has a greater influence on customer satisfaction can be determined. The use of the Kano model can lead to development of a wide range of product or service differentiation by examining attractive attributes. The attractive attributes are the key to beating the competition in the market place.” (Matzler and Hinterhuber, 1998)*

Despite the aforementioned benefits of the Kano model, Bharadwaj and Menon (1997) note that the model has several limitations:

- 1) *“It classifies, but does not quantify either qualitative performance or the attributes,”*
- 2) *“The model does not provide an explanation of what drives customer perceptions, why particular attributes are important to the customers and what the customer’s behavioral intentions are.”*

Kano’s basic theory of customer satisfaction is echoed by Oliver et al. (1997), which states that:

*“Customers have certain service standards in mind before consumption (their expectations), they observe service performance and compare it to their standards, and then form satisfaction judgments based on the comparison. The resulting judgment is labeled negative disconfirmation if the service is worse than expected, positive disconfirmation if it is better than expected, and simple confirmation if it is expected.”*

According to Oliver et al. (1997), once the customers are delighted, their expectations become higher. Customers will be discontented if the service level assumes previous levels, and this implies that more work will be required to satisfy the customers in future business transactions (Rust et al., 2000). This means more than simply avoiding problems—the “zero defect” strategy. On the other hand, Fornell et al. (2005) caution against trying to exceed customer expectations on a continual basis. They argue that reaching for an unobtainable objective may backfire and note that such efforts often come close to the point of diminishing returns.

## **2.6. Customer loyalty, retention, and churn**

### **2.6.1. Customer loyalty**

Historically, the word “loyalty” was used to define faithfulness and wholehearted devotion to a country, one’s roots, or a person. Contemporarily, the word has been adapted in the business world to express a customer’s eagerness to continue adver-

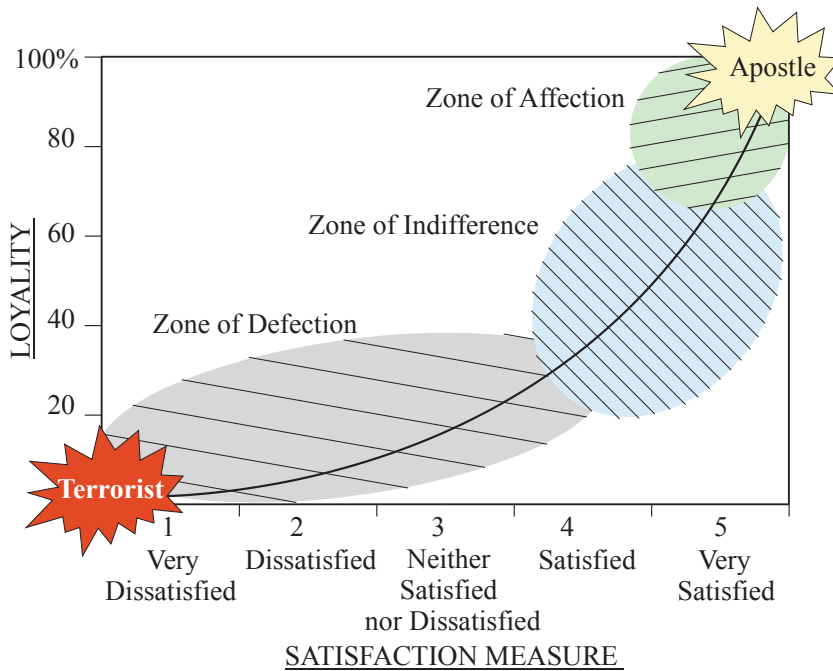
tising the firm in a positive way over the long term, preferably on an absolute basis, and proposing the firm's products to friends and allies. According to Lovelock and Wirtz (2007), "*customer loyalty goes beyond behavior and includes preference, liking, and future intentions.*" In Oliver's opinion (1997), loyalty is defined broadly and takes into account both behavioral and psychological aspects of customer loyalty. He defines loyalty as follows:

*"Customer loyalty is a deeply held commitment to rebuy or patronize a preferred product or service consistently in the future, thereby repetitive same brand or same brand-set purchasing despite situational influences and marketing efforts having the potential to cause switching behavior"*

Buttle (2001) defines customer loyalty as "*an attitudinal state, reflecting value, trust and commitment within the supplier-customer relationship.*" For customers to be loyal, they first have to be satisfied. Satisfaction is one of several predecessors of loyalty. A key principle influencing loyalty is the offer of distinctive value delivering benefits not offered by competitors. This means that service or product providers must improve value-based exit obstacles to achieve loyalty (Buttle, 2001).

### **2.6.2. Customer Satisfaction and Loyalty**

Lovelock and Wirtz (2007) confirm that "*customer satisfaction and service quality are prerequisites for loyalty. Highly satisfied and even delighted customers are more likely to become loyal apostles of a firm.*" On the basis of the literature, satisfaction loyalty can be summarized in three distinct groups, namely defection, indifference, and affection, as shown in Figure 6. Defection occurs at low satisfaction rankings. Extremely dissatisfied customers can turn into "terrorists" if they speak out against poor service delivery at every opportunity. The customers who are willing to shift to a competitor with better offers or services are in the zone of indifference. Customers in the zone of affection are very satisfied and very loyal to the firm or service providers. Customers who spread good WOM to others are referred to as "apostles," a term coined by Scott D. Cook (Heskett et al., 1994).



**Figure 6:** A Satisfied Customer Is Loyal (Adapted from Jones et al., 1995).

Customers in the zone of apostle, affection and indifference are business value drivers while the customers in zone of defection are business value destroyers.

### 2.6.3. Churn

Churn is a market-related term that characterizes a consumer transferring from one company to another. As a customer, he/she still has an affiliation with the main company but will go to a competitor in the near future. If the company wants to prevent him/her from leaving, a retention action is required.

Burez and Poel (2008) assert that “*customer churn prevention as a part of Customer Relationship Management (CRM) is an ongoing agenda.*” Large companies invest in implementing a churn prediction model for detecting possible churners over time. Most of the time, a data mining technique is employed to predict churn. According to Neslin et al. (2006), churn is in practice a rare challenge for companies but one of great interest and value. Gupta et al. (2006) state that understanding how to model rare events is one of the issues that represent opportunities for further investigation. According to a literature survey, there are several statistical techniques for churn prediction, but this thesis does not address these techniques. Com-

panies use churn prediction models to identify the customers who should be given an incentive to increase retention. Jamwal's (2011) research includes a customer service and customer complaint log for modeling based on the model presented in prior research by Wei et al. (2000). According to Buttle (2001), dissatisfaction and customer satisfaction are major causes of customer churn.

Today, churn is a phenomenon common to cellular network operators, although the practice of switching to alternative providers was initially legitimized during the post-divestiture long distance battles (Blake, 1997). According to Egolf (1995), the main factors that contribute to churn in connection with a mobile cellular provider are the perception of weak coverage and the variability of customer expectations. Egolf states that business users are willing to pay a premium, but subscribers are now looking for services that are comparable in price and quality and even interchangeable with landline services. Churn stems completely from the relationship between the subscriber and the network provider. In practice, many of the flaws lie hidden in the layers of management or mismanagement between network providers and their agents. Blake (1997) insists that timing is another critical factor in sustaining a long-lasting relationship with subscribers.

#### **2.6.4. Customer Retention**

Customer retention is defined as the action that a company or service provider takes to reduce the number of churn customers. This is a continuous process involving all the activities that a company deems relevant in encouraging its present customers to continue the existing relationship while purchasing more. Customer retention is strongly associated with customer loyalty; in other words, retention can be deemed a transitional step toward loyalty.

Gupta and Zeithaml (2006) point out that, despite the fact that retention and loyalty are strongly interrelated terms, there is a difference in observation. Customer retention is directly observable, while loyalty is not.

The customer retention rate is defined as the probability of a customer continuing to maintain a bond with a service provider or product manufacturer. The retention rate measures what percentage of customers who were in active mode in time period  $t$  have also stayed with the company in period  $t + 1$ . According to the literature, measuring retention is hard to achieve, especially with commodities that are based on a contract, such as buying potatoes. Husgafvel (2011) in his study, which includes a

survey, defines the retention rate for mobile terminals as following a conventional practice and calculates the retention rate (RR) for brand X in time t as follows:

$$RR(X)_t = \frac{X_t}{X_t + Y_t}$$

where  $X_t$  is the number of end users whose current and previous mobile terminal was of brand X:  $Y_t$  is the number of end users whose previous model was of brand X, but their current mobile terminal is of brand Y.” It can be seen from the formula that the bigger  $Y_t$  is, the lower the rate of retention will be. In theory, the  $RR(X)_t$  can range from 1, when the churn is zero, to 0, when churn tends to infinity. However, according to Gupta and Lehmann (2005), it is not the optimal goal for firms to aim at  $RR(X)_t = 1$ , i.e. 100% customer retention, as this would cause a significant increase in the cost of retaining these customers. On the other hand, various studies indicate that acquiring new customers usually costs much more than retaining existing customers (Reichheld and Teal, 1996). Fleming and Asplund (2007) find that “engaged customers generate approximately 1.7 times more revenue compared to normal customers.” They also find that, if companies had both engaged customers and employees, they were estimated to generate 3.4 times more than others. This is supported by Rucci et al. (1998), who study the connection between employees, customers, and profits at Sears and show that high employee retention is positively linked with customer retention, which in turn exerts a positive effect on profitability. Reichheld and Markey (2000) state that customer retention leads to ES and retention, and this in turn leads to better service to customers and hence to higher revenue achieved by a firm.

Customer retention can be simply measured in prescribed settings, where end users indicate when they end the contract. Broadband subscriptions or bank accounts are examples of contractual settings. In a non-contractual setting, such as buying bread or purchasing mobile terminals without a network operator agreement, a firm must infer whether customers are still active. In practice, non-contractual settings are more common than contractual settings, so measuring the retention rate can prove to be a challenge. In contrast to some other non-financial metrics, customer retention is basically related to company performance. In practice, the market share of a firm can, in theory, be obtained from its retention and procurement rates. This implies that changes in retention rates would in due course be reflected in market share.

## 2.7. The Concept of Service Quality

### 2.7.1. Services

Services are the activities that a customer receives from a service firm, a product manufacturing company, or the public sector. A service firm is a company, such as a mobile phone service operator, that renders services to mobile phone users or to another company that is in business-to-business operations. In the public sector, a service firm may provide, for example, services for hospitals, schools, homes for the elderly etc. Some definitions found in the literature for product and service quality are listed in Table 4.

**Table 4:** Definitions of product and service quality gathered from the literature.

<b>Product and service quality definitions</b>	<b>Author</b>
“Service is all the activities undertaken by the firm to provide in use over time, measured by increased customer satisfaction with a tangible product or series of products.”	Mathe and Shapiro (1993)
“Service is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything. Its production may or may not be tied to a physical product.”	Kotler (1997)
“Consistently delivering products and services that fully meet consumer needs and expectations.”	Vavra (1995)
“Product or service quality requires a total system, which identifies customer requirements, which designs the product or service to those requirements, and which establishes a production or service delivery system to produce in conformance with the specifications.”	Stonebraker and Leong (1994)
“The quality of a product or service is the degree to which it satisfies customer requirements. It is influenced by: Design Quality: the degree to which the specification of the product or service satisfies customer requirements. Process Quality: the degree to which the product or service, which is made available to the customer, conforms to specification.”	Wild (2002)



Stonebraker and Leong (1994) reveal some traditional differences between manufacturing and service operations, as displayed in Table 5.

**Table 5:** The characteristics of manufacturing and service environments (adapted from Stonebraker and Leong, 1994).

Characteristic	Manufacturing	Service
<b>1. Nature of locations</b>		
Number of locations	Few	Many
Placement of locations	Near key resources	Near customer
<b>2. Nature of employee</b>		
Skill type	Technical	Behavioral
<b>3. Nature of customer</b>		
Physical contact	Little	Great
Customer participation	Low	High
<b>4. Nature of deliverable</b>		
Perishable	No	Likely
Tangible	Yes	Mostly intangible
Constraining resource	Equipment, material	Labor
<b>5. Nature of capital structure</b>		
Fixed cost	High	Low
Variable cost	Low	High

A series of service characteristics has been discussed intensively in the literature, as in Grönroos (1980, 1982, 1988) and Parasuraman et al. (1985). Grönroos (1988) notes that “*most of the services have four basic characteristic features; intangibility, inseparability of production and consumption, heterogeneity, and perishability.*” The intangibility characteristic is concerned with performance, and unlike objects, they cannot be seen, felt, tasted, or touched (Bateson, 1997; Berry, 1991; Lovelock, 1981; Rathmell, 1974; Schostack, 1977). According to Bateson (1997), intangibility is the critical characteristic that distinguishes good services and from which all other service differences emerge. The inseparability characteristic refers to a service that involves both production and consumption simultaneously: haircuts and air trips are a few examples of this service feature (Carmen and Langeard, 1980). Heterogeneity deals with the imaginable high inconsistency in the implementation of a service. According to the literature, quality and the principle of service in different sections of business can vary from producer to producer. A service with high perishability refers to a service that cannot be kept when not utilized at

the time provided (Bessom and Jackson, 1975; Thomas, 1978). Table 6 summarizes the issues that often occur in connection with each of the four service features mentioned above.

**Table 6:** Unique service characteristics and resulting marketing issues (source: Valarie et al., 1985).

<b>Characteristics of Unique Service Features</b>	<b>Resulting Marketing Issues</b>
<b>Intangible</b>	<ul style="list-style-type: none"> <li>-Service cannot be stored</li> <li>-Not patentable</li> <li>-Not readily displayed or communicable</li> <li>-Difficult to set prices</li> <li>-Consumers participate in production</li> </ul>
<b>Inseparable</b>	<ul style="list-style-type: none"> <li>-More consumers are involved in production</li> <li>-Difficult to centralize production</li> </ul>
<b>Heterogeneity</b>	<ul style="list-style-type: none"> <li>-Quality control and standardization difficult to obtain</li> </ul>
<b>Perishability</b>	<ul style="list-style-type: none"> <li>Service cannot be inventoried</li> </ul>

According to the literature, each unique service feature leads to specific issues for service marketers. The work of Valarie et al. (1985), including other literature, explains how to deal with these issues, but it is beyond the scope of this work to go deeper into the subject.

### **2.7.2. Service quality as a differentiating factor**

Services can distinguish a product from those of competitors and enable effective economic gain, as it is hard otherwise to persuade customers that the company provides high quality (Davidow, 1986; Brown, 1992; Mathe and Shapiro, 1993; Wellmin, 1984). Only by continuously delivering outstanding service can customers be convinced of a high-quality product. After conducting a study, Rothschild (1984) concludes by stating, *“If services are priced into the products, then the services are seen as resources, but if services are priced separately, then services are seen as a*

*business in itself.*” It is service differentiation relating to a product that makes it complicated for competitors to copy or imitate a product (Rothschild, 1984; Parasuraman and Grewal, 2000). Service has become increasingly important as the suppliers shift from simply selling to customers to serving them effectively (Parasuraman, 1988).

According to Maister (1997), service companies can improve their performance in five areas: 1) “*Broadcasting*, 2) *Courting*, 3) *Super pleasing*, 4) *Nurturing*, and 5) *Listening*.” Broadcasting is the activity that creates prospects with customers. Courting means recognizing a new customer and addressing that customer. Super pleasing means surprising a customer by providing excellent unexpected services, hence enhancing his or her satisfaction. Nurturing implies being empathetic to the existing customers to secure forthcoming business. By listening to the customer’s voice, a company can determine how to improve their services to beat their challengers by providing better service quality. According to Cannie, (1994), Maister (1997), and Peck (1997), an obstacle to courting and broadcasting lies in the fact that the customers are not aware of the company and hence have no existing relationship, which makes it difficult for the company to establish a significant relationship.

According to Maister (1997), service providers aim at three goals: “1) *Delivering outstanding customer service*, 2) *Satisfying employees* and 3) *Achieving final gains*.” Accordingly, Wellemin (1984) argues that, among the vitally important elements required to influence customer awareness is demonstrating that the provider cares about the customer. Keeping the customer up to date with possible business changes is a vital activity. Wellemin (1984) argues that having a contract with a customer can be regarded as a tactic to prolong the relationship with a customer, which in turn can be utilized for the activation of customer issues, information, and future product innovations.

### **2.7.3. The Concept of Quality**

There are many definitions of quality in the academic literature and books. Gavin’s (1984) definition of quality is one of the most widely used in practice. Gavin defines eight quality dimensions, displayed in Table 7 below. In this study, three of these dimensions selected from the published literature are presented. One of the frequent definitions used in defining quality is specified by the eight quality dimensions (see Table 8), developed by Gavin (1984).

**Table 7:** Garvin’s product quality dimensions (source: Base, 2011, p. 90).

<b>Term</b>	<b>Definition</b>
<b>Performance</b>	The efficiency (e.g. return on investment) with which a product achieves its intended purpose
<b>Features</b>	Attributes that supplement the product’s basic performance, e.g. tinted glass windows in a car
<b>Reliability</b>	The capability of a product to perform consistently over its life cycle
<b>Conformance</b>	Meeting the specifications of the product, usually defined by numeric values
<b>Durability</b>	The degree to which a product withstands stress without failure
<b>Serviceability</b>	Used to denote ease of repair
<b>Aesthetics</b>	Sensory characteristics such as look, sound, taste, and smell
<b>Perceived Quality</b>	Is based on customer opinion

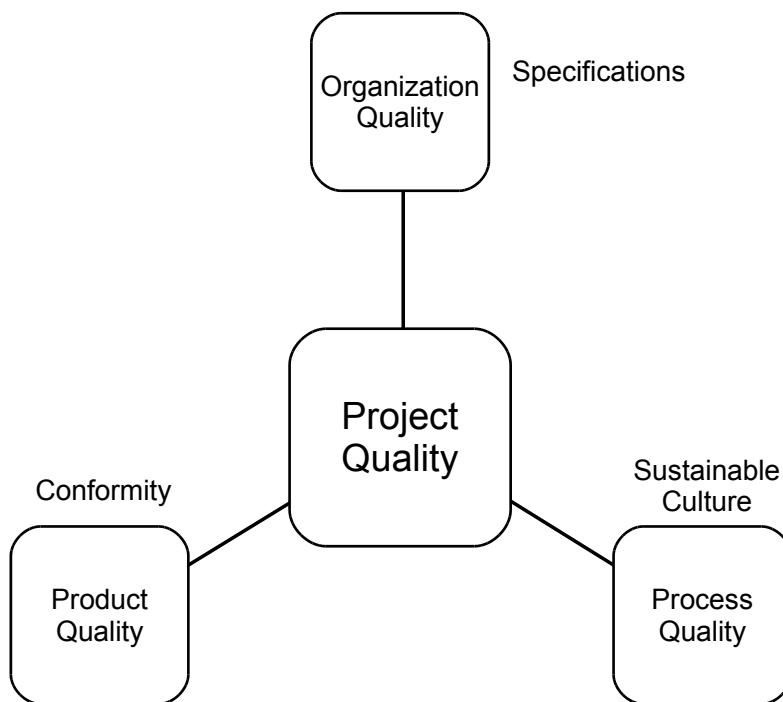
The quality terms defined in Table 8 are not reciprocally complete, despite the fact that they are associated mainly with the quality of the product. According to the literature, it is perceived that defining service quality is harder than defining product quality. Parasuraman et al. (1984) compiled a set of quality dimensions widely cited in the literature. The list is displayed in Table 8.

**Table 8:** Parasuraman et al. (1984) service quality dimensions (source: Basu, 2011, p. 90).

<b>Term</b>	<b>Definition</b>
<b>Tangibles</b>	The physical appearance of the service facility and people
<b>Service Reliability</b>	The ability of the service provider to perform dependably
<b>Responsiveness</b>	The willingness of the service provider to be prompt in delivering the service
<b>Assurance</b>	The ability of the service provider to inspire trust and confidence
<b>Empathy</b>	The ability of the service provider to demonstrate care and individual attention to the customer
<b>Availability</b>	The ability to provide service at the right time and place
<b>Timeliness</b>	The delivery of service within an agreed lead time
<b>Professionalism</b>	Encompasses the impartial and ethical characteristics of the service provider
<b>Completeness</b>	Addresses the delivery of the order in full
<b>Pleasantness</b>	Simply means good manners and politeness

The lists of quality dimensions by both Parasuraman et al. and Garvin (Table 7, 8) have some limitations in that they do not include all possible quality dimensions. According to Wild (2002), a “*definition of design or process quality provides a broad framework within which to develop a company-specific quality strategy.*”

Basu (2011) adds a quality dimension of organization to the two models developed earlier by Garvin and Parasuram. Basu’s approach is the foundation of the value of complete practice and a necessary prerequisite for an approved quality assessment organization, such as that of the European Foundation of Quality Management (EFQM). The three-dimensional model developed by Basu is shown in Figure 7.



**Figure 7:** Three Dimensions of Quality (Adapted from Basu, 2011).

It is important that the organization-defined quality strategy is shared with each department within a company so that the common direction of working is synchronized. Product quality should include some distinct standards of an acceptable level, so that when testing for compliance, it is easy to confirm if the criteria have been met (Basu, 2011). According to Basu (2011), organizational quality can only take root when the approach is complete, and this includes transparency in the

company and senior management commitment. Basu et al. (2011) compiled a set of key organizational quality dimensions, shown in Table 9.

**Table 9:** Basu’s organizational quality dimensions (2011, p. 93).

<b>Term</b>	<b>Definition</b>
<b>Top Management Commitment</b>	Organizational quality cannot exist without the total commitment of the top executive team
<b>Sales and Operational Planning</b>	A monthly senior management review process to align strategic objectives with operation tasks
<b>Single Set of Numbers</b>	Provides the common business data for all functions in the company
<b>Using Appropriate Tools and Techniques</b>	Relates to the fact that, without the effective application of the appropriate tools and techniques, the speed of improvement will not be ensured
<b>Performance Management</b>	Includes the selection, measurement, monitoring, and application of key performance indicators
<b>Knowledge Management</b>	Comprises the education, training and development of employees, sharing of best practice, and communication media
<b>Teamwork Culture</b>	Requires that teamwork should be practiced in cross-functional groups to encourage a borderless organization
<b>Self-assessment</b>	Enables a regular health check of aspects of the organization against a checklist or an accepted assessment process such as EFQM
<b>Continuous Learning</b>	An ongoing learning process that seeks to incorporate the lessons learned (from the results already achieved) into a continuous improvement program

quality reduces the cost of doing business by increasing efficiency and being lean. In this process, quality is deemed as raising customer and employee satisfaction.

If a firm is to deliver service quality, it needs to assess how well the firm is performing. CS provides this measure. In this respect, CS can be regarded as a subgroup of service quality measurement (Chakrapani, 1998). On the other hand, according to Cassin (2007), there is not yet one agreed definition of “quality” accepted by everyone. There are several definitions and varying opinions; they are probably correct, but not completely. According to Casin (2007), the best definition

found is “fit for purpose,” where the person who is using the product or service (customer) finds how suitable the product or service is.

Internal service quality leads to increased ES and loyalty, and in the end, it affects external service quality and CS (Minho et al., 2008; Heskett et al., 1997). Employee loyalty is as important an indicator of CS as are internal service quality, ES, and external service quality (Minho et al., 2008; Ellram et al., 2004; Hallowell et al., 1996; Heskett et al., 1997; Hurley et al., 2007; Pritchard et al., 2005).

From the perspective of repair, product quality is defined in terms of its serviceability (Garvin, 1984). Parasuraman et al. (1984) defines service reliability as “*the ability of the service provider to perform dependably with responsiveness.*” Future technologies in mobile terminals come with such repair complexity that customers will be more demanding of corrective actions immediately at any time, anywhere, for anything that goes wrong or is required.

The importance of quality, whether in a tangible product or service, is vital for sustaining a business. It is quality differentiation that can give a company an advantage over its competitors. In this thesis, quality is manifested through perceived quality of issue corrective actions (P-QoiCA) and perceived quality of issue resolution time (P-QoiRT).

## **2.8. The effects of issue correction actions (iCA) and issue resolution time (iRT)**

According to Buttle (2001), if an issue raised by a customer is not properly resolved, i.e. a poor or partial corrective action is taken, it can have a bigger impact on loyalty than the original issue presented. The key to the success of correction actions was found to be the customer’s view of justice. Correction actions must be right the first time. Customers who remain dissatisfied after an issue is dealt with by a corrective action are more dissatisfied than if no corrective actions have been provided at all (Buttle, 2001). According to Gopalkrishnan and Bejou (2008), a single poor service issue situation could lead to a significant negative impact for the company, especially if poor corrective actions are credited to factors that are within the control of the firm. According to Gopalkrishnan and Bejou (2008), such

factors include “*service design, service image, frontline employees, service prices and service recovery.*” According to the findings of Kasper and Lemmink (1989), issue resolution time (iRT) is regarded by customers as the most important service item. According to Dolinsky (1994), effective issue corrective actions are a key driver of customer loyalty. According to the literature, for example, Motorola finds that actual issue corrective actions were a significant predictor of a customer with an issue becoming a loyal customer. Furthermore, research such as that by Halstead (1993) shows that many customers simply do not complain, so grievance data will only capture a small percentage of actual issues. Whereas an issue escalating recording system is designed to capture views of customers’ issues, issue resolution (iRT) and issue management are calculated to gather the views of customers who have had issues yet did not raise them. In essence, collecting data about issues is reactive, whereas issue corrective actions (iCA) and handling issue data are proactive. Figure 8 demonstrates the factors required to ensure that customers receive effective issue resolution (iRT). How can customer issues benefit a business? Customer issues provide an opportunity for a business to delight a customer by providing unexpected service with its corrective actions, keeping the customer informed of the issue status, and by following up with the customers to learn how satisfied they are with the corrective actions provided. Follow up can be in terms of a survey or a face-to-face visit in the field.



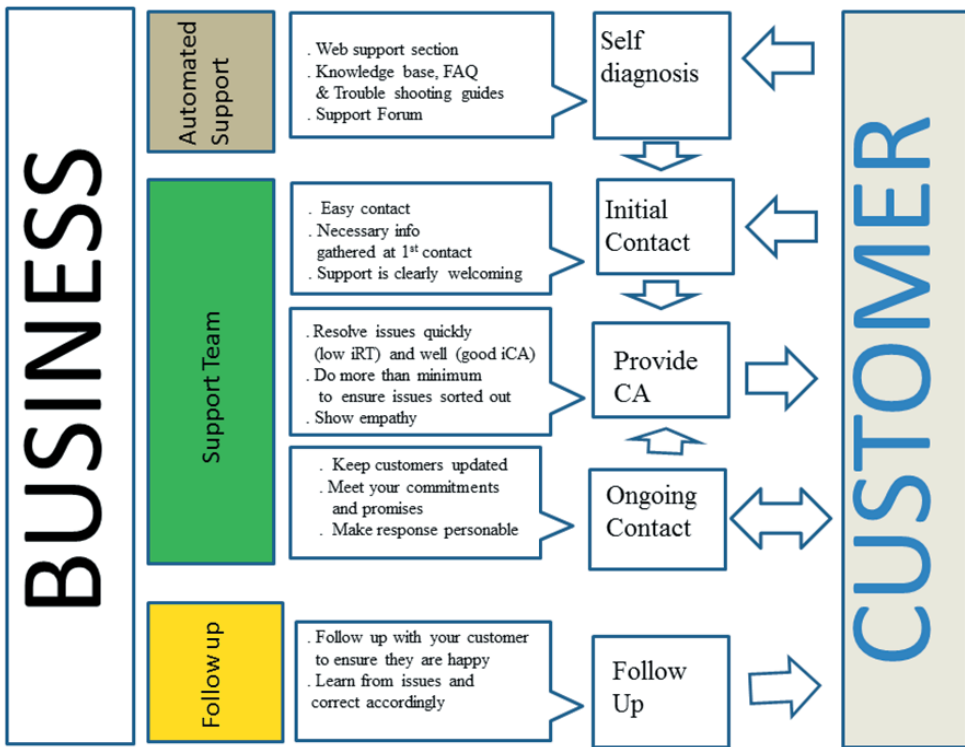


Figure 8: Dealing with Customer Issues Effectively (Adapted from Maplesden, 2013).

# 3. Handling Customer Issues in a Support Chain

*“Each and every one of you will make or break the promise that our brand makes to customers”*

– An American Express manager, speaking to his employees

## **3.1. Theoretical assumptions**

This chapter explains the meaning of managing customers’ issues through a channel network and discusses the ways in which it should be managed. In this thesis, the term “channel network” refers to an organization through which issues are channeled to achieve a resolution. The organization might be within a different individual company, entity, etc. Issue management is primarily meant for satisfying a customer, and significantly, it should lead to improved functioning and improved

business performance. Some organizations may ignore the operational value of issues, and as a result, many issue activities seem to be geared toward trying to calm customers rather than ensuring that the issues do not reoccur.

An issue may be an instance or a concern from a customer regarding a service or a product provided by a service provider or a product manufacturer. In this thesis, complaints, instances, or concerns are referred to as issues. According to the *Oxford Learning Dictionary of Current English* (Hornby, 2005), an issue is defined in five different contexts, one of which is as follows:

*“An issue is a question that arises for discussion: debate an issue; raise a new issue etc.”*

According to the Visual Thesaurus interactive dictionary (Zimmer, 2008),

*“An issue is an important question that is in dispute and must be settled.”*

Johnston (2000) suggests that financial improvement might be better leveraged by bringing about organizational improvements and ensuring that issue processes are “staff-friendly” rather than simply by trying to satisfy customers. Many scholars, such as Buzzell and Gale (1987), have contributed to our knowledge of the impact of service delivery on business performance, especially the link between service quality and profit, starting with the Profit Impact of Market Strategy (PIM) study. According to Boshoff (1997), issues are a natural consequence of service activities since *“mistakes are an unavoidable feature of all human endeavor and thus also service delivery.”* According to Zemke and Schaaf (1990) and Berry and Parasuraman (1991), service recovery is the practice of rectification or putting things in the right perspective. Johnston (1995) defines service recovery more broadly and more proactively as the act of searching out and dealing with issues in the delivery of service.

The term “issue management” includes customer complaints and issue corrective actions, involving escalation, acknowledgement, analysis, resolution, and prevention of the customer issues and gaining back the trust of the customers. Adequate literature has been written on issue management, embracing the nature of issue complaint behavior (Berry and Parasuraman, 1991; Hart et al., 1990; Barlow and

Moller, 1996; Brown et al., 1996); developing measurement instruments (Cooper et al., 1989; Boshoff, 1998), elements of recovery and recovery strategies (Barlow and Moller, 1996; Boshoff, 1997; Boshoff and Leong, 1998; Johnston and Fern, 1999); and issue corrective actions applied to internal customers (Bowen and Johnston, 1999).

### **3.2. The issue management process**

Issue management activity, from an operational viewpoint, is the process by which issues are handled and customer trust is regained or maintained. The design, planning, control, and implementation of these practices are fundamental tasks. Numerous reasons have been given to suggest what is meant by a “noble” issue management process (e.g. Hart et al., 1990; Johnston, 1995; Barlow and Moller, 1996; Boshoff, 1997; Van Ossel and Stremersch, 1998). Table 10 presents the good or noble issue management processes established by Johnston (2001).

**Table 10:** Issue managing process (source: Johnston, 2001, p. 61).

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<b>Good process for managing issues</b>
- Clear procedures,
- Speedy response,
- Reliability (consistency) of response,
- Single point of contact for issues escalation,
- Easy access to the issue escalation process,
- Easy use of the process,
- Update the issue owner frequently,
- Staff understands the issue process,
- Issues are taken seriously,
- Employees are empowered to deal with the situation,
- Having follow-up procedures to check with the customer after resolution,
- Using data to engineer out the issues,
- Using measures based on root cause reduction rather than issue volume reduction.

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The main purpose of handling issues effectively is to boost profits by increasing income and reducing costs. According to Berry and Parasuraman (1991) and other researchers, excellent issue management or providing timely issue corrective actions can significantly influence CS. The recovery of failures is an opportunity to establish satisfied customers (Johnston, 1995; Bitner et al., 1990), and Feinberg et al. (1990) find that the failure to respond to an issue can cause dissatisfaction among customers: As satisfaction has an effect on retention (Rust and Zahorik, 1993; Anderson et al., 1994; Jones and Sasser, 1995; Rust et al., 1995; Loveman, 1998), an effective response to issues is of high significance in terms of customer loyalty (Hesket et al., 1990; Berry and Parasunaman, 1991; Bailey, 1994; Spreng et al. 1995; Van Ossel and Strersch 1998). According to Halstead and Page (1992), there is a clear relationship between loyalty and repurchase intentions when effective issue resolution has been provided. Customers who are just “satisfied” are less loyal than delighted customers (Johnston, 1995). Delighted customers, more than being loyal, can also be an advocate of a company or service provider. (Barlow and Moller, 1996; Spreng et al., 1995). In addition, Peters (1987) concludes that “*retaining customers is significantly cheaper than attracting new ones.*”

According to Van Ossel and Stremersch, (1998) and Slack et al. (1998), the importance of handling customer issues lies not only in providing timely corrective actions but also in managerial learning from those issues and in improving and taking preventive actions for future products. Issues should lead to the identification of problems that need to be resolved so that the issue does not reappear. It is important that the employees handling the issues describe them clearly and accurately so that management can use the information for the continuous improvement plan; in other words, management can use the information to redesign the system (Brown et al., 1996, Mwegerano, Kytosäho, and Tuominen, 2007). A good issue management process should give employees the freedom to work without stress and to be satisfied, which will then result in improved customer satisfaction. Less stress for the employees leads to better work satisfaction and organizational devotion, better work accomplishment, and well-being (Fox et al., 1993; Motowildo et al., 1986). Furthermore, when the employees are satisfied, it also affects customer satisfaction (Heskett et al., 1994). A well-organized issue management culture in terms of visible processes and structures, strategies, goals, and philosophies or unconscious beliefs, thoughts, and feelings (Schein, 1985) exercises a strong inspi-

ration on organizational and operative practices. According to Johnson and Scholes (1993), the organizational culture reinforces the formation of a customer-driven organization or an organization devoted to service excellence. Whether the issues are seen as an annoyance or a reward will affect the quality and strength of issue process management (Barlow and Moller, 1996; Handy, 1995; Kakabadse and Kakabadse, 1999).

According to Johnston (2001), it is not only the issue management process itself that precedes economic profit but also how the organization manages the intervening variables, i.e. how it improves economic execution by pleasing and retaining the customer/employee and/or refining the product/service or bringing about process improvement. Johnston (2001) suggests four “acid tests” that could be applied to issue process management, by which the organization could ascertain whether companies or service providers are getting the most from their issue management process:

- (1) *“Do they satisfy customers who have experienced failure?”*
- (2) *“Do they retain those customers who have experienced failure?”*
- (3) *“Do they improve organization-wide processes as a result of information from failures?”*
- (4) *“Do they help retain employees?”*

By utilizing information from issue management data to improve both operational and organizational processes, the service provider can obtain financial benefits by accrual from satisfied customers and by retaining dissatisfied customers (Johnston, 2001).

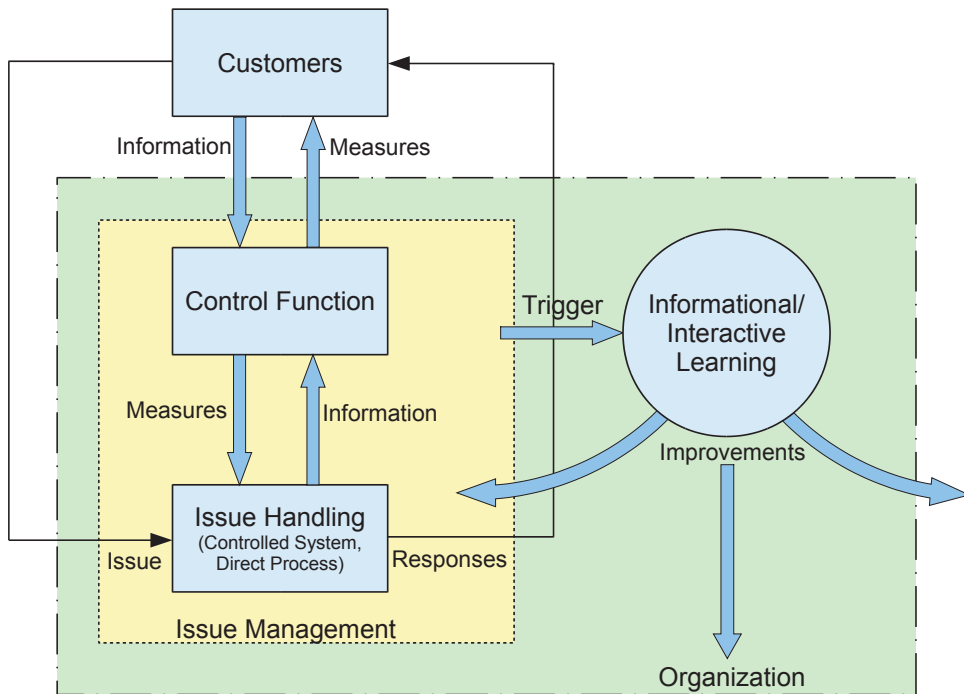
According to Vos et al. (2008), customers’ issue complaint behavior should be enabled and taken genuinely, finally motivating organizations to arrive at a corrective action of some kind. A new issue could be a new starting point for analysis, development, or even the abolition of particular organizational practices that may have led to these issues (Vos et al., 2008). Some companies seem to consider issue management a cost center or even a waste of money, so they ignore the issues or handle them vaguely (Barlow and Moller 1996; Tax and Brown, 1998; van Ossel et al., 2003). Tax and Brown (1998) point out that *“only 5–10 per cent of customers who are dissatisfied actually complain when their issues are not handled or man-*

*aged well.*” This implies that the companies or service providers cannot learn from these customers.

### **3.3. Issue handling and issue management**

Stauss and Seidel (2005) distinguish between the terms “issue handling” and “issue management.” Issue handling deals with operational actions intended to help customers resolve their issues. Issue management is a customer-focused business process comprising front-end actions. Issue handling refers to the overall process. This consists of both the customer-oriented business as well as internal business, such as the planning and control of issue handling, including long-term issue management analysis of the issues. The result of the analysis helps the organization to identify areas of opportunity by reviewing possible weaknesses within the internal and external processes. The issue management process does focus not only on customer retention by resolving customer discontent but also on guaranteeing the long-term development of services to the customers, hence building a customer-adapted organization (van Ossel et al., 2003; Stauss and Seidel, 2005).

Organizations can learn from customer issues by combining issue management and organizational learning (Vos et al., 2008), as shown in Figure 9. First, the customers raise their issues with the issue handling groups (front-end experts), who resolve the issues regarding a product or service and provide corrective actions for the customers. Issue management consists of the issue handling and control function, which deals with planning and control. The informational learning model is added to issue management to generate the improvements needed in different parts of the chain managing the customer issue. The issue management function delivers triggers for informational learning, which focuses on the gaining, storage, and sharing of information (Day, 1994; Gavin, 1993).



**Figure 9:** The Combined Model of Organizational Learning and Issue Management (Adapted from Vos et al., 2008).

Vos et al. (2008) state that “*the learning practices are classified on the basis of the extent to which they served as a trigger or as an example of how learning can take place.*”

(1) Triggers:

- Issue reports, including information on the customers, the case number of the issue, and iRT. Reporting the status of customers’ issues on corrective actions and progress in general.
- Investigation results on customer satisfaction with samples of issues that can be used for further improvement.
- On-line feedback information about issues stored for analyzing and distribution. Reports and analysis generated automatically.
- Distribution of issue reports via the Web: information about the issues is free.



- Mail escalation to managers when customers with issues are not happy with the iCA or if the iRT becomes too long.
- (2) How:
- Information discussion and contribution during the issue handling process and learning prospects (informational):
    - Mail alerts to all employees involved in the development process and the customer who owns the issue.
    - Creating information about improvement projects dedicated to issues available on the intranet.
    - Publication of the information about realistic terms concerning issues all over the organization (for example, on the intranet or wiki pages).
  - Interactions to better understand the issues and their root causes (interactional):
    - Initiating a discussion with a customer about the issue; facing the customer with an issue.
    - Brainstorming by employees in different units in a different time frame to gain insight into the customer's issue and its probable root cause.
    - Regular gathering of responsible staff members from different units or of one particular unit to analyze the issue.
  - Communications for resolving issues (interactional):
    - Introducing a detailed management system (e.g. a project-based system or a follow-up project team in the organization) used by employees to work on developments in the iCA.
    - Improving the work process by direct contact between the employees of different units or by assigning them to teams dealing with issues.
    - Communication regarding support and improvement regarding customer issues and their forthcoming corrective actions.

- Core source analysis by and within the units that trigger the most issues; here, teamwork is encouraged in order to find corrective actions together.
- Assessments by the (quality) organization to ascertain whether issues that constantly happen are being (or have been) improved.
- Incorporating management activities regarding issue handling and analysis and improvement of new products (including products that have been marketed lately).
- Progressing with metrics for issue handling as well as implementing improvements.
- Regularly checking the staff competence level in handling customer issues along with providing education in accordance with the need.

The exercises described above are regarded as managerial instructions intended to harmonize an organization's issue management practices as well as to increase empathy of how to work with triggers and learning activities.

Vos et al. (2008) state that, *“because of urgency, it might be difficult to allocate time and money to indirect IM processes, such as information retrieval and exchange between people, in order to learn.”* Hence, to acquire enough information by means of shared learning in specific cases, this exercise should be organized simply inside the issue handling process.

### **3.4. Practical example**

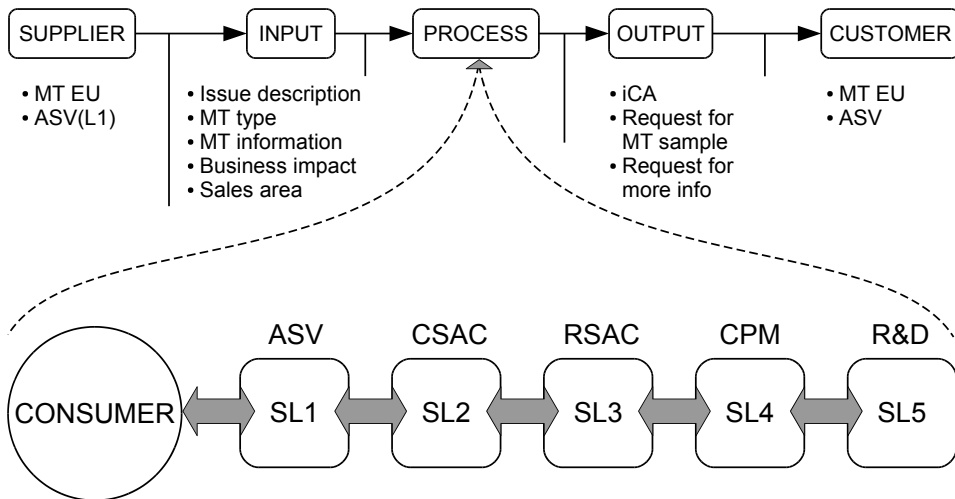
In this section, two practical examples of how customer issues can be handled are described. Figure 10 illustrates the first practical example of how a customer's issues with a mobile terminal are handled. Figure 10 demonstrates a generic procedure for the handling of customer issues.

#### **3.4.1. I Practical example MT**

SIPOC (Pyzdek, 2003) is an acronym for supplier(s), input(s) and key requirements, processes, output(s) and key requirements, and customer(s). In this exam-

ple, a SIPOC diagram is employed to demonstrate all the relevant elements involved in handling customer issues. A SIPOC diagram provides a visual representation of a high-level procedure map, incorporating suppliers and inputs into the activity and the outputs and customers of the process. The SIPOC block diagram below illustrates how the customer issues of a mobile terminal manufacturer escalated and how the iCAs were obtained.

The main suppliers in the SIPOC diagram, Figure 10, are the mobile terminal end users (MT EU), mobile terminal authorized service vendors (ASV), and less frequently, the manufacturer country sales area technical support engineers (CSAC) and the manufacturers' regional sales technical support engineers (RSAC). The inputs are the customer issues raised by the ASV (called L1 in the service chain network), including the product specifications, such as software, variant software, product samples, issue symptoms (TA), business impact (iBI) due to the issue, etc. The process is described as follows: when a customer, EU X, approaches an ASV with an issue Y with his/her mobile terminal (MT), the ASV tries to find a solution to issue Y and resolve the issue and gives back the MT to EU X. However, if issue Y cannot be resolved by the ASV, the issue is documented in an in-house tool database and escalated to the sales area (SA) technical support (referred as L2 in the service chain), who then tries to resolve the issue and escalate it back to L1; otherwise, they escalate the issue to regional sales area technical support engineers (RSAC), i.e. L3. The process goes on as described above until the issue resolution is found. The issue correction action (iCA) is the output in the SIPOC chain. The customers are mainly the ASVs and, indirectly, the MT EUs.

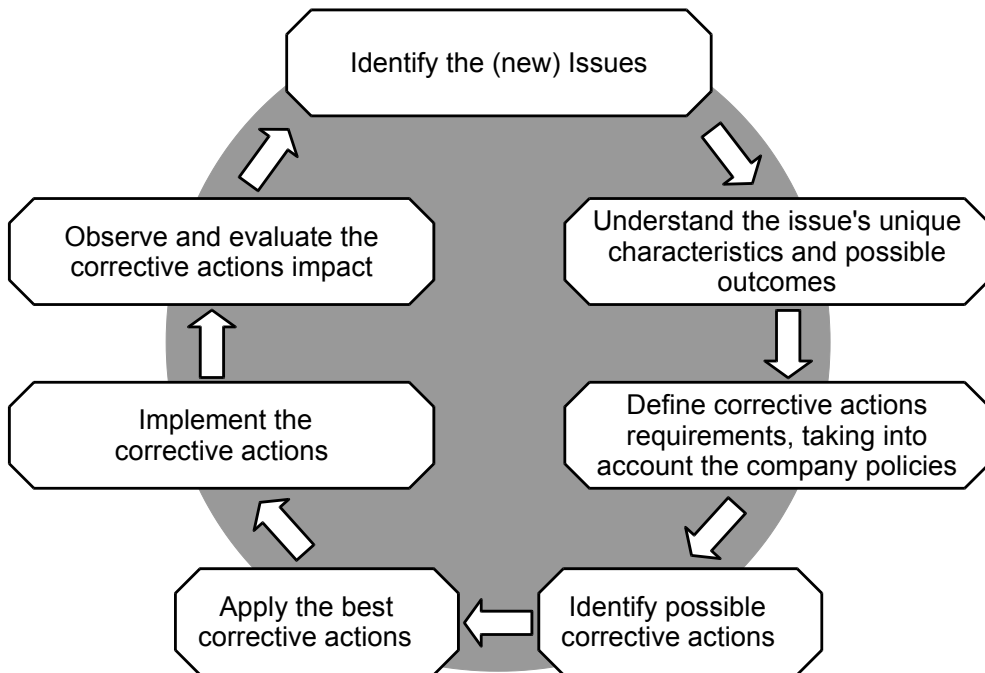


**Figure 10:** SIPOC Diagram of Customer Issue Escalation (Mwegerano and Ollikainen, 2013).

Issues raised by customers are dealt with through the customer care department if they cannot be resolved by authorized service vendors. The issues might go through various organizations before a corrective action can be provided. The organizations through which the issue passes is referred to as a chain network.

### 3.4.2. II Practical example generic

The second practical example shown in Figure 11 illustrates a seven-step model for resolving customer issues. This is a generic example of how customer issues can be handled, according to Harris (2010).



**Figure 11:** Customer Issue Resolution Model (Adapted from Harris, 2010).

The above seven steps are guidelines that, when followed, help to resolve some customer issues. The seven steps are elaborated in Table 11:

**Table 11:** Seven steps for resolving customer issues (adapted from Harris, 2010, p. 32).

<b>Step</b>	<b>Action</b>
1 Identify the issue	Recognition and understanding the existing issue. Sometimes it is difficult to identify the true issue because of other variables that are more closely identified but do not represent the issue that requires corrective actions.
2 Understand the issue's unique characteristic and possible outcomes	The issues to be resolved are often confounded by unique features. The unique features may have no bearing on the final corrective actions, but they must be taken into consideration while the corrective action is being developed.
3 Define the corrective action requirements considering the company policies in place	Promote consistency in providing corrective actions. The requirements of corrective actions must be determined and the policies considered. Policies that are flexible should be considered opportunities.
4 Identify possible corrective actions	Establish two or more possible corrective actions and select the best among them, reflecting also on the customers who will be affected.
5 Select the best corrective action	The pro and con results must be considered from both the company's and the customer's perspective.
6 Implement the corrective action; inform the customer of the details and how the customer will be affected	Establishing the CA in place is an integral part of the corrective action process. A customer is satisfied when the corrective action is implemented and resolves his/her issue.
7 Observe and evaluate the corrective action's impact	Evaluate and determine whether the provided iCA was successful at a designated time

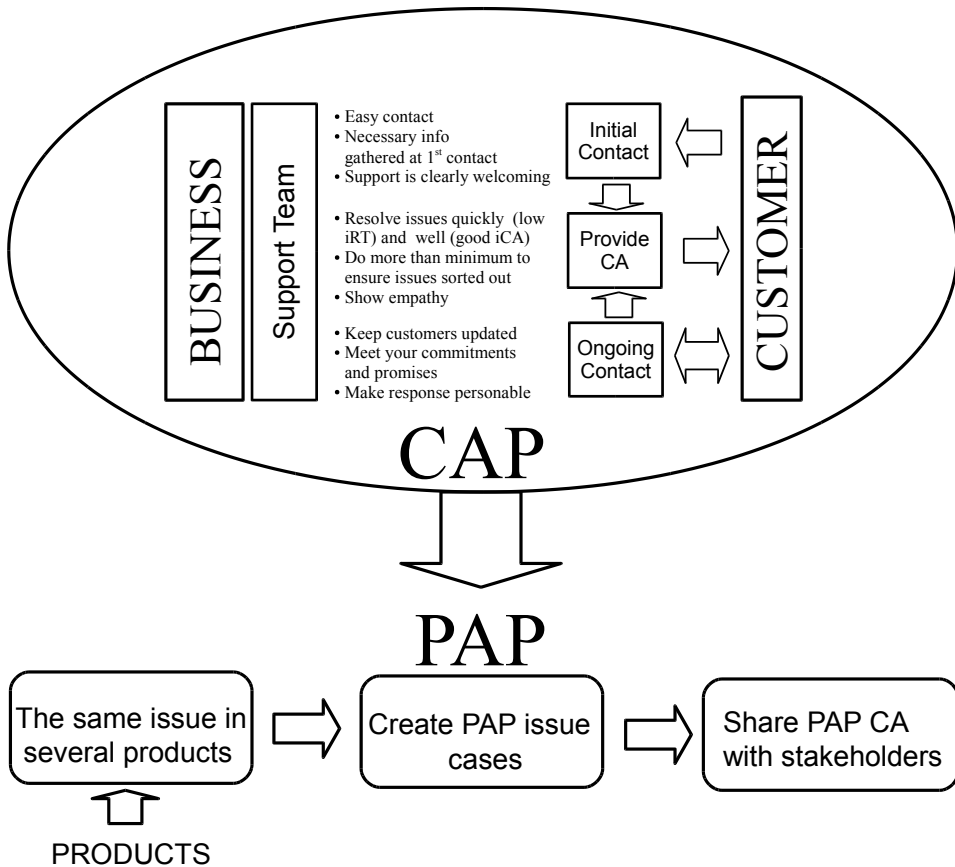
In concluding this chapter, it is worth mentioning that, in the mobile device industry, nearly 50% of customers do not raise their issues (Zairi, 2000). From Zairi's observation, it can be concluded that the raising of fewer issues from customers does not imply or indicate the true story of how effectively issues are managed. A smart organization needs to encourage customers to raise their issues and provide them with the necessary tools and information to encourage them to do so. Resolving customer issues effectively and in a timely manner increases customer satisfaction (Kasper and Lemmink, 1989; Heskett et al., 1994) and boosts profits by increasing income and reducing costs (Berry and Parasuraman, 1991).

### **3.5. Strategy and managerial implications in handling customer issues**

The importance of timely resolving customer issues and with good-quality corrective actions cannot be ignored. Hence, managers handling the process and managing customer issues must have concrete plans for how to achieve and maintain their goals. First, managers should conduct a periodic review to identify the existing challenges in the field. Second, managers should analyze the actions of various stakeholders working in the chain. An action review should also be held with the stakeholders. The managers should ensure that the customers are informed on a regular basis as to the status of their issues and plans for the future. Managers should set key performance indicators (KPI) for employee performance and give incentive rewards according to performance achievement. The KPI could be, for example, 1) how many issues were resolved in a specific agreed time or 2) how good the correction actions were based on customer feedback. The managers should create a business strategy for the continuous improvement of the handling of customer issues based on descriptive as well as inferential statistics.

As the wise saying goes, "prevention is better than cure," and the same idea is applicable to products. When it is observed that the same issue affects many other products, a counteractive measure should be taken so that the issues do not occur repeatedly. A prevention action process (PAP) (see Figure 12) is established when: 1) issues reoccur in several products, 2) issues are visible to customers, resulting in customer complaints, 3) issues are likely to be repeated in future products unless

they are addressed, 4) issues are defined and the issue mechanism is identifiable, and 5) issue mechanisms can potentially be addressed by the product developers. These criteria are effective when issues reoccur if a PAP is put into practice so that lessons can be learned from past issues.



**Figure 12:** Prevention Action Process (PAP) for Reoccurring Issues.

The PAP process is aimed at preventing repeated engineering design failures in future products by: 1) identifying critical issues by having input channels from maintenance quality, customer care, and other relevant sources; 2) creating sustainable, long-term prevention in upcoming product programs; and 3) implementing follow-up in product reliability and milestone reviews.



If implemented well, the PAP process can also be seen as a means of saving warranty costs for the manufacturer, as issues of the same nature will diminish, if not vanish.

# 4. Factors Affecting the Service Chain

This chapter discusses some crucial elements that affect the service chain. The particular chain addressed is that of mobile terminal issue handling, as illustrated by the example. For a chain network to be cost-effective, it must fulfill various requirements:

- 1) Continuous learning: The competence of the people has to be in place; i.e. if the service required is for a product in the field, knowledge about the product(s) should be competitive. The service care staff should be knowledgeable about the hardware (HW), the software (SW), the mechanics, the usability, and so on.
- 2) Issue verification: The service care staff should be able to verify the issues reported for attention and be able to communicate them throughout the organization, including to the designers. The tools and equipment used for verification of the issues should be mastered well by the issue resolvers.
- 3) Description of the issues: The authorized service vendors should be able to describe the issues reported by the end users clearly to the firm's service

care staff by answering all the pre-questions, such as how the issues can reproduced.

- 4) Samples for verification: The authorized service vendors should be able to provide samples with the symptoms experienced by the consumers for verification in the service care organization.
- 5) Performance measure: The key performance indicator (KPI) of the network chain should be used to measure its performance and effectiveness. The KPI might include the response time for escalated issues, the quality of the response, and a measure of both internal and external customer satisfaction.
- 6) Issue prioritization: As many issues are reported from the field, a method should be in place to prioritize these issues in providing corrective actions. In this case, the authorized service vendors and service care staff should come up with a business justification for resolving the issues. The business justification might include, for example, the volume of affected products, the repair costs incurred by the authorized service vendors, the estimated cost loss before the issue is escalated, and a projected cost loss in the future if the issue is not resolved.

To perform all the above tasks efficiently in the chain, the following factors that affect the service chain should be in place:

- 1) Competence: The competence of the staff in the chain should be in place.
- 2) Education: Education is a vital element for the staff in the chain.
- 3) Knowledge of the chain: The service knowledge chain should be a part of the staff's competence.
- 4) Components: For repair operations, the quality of the components plays a role in the final repair quality
- 5) Repair cost: This element includes warranty repairs, which is a cost for the product manufacturer in the first few years that a product is in the field.

All the above factors affecting the service chain are discussed briefly with reference to the literature under the respective subheading below.

## 4.1. Competence

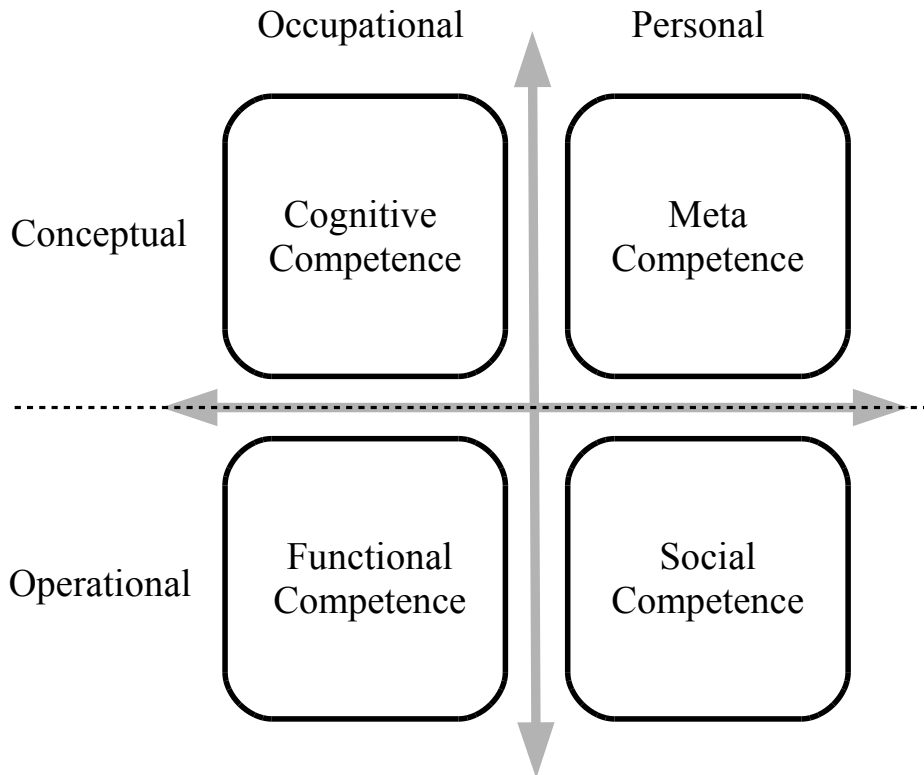
In the literature, the terms “competence” and “competency” are used interchangeably. In their strict meanings, the term “competence” refers to operational activities, while the term “competency” refers to the area of communication. The literature in 1990 focused on fundamental competence in the management strategy for succeeding against competitors (Campbell and Luchs, 1997; Mitrani et al., 1992; Nadler and Tushman, 1999). According to *Webster’s Dictionary*, the root of the term “competence” dates back to 1596 (Stoof et al., 2002). The concepts of competence become influential in business organizations, particularly in the area of human resource development (HRD) when interviewing new employees for jobs. McClelland (1973) and Spencer and Spencer (1993) are regarded as the pioneers in the HRD arena. The focus of HRD is on interviewing, choosing, assessing, training, and developing employees (Weinberger, 1998; Rothwell, 1996, p. 263). According to Stasz (1997), *“it is paradoxical that, while management strategists were emphasizing competences that are unique and firm-specific, the HRD literature was more concerned with developing highly transferable generic competences that are required for most jobs or particular occupations or job roles.”* Stoof et al. (2002) notes that there was no definition for the term “competence” that was widely accepted. As an example, a collection of definitions of competence is given in Table 12.

**Table 12:** Examples of the definition of competency/competence (source: Stoof et al., 2002).

<b>Definition</b>	<b>Citation</b>
“Competency is a knowledge, skill, ability or characteristic associated with high performance on a job, such as problem solving, analytical thinking, or leadership. Some definitions of a competency include motives, beliefs and values.”	Mirabile, 1977, p. 75
“A competency is: a cluster of related knowledge, skills and attitudes that affect major part of one’s job (a role or responsibility), that correlates with performance on the job that can be measured against well-accepted standards, that can be improved via training and development.”	Parry, 1996, p. 50
“A competency is an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation. Underlying characteristic means that the competency is a fairly deep and enduring part of a person’s personality and can predict behavior in a wide variety of situations and job tasks. Causally related means that a competency actually causes or predicts behavior and performance. Criterion-referenced means that the competency actually predicts who does something well or poorly, as measured against a specific criterion or standard.”	Spencer and Spencer, 1993, p. 9
“Competence [is the] ability to handle a situation (even unforeseen).”	Keen, 1992 p. 115
“Competence is a compound, made up of different parts, just like the fingers of a hand [i.e., skills, knowledge, experience, contacts, values and additionally coordination, which is located in the palm, and supervision, symbolized by the nervous system.”	Keen, 1992, p. 112
“Human competence is displayed behavior within a specialized domain in the form of consistently demonstrated actions of an individual; these are both minimally efficient in their execution and effective in their results.”	Herling, 2000, p. 20
“Competence is the underlying characteristic of successful performers, which can include bodies of knowledge, skills, traits, abilities attitudes or beliefs.”	Weinberger, 1998; Rothwell, 1996, p. 263
“Core competence is collective learning in the organization, especially how to co-ordinate diverse production skills and integrate multiple streams of technologies.”	Prahalad and Hamel, 1990, p. 82

According to Parry (1996), there are two kinds of competence, i.e. soft and hard competences. Hard competence refers to job-specific skills such as specialization in a certain area that requires expertise. Soft competences refer to personality characteristics such as behavior and attitudes toward matters. Nowadays, competence is approached at a high level of managerial stratagem and accomplishment, often described as fundamental competence (Parahalad and Hamel, 1990; Quin, 1992). Usually, the core competence is a unique resource of a company or service provider, and it is hard for other organizations or competitors to copy (Cappelli and Crocker-Hefter, 1996; Foss and Knudsen, 1996).

Le Deist and Winterton (2005) argue that “*one-dimensional frameworks of competence are not enough, and ... instead, multi-dimensional frameworks are taking root.*” A more holistic structure, reflecting the knowledge, skills, and behavior scopes of competence are being customized by many countries, such as France, Germany, Austria, etc. According to Le Deist and Winterton (2005), a holistic typology is a reasonable tool for comprehending the blend of knowledge, skills, and social competences that are needed for a specific job. The required competence for a particular task includes both conceptual and operational competences. Le Deist and Winterton (2005) state that “*both conceptual (meta-competence, including learning to learn) and operational (social competence, including behaviors and attitudes) competences are necessary for individual success.*” Figure 13 displays the interrelation of the four competences.



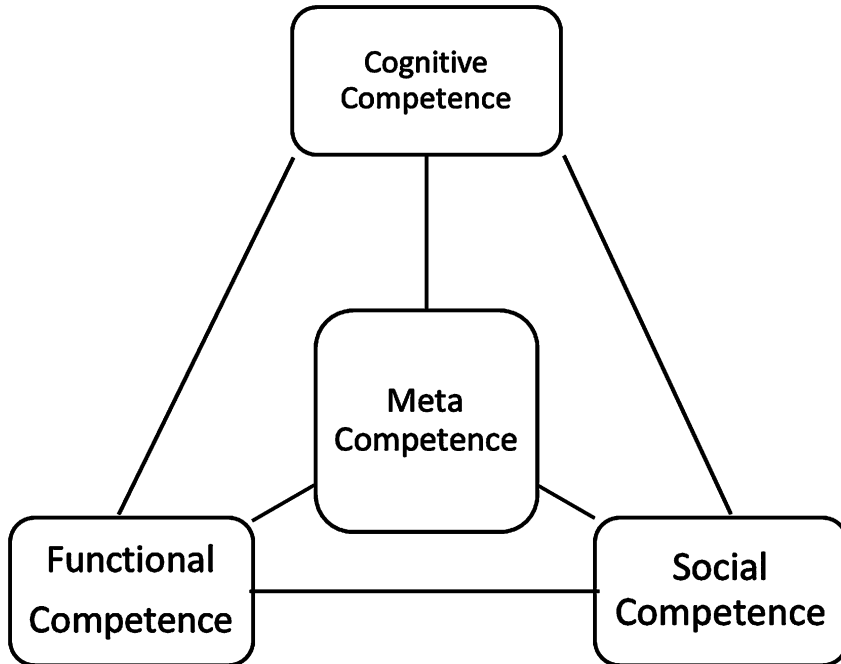
**Figure 13:** Typology of Competence (Adapted from Le Deist and Winterton, 2005).

The cognitive, functional, and social competences are quite global and the long-standing knowledge, skills, and attitudes (KSA) of the tutoring vocation. Knowledge (understanding) is seized by cognitive competence, skills are captured by functional competence, and “competencies” (behavioral and latitudinal) are described by social competence. The meta-competences are related to the acquisition of the other essential competences.

A holistic competence model developed by Le Deist and Winterton (2005) is shown in Figure 14. The figure replicates the unity of competence and the complexity of separating the cognitive, functional, and social dimensions in the real world. The meta-competences are represented as an over-arching input that facilitates the acquisition of output competences at the base of the tetrahedron.

Le Deist and Winterton (2005) explain an ideal competence as follows: “*the multi-dimensional holistic competence approach is becoming more widespread and of-*

*fers the opportunity of better aligning educational and work-based provision, as well as exploiting the synergy between formal education and experiential learning to develop professional competence.”*



**Figure 14:** Holistic Model of Competence (Adapted from Le Deist and Winterton, 2005).

According to studies of competences carried out by McClelland and his co-workers (1973), the 20 most common competences have been identified as shown in Table 13, together with their associated rating scales and respective clusters according to the dictionary definition of competence they used (Spencer and Spencer, 1993).



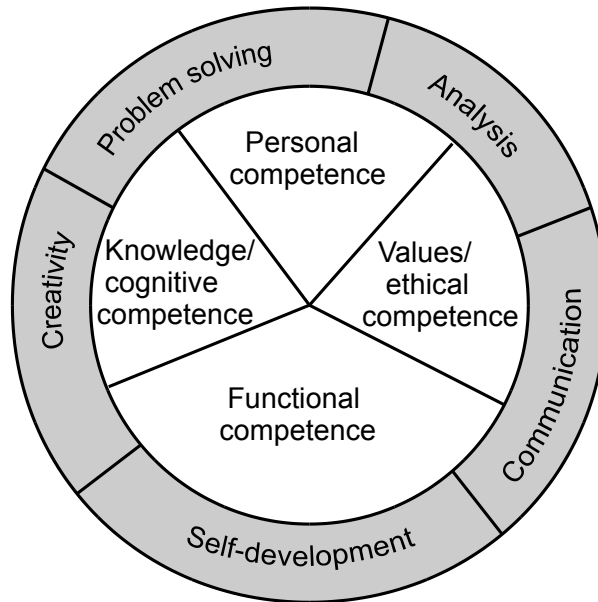
**Table 13:** The 20 most common competences (source: Spencer and Spencer, 1993).

Category	Competence	
1	Achievement orientation	
2	<b>Achievement and action</b>	
3		Concern for order, quality, and accuracy
4		Initiative
5	<b>Impact and influence</b>	
6		Information seeking
7		Impact and influence
8	<b>Cognitive</b>	
9		Organizational awareness
10		Relationship building
11	<b>Personal effectiveness</b>	
12		Analytical thinking
13		Conceptual thinking
14	<b>Helping and human services</b>	
15		Technical/professional/managerial skill
16		Self-control
17	<b>Managerial</b>	
18		Self-confidence
19		Flexibility
20	Organizational commitment	

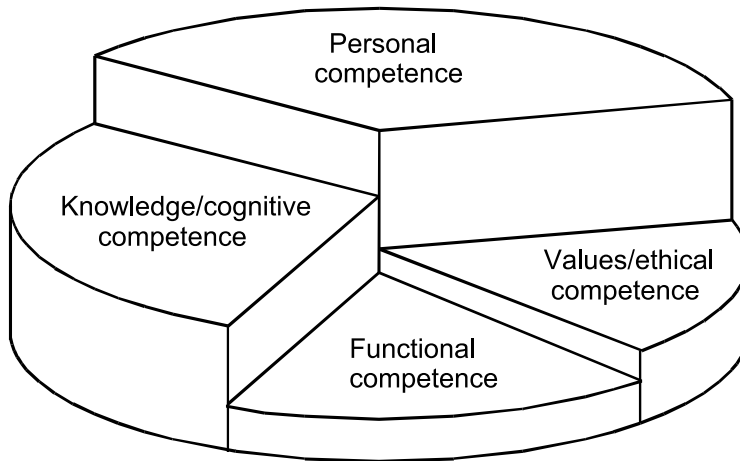
According to Eurat (1997), the communication between the individual's continually developing competences and the organization of specialist tasks in response to varying requirements and significances is regarded as a fundamental reason affecting the accomplishment of their employing organizations and the quality of the services provided to customers.

According to Cheetham and Chivers (1996), different mixes of core competences may require different divisions within the same occupation. The likely differences between and within occupations have led to the improvement of the linked occupational competence mix model displayed in Figure 15. According to Cheetham and

Chivers (1996), acquiring the required competence does not stop someone from pursuing further studies to obtain deeper competence, as continuous learning enhances competence and being competitive in the area of specialization. Ongoing improvement proceeds at different speeds within distinctive fundamental competence areas, and this is illustrated in Figure 16 by the variation of heights between segments. For simplicity, meta-competence is not displayed in the figure, but these are also to be differentially developed.

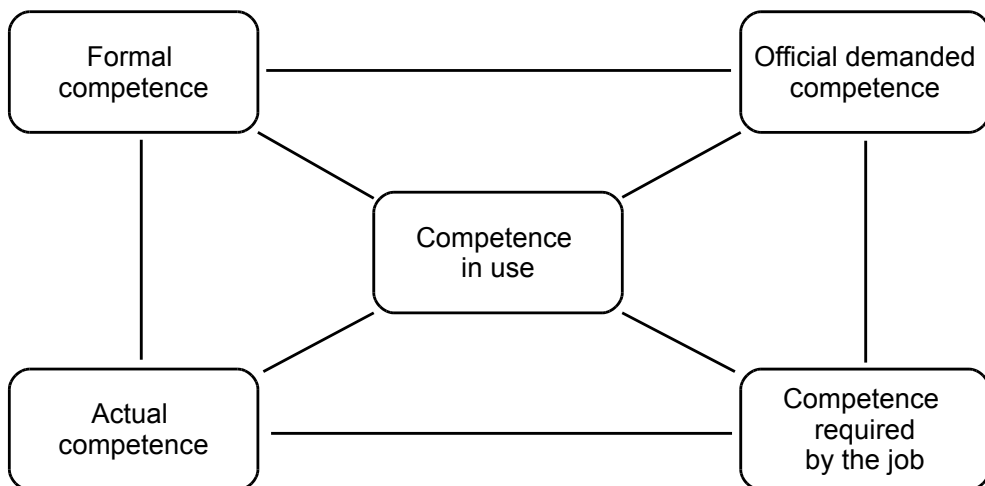


**Figure 15:** Occupational Competence (Adapted from Cheetham and Chivers, 1996).



**Figure 16:** Individual Competence Mix (Adapted from Cheetham and Chivers, 1996).

According to Ellström (1997), official competence is measured, for example, by the number of years of schooling accomplished or by exam passes obtained by the individual. Real competence is the ability to handle a certain situation effectively or to complete a certain assigned task. In managing customer issues, competence as a requirement is needed to accomplish assignments effectively and in a timely manner, as illustrated in Figure 17.



**Figure 17:** Different Meanings of Occupational Competence (Adapted from Ellström, 1997).

## **4.2. Education**

The term “education” has a wide meaning, but it is often narrowed to imply the process of learning and obtaining information and knowledge. It is vital for a service provider or product manufacturer to provide continuous education activities for their employees to enable them to cope with rapid changes in the market. According to the literature, being exposed often to new ideas and skills leads people to better thinking, working, and contributing well to social welfare advancement.

According to Bensson (1997), Watkins and Marsick (1992) generalize that most of the learning that takes place at work is informal, i.e. not pre-organized. The job training provided by employers can equip employees with the skills needed to perform their tasks (Doornbos and Krak, 2001). Learning at work has been employed, for instance, from the standpoint of developing an organizational learning culture (Argyris and Schön, 1996; Brown and Duguid, 1991).

It is broadly recognized that carrying out an occupation in a competent way demands the right education in addition to continuous learning during one’s employment (Eraut et al., 1997; Marsick and Watkins, 1990).

It has been observed that learning at work happens in three different forms: 1) informal or incidental learning, 2) experiential learning; and 3) context-bound learning.

Informal learning is related to each case of issue resolution (Argyris and Schön, 1996). It has been observed in the literature that many factors determine how and what one can learn. These factors include: 1) experimentation, 2) circumstances, 3) the other people around the learner, 4) innovations, and 5) discoveries.

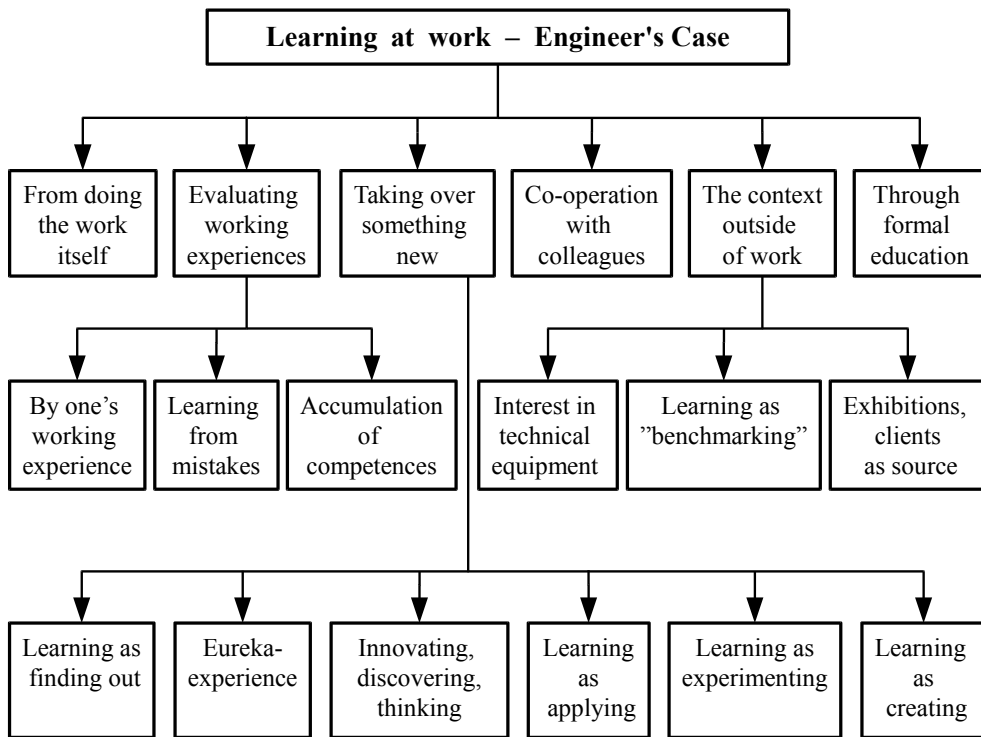
Learning at work is experiential, which implies that learning and working are mutually interdependent. This indicates that working and learning are usually difficult to separate from each other. Learning is entrenched in everyday issue resolution circumstances (Bereiter and Scardamalia, 1993).

Learning at work is broadly narrowed to a certain specific task area. Learning is located and broadly acknowledged these days in the workplace (Brown et al., 1991; Lave and Wenger, 1991).

Figure 18 illustrates an example of the formation of studying at work experienced by development engineers (Collin, 2002). As a result of a nomographic analysis, Collin (2002) identifies six distinctive groups of learning at work as follows: 1) *“learning by doing the job itself, 2) learning through co-operating and interacting with colleagues, 3) learning through evaluating work experience, 4) learning through taking on something new, 5) learning through formal education, and 6) learning through extra-work contexts”*. As Figure 18 is self-explanatory, it is not the intention of this thesis to go into it deeply.

The skills of learning, self-awareness, executing plans, and issue resolution is part of a process of critical analysis in which decisions are made upon organizational issues and plans executed, which in turn provide business results. Keeping pace with the dynamic of business changes requires that employees continuously learn new skills according to the tasks' demands as they evolve with time. According to Carnevale et al. (2001), the major objective of learning at work is to develop inventory skills and attitudes that can be applied successfully in the workplace to resolve issues and foster innovation.

The strategic relevance of interactive, compromise, and cooperation skills is evident. They are essential means for attaining the suppleness and compliance that the organization's employees must have to remain excellent at their jobs.



**Figure 18:** Engineer’s Conceptions of Learning at Work Model (Adapted from Collin 2002).

### 4.3. Knowledge chain

What is a knowledge chain? A knowledge chain is the information sharing process, from the creation to the ultimate use and reuse of knowledge, linking individuals, functions, disciplines, company(ies), and organization(s) both internal and external to the company (Shawn, 2012). According to Shawn (2012), the information assigning functions, both inside and outside a company, are functions that add value to and enable the effective use of knowledge to do the following:

*“Provide products and or service to customers”*

*“Obtain products and or service from vendors”*

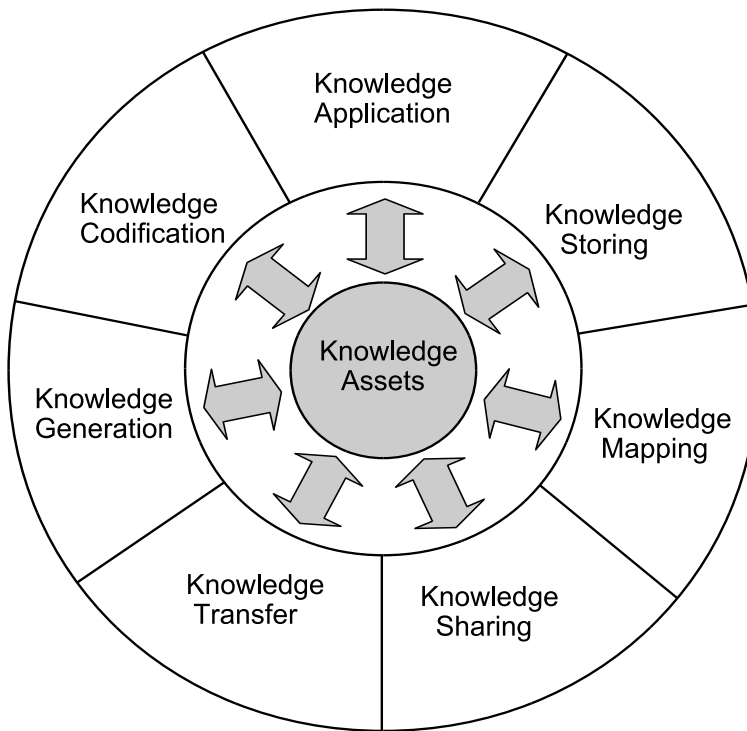
*“Increase stakeholders’ value”*

According to Carlucci et al. (2004), the knowledge chain is a classification of intellectual tasks, by means of which knowledge workers build their employer's distinctive competitive lead. An example of a knowledge chain is the components of a research and development project. According to researchers, improvement flows from the knowledge integration that occurs when knowledge management techniques are applied to the continuous improvement of a business process.

Knowledge management is regarded as a key factor in realizing and sustaining organizational success for improved efficiency, innovation, and completion (Alawneh et al., 2009). Bassi (1997) states that “*knowledge management is the process of creating, capturing, and using knowledge to enhance organizational performance, such as documenting and codifying knowledge, and disseminating it through databases and other communication channels.*” The main purpose of managing knowledge is to be certain that the right knowledge is available for the right person at the right time (Hariharan, 2002).

There are three explanatory aspects of knowledge management, strategic, managerial, and operational, all relating to the organizational levels of knowledge management (Carlucci et al., 2004). In the managerial dimension of knowledge management, two types of study exist: 1) creation of knowledge and 2) assessment of knowledge. The creation of knowledge begins with the unaccomplished task of Nonaka (1991). Nonaka's work introduces the “knowledge creating company” and defines knowledge management (KM) approaches and models of both a descriptive and a prescriptive nature.

The “knowledge process wheel” has been proposed as a taxonomy of the KM process (Marr and Schiuma, 2001). According to Marr and Schiuma (2001), the model defines the seven main processes of KM: “1) *Knowledge generation*, 2) *Knowledge codification*, 3) *Knowledge application*, 4) *Knowledge storing*, 5) *Knowledge mapping*, 6) *Knowledge sharing*, and 7) *Knowledge transfer*,” as displayed in Figure 19. The process is based on the understanding that knowledge is dynamic in nature; on the basis of this argument, the authors provide guidelines on how to use, share, transfer, develop, and remove the cognitive assets of an organization (Wiig, 1997). However, it is not the intention of this work to address the model in detail.



**Figure 19:** Knowledge Process Wheel (Adapted from Carlucci et al., 2004).

The second part of the wheel incorporates the knowledge assessment, which builds upon knowledge management for providing an operational tool identifying the value and intellectual capital of a firm.

#### **4.4. Others factors affecting customer satisfaction**

This sub-section briefly explains other factors that affect customer satisfaction. The relationship between the product manufacturer and the authorized vendor should be good to ensure that the end user or customer is satisfied. In this section, therefore, other factors that might affect customer satisfaction or dissatisfaction are demonstrated in Figure 20, depicting the after-sales scenario.

“After-sales service activities” in this thesis refers to technical activities that occur between the product manufacturer, in this case the mobile terminal manufacturer, and the authorized service vendor (ASV), as well as mega-customers such as ser-



vice operators. The ASVs are in direct contact with MT end users. According to the results of a survey on ASVs in Europe, the success of an MT manufacturer's business is also regarded as the success of an ASV's business and vice versa (Mwengerano and Sippola, 2014). The mutual success of business between the two firms is a win-win situation.

As demonstrated in the Figure 20 the MT manufacturer prepares the product training for the ASVs and mega-customers before product launch to enable servicing of the MT product in the after-sales phase. The MT manufacturer provides service manuals and a service repair policy and deals with issues regarding the warranty process. The mega-customers, like the service operators, receive their localized products according to their orders.

The most important driving factors in the after-sales period for ensuring that customers are satisfied with a product or service provider are costs, quality of service (QoS), and speed of service (Kasper and Lemmink, 1989; Johnston, 1995).

When a mobile terminal (MT) end user experiences issues with the product and is unable to resolve the issue himself or herself, the customer will contact the nearest ASV for service. The ASV will perform a diagnostic analysis to find the cause of the issue and resolve it. The ASV estimates the service costs, which will be paid by the customer if the device is not under warranty. If it is anticipated that the issue correction actions (iCA) will take a long time, a swap or lend MT is provided for the customer until the resolution is obtained.

The ASV receives from the OEM 1) knowledge of the software (SW) and hardware (HW) of the MT and 2) the spare parts and all other items needed for handling a customer issue at any given time. The ASVs have the issue management metrics in place to ensure that the quality of the corrective actions is high. However, it is not the intention of this dissertation to address the details of the operational functions of the ASV. The key message from this figure is that there are many activities involved between the OEM and the ASV that may mutually affect overall customer satisfaction, regarding, for example, issue resolution time (iRT) or the quality of issue corrective actions (QoiCA). Management on both sides must ensure that the activities are run efficiently and are productive and competitive in the market. The ASV activities regarding costs, speed and quality, and indicators for CS/D are indicated by colors in figure 20.

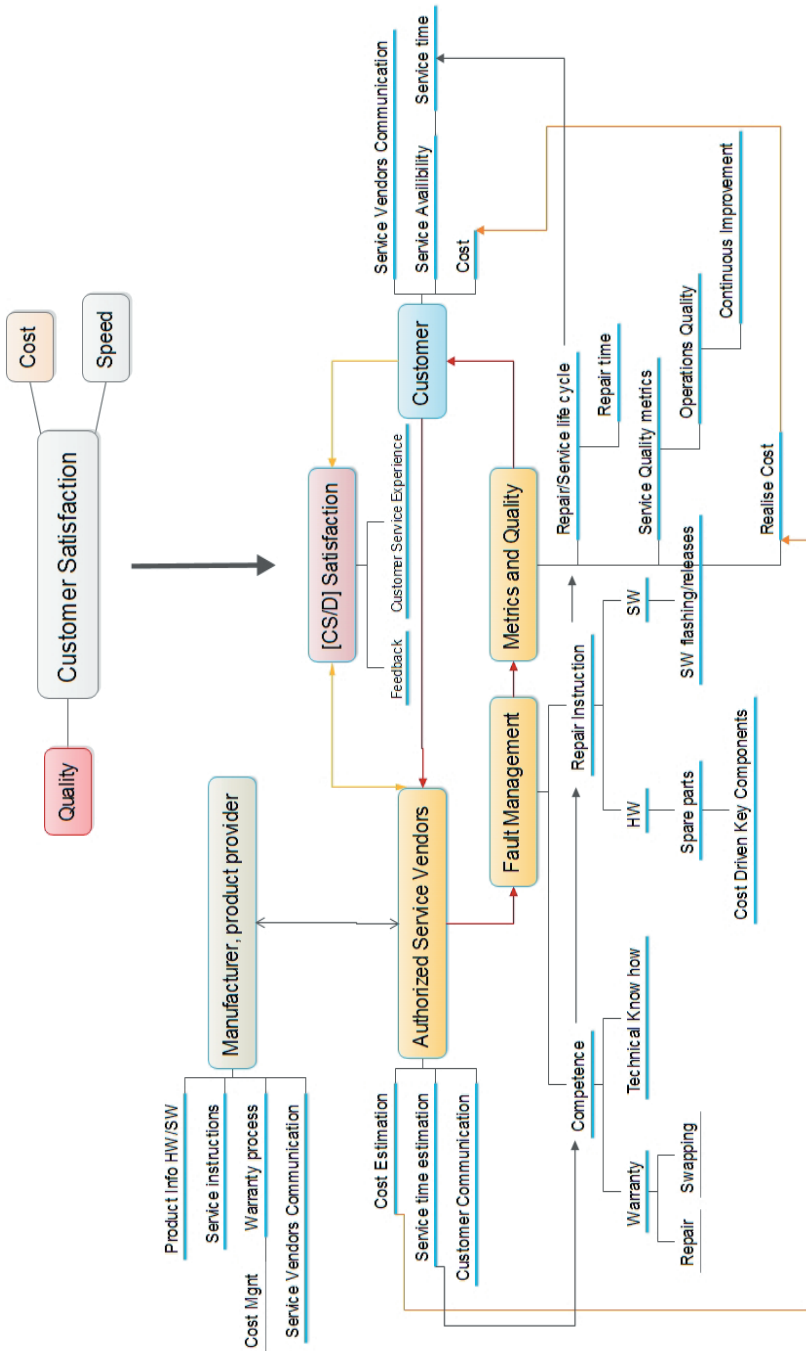


Figure 20: ASV and OEM Activities in the After-sales Phase.

## **4.5. Repair cost**

In essence, the repair costs in the after-sales situation for mobile phones consist of the following: 1) repair labor, i.e. how much is paid by the manufacturer for a specific repair action when the devices are still under warranty; 2) transportation, which is paid to cover the logistics cost of parts, i.e., sending and receiving consumer's defective products; 3) spare parts, the cost of replaced parts; 4) overhead, which is the additional operational costs arising from the cost of the operation, e.g. rent, energy, salary, etc.; and 5) market-specific policies or penalties, which involves contractual penalties that the OEM must pay to the authorities or customers due to the defectiveness of products.

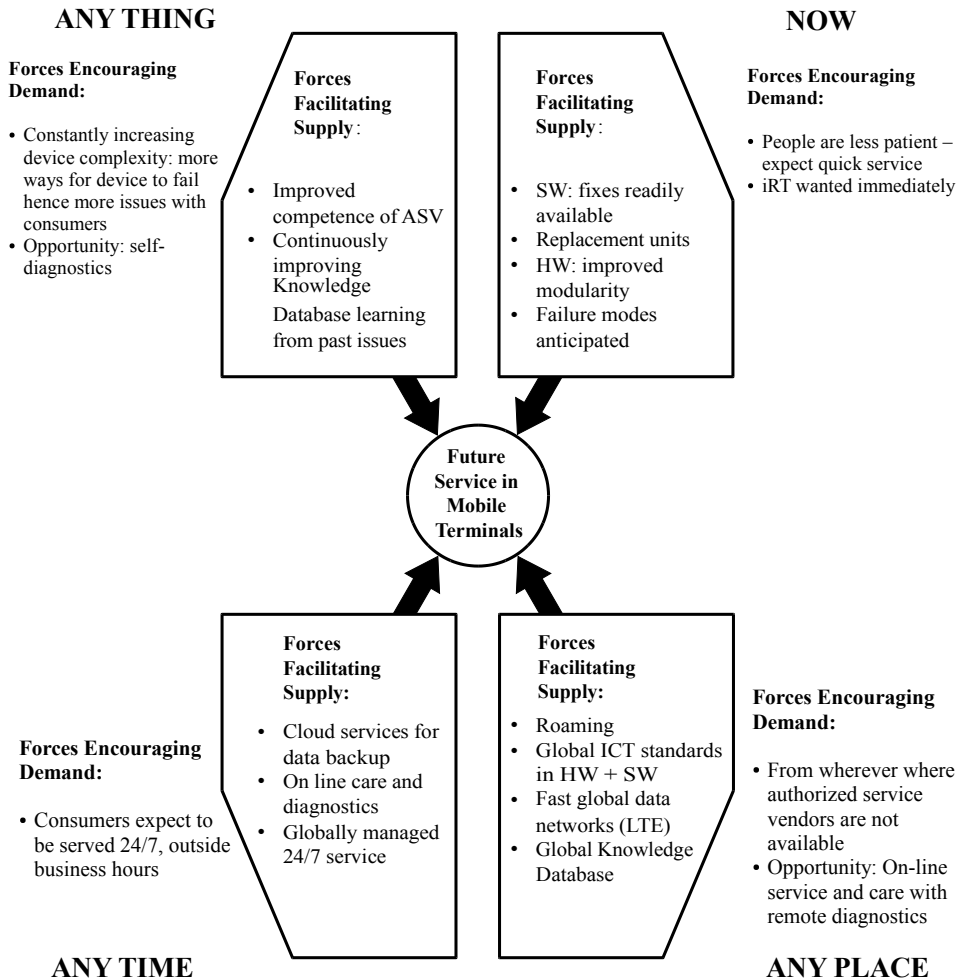
It is important to note that the cost per repair varies greatly across different geographical regions or different logistics chains. For example, labor costs are far lower in China and in India than in Europe or in North America. Moreover, in the U.S.A., the repair cost may be much higher with one mobile operator than another due to differences in contracts and the logistics chain.

## **4.6. Future Service Breakthrough in Mobile Terminals**

Figure 21 shows the migration toward a situation where customers can demand have anything at any time and any place, including now. Figure 21 demonstrates the forces encouraging demand and facilitating supply. Presently, mobile terminal consumers are still at the stage where they do not necessarily expect or know how to deploy the support available in their devices. In other words, the most common response one would get from consumers if they were asked where they would go for help when faced with an issue with their devices would be, "I would turn to a friend or colleague or relative." The great asset of mobile support is the fact that it is there, always available and effortless to use. According to Chambers (2013), within two to three years, the consumers will learn to expect support "on the go" as a given.

Second, consumers will learn to demand more from these services: while self-support is cost-efficient for the service provider, consumers are also looking for interaction in some form or another. The use of social media as a means of get-

ting assistance is increasing at a rapid pace. There are also companies that are using support as a differentiating factor in their marketing, such as Amazon with their May Day button on Kindle devices. The forthcoming years will show that manufacturing companies will need to develop their support offering through mobile devices continually and that consumers will want to have some issues resolved by interaction with actual persons instead of resorting to self-help.



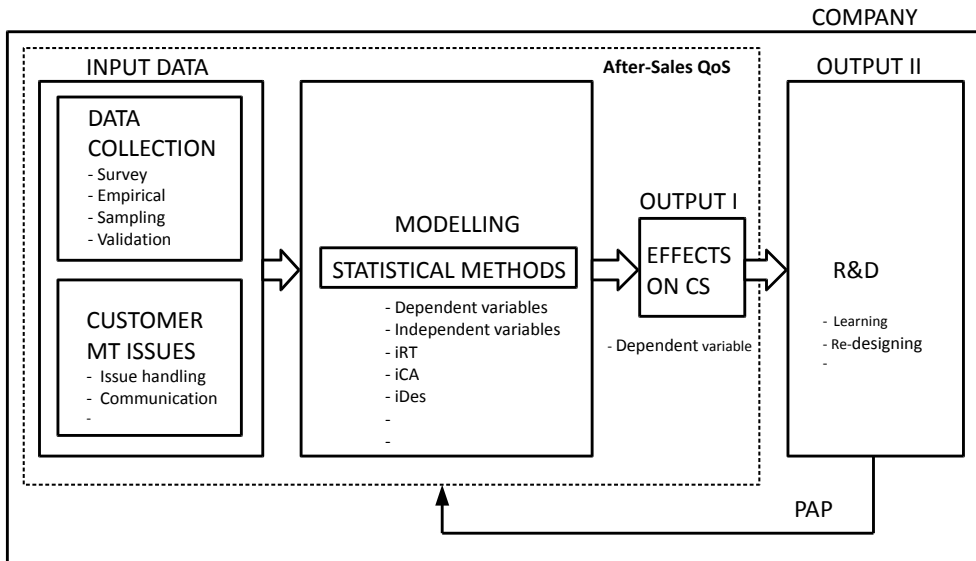
**Figure 21:** Factors Influencing the Nature of Service Breakthroughs for Mobile Terminals (Adapted from Heskett et al., 1990).

Figure 21 presents an overview of how future services for mobile terminals will look. The forces encouraging demand are the factors that cause demand at any time and any place for anything. The forces facilitating supply are the service possibilities that will be supplied to fulfill the customers' demands.

# 5. Empirical Case Studies

This chapter summarizes the empirical studies and the five case studies included in this dissertation. The dissertation has mostly focused on customer issues concerning corrective actions (iCA) and issue resolution time (iRT) for mobile terminal devices. The case studies were conducted at Nokia. Figure 22 displays the research design framework on which all five articles are built. The company in this study, the mobile terminal firm, has an after-sales department that deals directly with customers in the field. One of the services that the after-sales department provides are issue corrective actions (iCA) that have issue resolution times (iRT). The design framework of the thesis includes handling customer issues, collecting data for analysis, modelling for different given data, and the effect on customer satisfaction, which is the measure of quality of service (Kasper and Lemmink, 1989). The theories used in this study, such as the statistical methods used for modelling, are addressed in the five articles. The underlying data collection and survey theories are intrinsic to the statistical methods. The literature and theories for handling customer issues are reviewed extensively in the work. The aim of the study is to apply statistical methods to the entire service chain to understand it better so that it can be improved. The comprehensive aim is to use the outcomes from the customer ser-

vice process to guide product development, from concept onward, to enable robust designs that will work better for new products. The target will be achieved when the entire service chain from customer up to product development can be modeled and this modeling is used as an aid at every level of the organization.



**Figure 22:** The Research Design Framework of the Dissertation Work Used in the Five Articles.

The first task after the modeling is to check the effect on customer satisfaction (CS) (Van Ossel, 2003, Zairi, 2000, Parasuraman et al. 1985, Zeithaml et al., 1990), and the second is to identify the preventive actions process (PAP) measures taken by R&D to prevent issues from reoccurring in the field.

The structure of the articles included in this dissertation is shown in Table 14. The articles were analyzed on the basis of the content and type of data. The two types of data used in this work are company data and survey data. The company data were obtained from Nokia’s internal database, and the survey data were collected from the staff working in the service chain, i.e. from service level 1 (SL1) to service level 5 (SL5).

**Table 14:** The structure of the articles.

<i>Data Type</i>	<i>Publication</i>	<i>Analysis Methods Applied</i>
<b>Company Data</b>	<b>I</b>	Weibull Distribution, Simple Correspondence Analysis, Principal Component Analysis.
	<b>IV</b>	Frequency Table, Binary Logistic Regression, Mood's Test, Kruskal-Wallis One Way Analysis of Variance
	<b>V</b>	Generalized Linear Model
<b>Survey Data</b>	<b>II</b>	Ordinal Logistic Regression, Log-linear Model
	<b>III</b>	Self-Organizing Map, Principal Component Analysis

The articles were published between 2008 and 2013. Publications 1 and 2 were designed to be more exploratory, i.e. to contribute to understanding of the dimensions of the issue. Subsequently, publications 3, 4, and 5 moved toward creating practical models for the data gathered. The survey data for publications 2 and 3 were gathered from the staff working in the service channel network, i.e. from service level 1 to service level 4. The content of the articles is summarized in the following sections.

## 5.1. Publication I

In the first publication (P1), analyses of the corrective actions (CA) taken to address different issues in three different product categories were conducted. Products 1, 2, and 3 were chosen according to the complexity of their functionalities and features. Product 1 belonged to the basic category, i.e. the least complicated product in terms of features and functionalities. Products 2 and 3, respectively, had more complex features and functions compared to Product 1. It was found that, in all three products, a type "A" root cause was predominant. The activities of different corrective levels in the chain model were analyzed, and it was observed that most actions took place at level 2 (L2) and level 4 (L4). In this paper, the best distribution model was selected by the maximum likelihood method, the Anderson-Darling method. The Newton-Raphson algorithm was used to calculate maximum likelihood estimates for the pa-



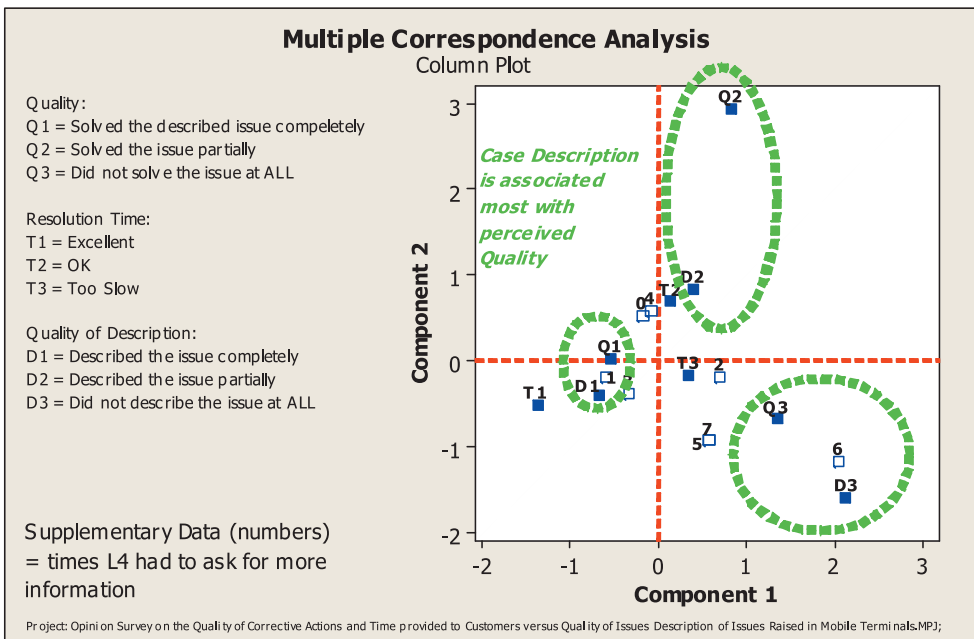
rameters, which define the distribution. The Weibull distribution was selected due to its having the lowest Anderson-Darling value in the goodness-of-fit test. A Pareto chart was applied in the CA analysis to prioritize opportunities. CA “A” had a major impact on the three products. Furthermore, a simple correspondence analysis was performed to find out how well the CA was associated with different products. The plot tool was used to show differences in characters of the data set. Principal component analysis (PCA) was further performed to simplify the data set by reducing the multi-dimensional data to a lower dimension for analysis. It was found that CA at L2 and L4 were the major contributors to the total issue resolution time (iRT), so the optimization was focused on L2 and CA “B” and in L4 category “A” and “C,” respectively. With the most complex product, Product 3, L1 was deemed a significant contributor to CA “A.” A new iRT was simulated with the desired Weibull shape and scale parameters. As an example, L2 and CA “B” were simulated to give the distributions before and after optimization. The procedure was found to be applicable to forthcoming products to point out improvements needed to optimize iRT. It can be concluded that the shorter the iRT is, the lower the repair costs will be, as these include time and other components.

The author was responsible for formulating the research question and established the model for the customer issue escalation process. The author gathered the data from a database tool built in-house called GENIUS. Together with a statistician, the second author researched suitable methods for analyzing the data and analyzed the data and findings, and conclusions were established together with the co-authors. The author prepared and presented the original version of this paper at the International Conference on Electronics Packaging (ICEP), Tokyo, Japan, April 13–15, 2005, pp. 66-70, receiving comments to develop it into a full manuscript. The third and fourth authors acted as mentors for this research. The author prepared the manuscript of this work for the *Quality and Reliability Engineering International Journal* 2008; 24: pp. 613-621.

## **5.2. Publication II**

The second publication (P2) presents the interactive communication between issue resolvers and issue providers, who are authorized service vendors (ASV). The re-

search work focuses on the perceived quality of the issue corrective actions (P-QoiCA) provided by the resolvers and the perceived quality of the issue resolution time (P-QoiRT). This study is based on 160 responses from the empirical data collected for the survey from internal and external participants. The internal participants were the issue corrective actions (iCA) providers, and the external participants were the ASVs. The ASVs rated the P-QoiRT and the P-QoiRT. The issue resolvers were asked to rate the perceived quality of the issue description and additional information (P-QoiDesAI). Figure 23 illustrates that the issue description is associated with the perceived quality of the issue corrective action (iCA).



**Figure 23:** Multiple Correspondence Analysis (Mwegerano and Kytösaho, 2007).

The data were analyzed using ordinal logistic regression and the logistic model. The ordinal logistic regression provides information about the predictor, the predictive variable inter-relationship, and the association between these variables.

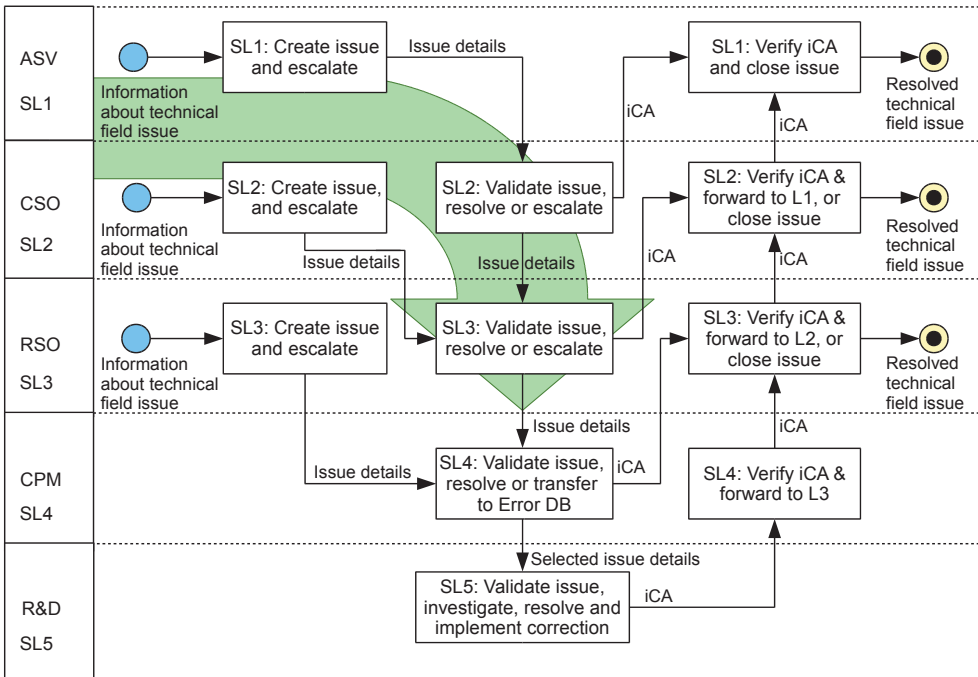


Figure 24: Issue Escalation Flow Chart (Adapted from the company case, 2014).

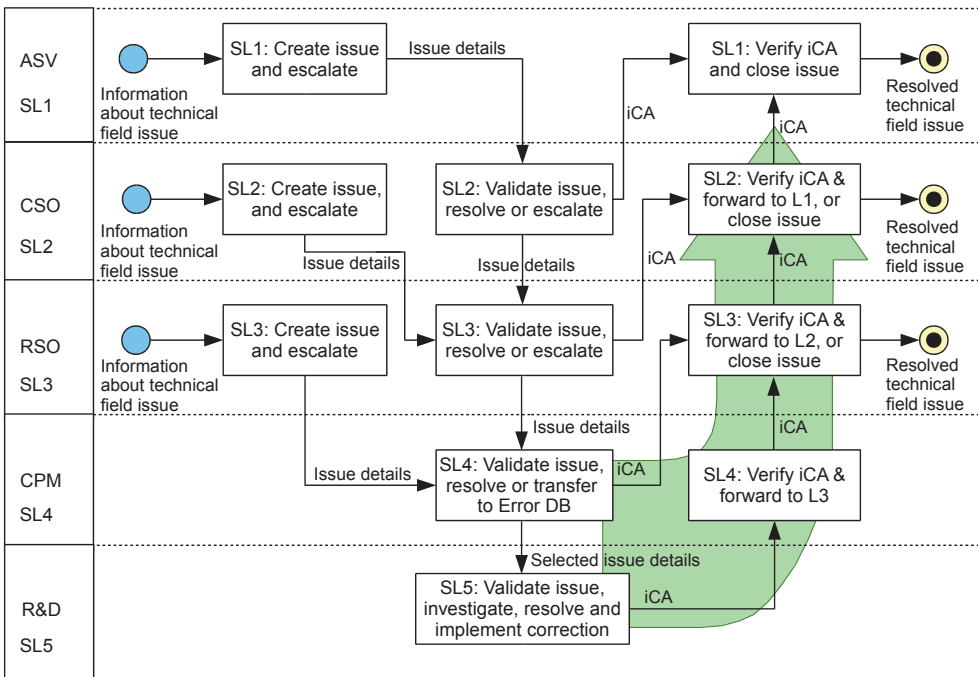


Figure 25: iCA Escalation Flow Chart (Adapted from the company case, 2014).

Figures 24 and 25 demonstrate how issues are escalated from customers to resolvers and how the iCA is escalated from resolvers to customers. According to the statistical analysis, is a significant difference between the levels in the response. The regression equations for the change from score 1 to score 3 were determined. According to the association measures, Goodman and Kruskal's (1954)  $\Upsilon$ , Somer's (1962) D, and Kendall's (1938)  $\tau$ -a, there is a positive association between response and predictors. This interpretation is based on the work of Goodman and Kruskal (1954). The study shows that, to increase the customer's P-QoiCA, the P-QoiRT must be reduced. The absolute CRT had no practical significance when evaluating P-QoiCA. This leads us to conclude that the P-QoiRT and CRT are totally different. P-QoiRT is more important to the customers. For one customer, a week P-QoiRT is a long time, while for another customer, a two-week P-QoiRT is a short time. This has a clear managerial implication, as the service process managers should focus more on communication within the service channel. From the study carried out, it can be concluded that interactive communication between issue resolvers and customers is vital. The resolvers should follow up with the customers to ensure that they are happy, that the resolvers learn from the issues, and that they are able to provide corrective actions accordingly.

The author was responsible for formulating the research question and establishing the model for the customer issue escalation process. The author gathered the data from the GENIUS database tool. The authors researched suitable statistical methods to analyze the data and analyzed the findings, and conclusions were established together with the co-authors. The author prepared and presented the early version of this paper for comments at the 4th Conference on New Exploratory Technologies held in Seoul, Korea, on October 25–29, 2007, pp. 24–26.

### **5.3. Publication III**

Publication III analyzes the perceived quality of issue corrective actions (P-QoiCA) from the users' perspective regarding the quality of corrective actions provided through a database tool (GENIUS) used within the case study firm. The article also analyzes factors that contribute to customers' perceived issue resolution time (P-QoiRT), i.e. the time used to resolve the customers' issues.

A questionnaire was sent to different participants in the network chain that handles or resolves issues. The participants were from 17 European countries and seven non-European countries. The responses were analyzed using statistical methods and by using the Self Organizing Map (SOM) model. The results are used to pinpoint or suggest the areas that are seen as opportunities for improving the quality of the corrective actions provided. Higher quality corrective actions, along with other initiatives, will help to improve customer satisfaction.

Due to the nature of the data, clustering with the SOM was found to be the most applicable method for analyzing the survey data. The analysis was done using the e-SOM software. Neural network, Mini Tab, and e-SOM2 data mining tools were used to analyze different response items from different users at various levels. The results of this research showed that the issue resolution time (iRT) is perceived to be high due to the following elements: 1) a long time taken to receive samples for verifying the customer's issues, 2) a high rate of requesting more information by the issue resolvers from the issue creators, i.e. the customers, in this case the authorized service vendors (ASV), and 3) business price tags to allow the issues to be prioritized were missing from the escalated issues. It was also found that the P-QoiCA is affected by a poor description of the issue provided by the case creator and a poor response to the default requested questions (information) regarding the reported issue. The work also found that the authorized vendors (ASV), in this case the issue creators, needed more training with the inbuilt tool for escalation of the issues. As a managerial implication, when customers' issues are resolved satisfactorily, it is very likely that the customers involved will remain satisfied and loyal.

The author was responsible for formulating the research question and establishing the model for the customer issue escalation process. The author gathered the data from the database tool called GENIUS. Together with a statistician, the second author researched suitable methods for analyzing the data and analyzed the data and findings, and conclusions were established together with the co-authors.

The author prepared and presented the early version of this paper for the International Conference on Electronics Packaging (ICEP) Tokyo, Japan, April 19–21, 2006, pp. 304-309. The author prepared the final manuscript of this work for the *iBusiness* journal 2012, 4, pp. 108-120.

## **5.4. Publication IV**

To analyze certain issues in any functional system fully, samples having the same symptoms as the issue reported are essential. With samples, one can try to reproduce the issue and gain a better understanding of the nature of the issue. However, in some cases, it might be difficult to obtain the right samples in good time to perform an analysis of the issue raised by the customer. On the other hand, it may be intuitive to assume that the perceived quality of corrective actions (P-QoiCA) can be improved by collecting samples of the faulty products in question for verifying the issues reported from the field.

Publication IV analyzes whether a sample collected can be used for verification purposes, i.e. whether it 1) helps to resolve field issues raised by the ASV, 2) decreases or increases absolute issue resolution time (iRT) compared to issues resolved without samples, 3) has an effect on the customer's P-QoiCA and perceived quality of issue resolution time (P-QoiRT) compared to issues resolved without samples, and 4) has a different collection time in different sales areas (SA). In addition, the following were analyzed: 1) whether the quality of the samples (QoS<sub>a</sub>) has an effect on iRT, 2) whether the frequency of the sample request differed between products (mobile terminals) of a different software platform (SW\_P), and 3) how sample collection turnaround time (SC-TAT) differed depending on the SA.

For the purpose of analysis, two years of technical empirical data of customers' resolved issues were collected from the database tool. Over 10,800 and 800 customer issues were collected without samples and with samples, respectively, for this study. The data were analyzed using three different established statistical analysis methods: binary logistic regression, Kruskal-Wallis statistical tests, and Mood's median test. These methods were used because the data collected are categorical. The main findings were that the collected samples had no significant effect on P-QoiCA or on P-QoiRT. It was also shown that the QoS<sub>a</sub> and SC-TAT have no effect on the iRT. In this study, it was found that Mood's median test showed significant differences in iRT between different software platforms (SW\_P), similar to findings by Mwegerano and Tuominen (2005). As for managerial implications, more research will be needed to establish the reasons that samples had no significant effect on P-QoiCA and P-QoiRT and why the QoS<sub>a</sub> and SC-TAT had no effect on iRT.

The author was responsible for formulating the research question and establishing the model for the customer issue escalation process. The author gathered the data from the GENIUS database tool. Together with a statistician, the co-author researched suitable methods for analyzing the data and the findings, and conclusions were established together with the co-authors. The author was the corresponding author for the manuscript. The author prepared and presented the original version of this paper idea for comments at the 6th Electronics Production and Packing Technology Conference at the Pori University Consortium, Finland, on May 19–20, 2005, pp. 162–164.

## **5.5. Publication V**

It is crucial for customers in any business to have an idea when the issues presented to a firm or authorized service vendors (ASV) will be resolved. This paper attempted to build a model that predicts issue resolution time (iRT) as soon as an issue is recorded in the corrective action process tool (CAP) in a database built in-house for mobile terminal (MT) products. Depending on the estimated issue corrective actions (iCA) iRT, the ASV might lend an MT product for the period when the customer's MT is being repaired. A two-year (2010–2011) data bank of 10,000 resolved technical issues was gathered from the in-house database and analyzed using the linear model statistical method to predict the iRT. The variables that were used to predict the model were 1) the entity type of the MT, i.e. the business unit (BU), 2) the software platform, (SWP), i.e., for example, the operating systems Symbian, Linux tablet, Maemo, code division multi access (CDMA), MeeGo, Mango, Windows, etc., 3) the program center (PC), i.e. the place where the MT was actually designed, 4) the sales area (SA), i.e. where the MT products were sold, 5) the symptom of the reported technical issue area (iTA), and 6) the business impact of the reported issue (iBI). Continuing from the prior work of the author (Mwegerano & Ollikainen, 2013) to model the iRT, a regression approach resulted in only a modest 4.4% of the variation being explained. Approaching the data with a linear model, the authors used the added verification sample to uncover the challenge of low variance, focusing specifically on whether a model of customer issue resolution time can be built with the existing variables. In this paper, the method chosen for the analysis slightly increased the value of  $R^2$  to 0.107602; i.e. approxi-

mately 10.8% of the transformed iRT could be explained by the model. However, despite the fact that the explanation of the variables used in this model slightly increased  $R^2$ , it is not enough to be of practical use.

Managers should be interested in being able to find ways of building a process for predicting the length of time it takes to resolve customer issues. The work poses a complex problem with significant managerial implications, with several latent variables falling outside the traditional resource planning data gathered.

The contribution to this paper is the method and methodology employed to investigate the iRT variable dependents. The author was responsible for formulating the research question and establishing the model for the customer issue escalation process. The author gathered the data from the GENIUS database tool. Together with statisticians, the co-authors researched suitable methods for analyzing the data and the findings, and conclusions were established together with the co-authors. The author was the corresponding author for the manuscript.



# 6. Discussion and Conclusion

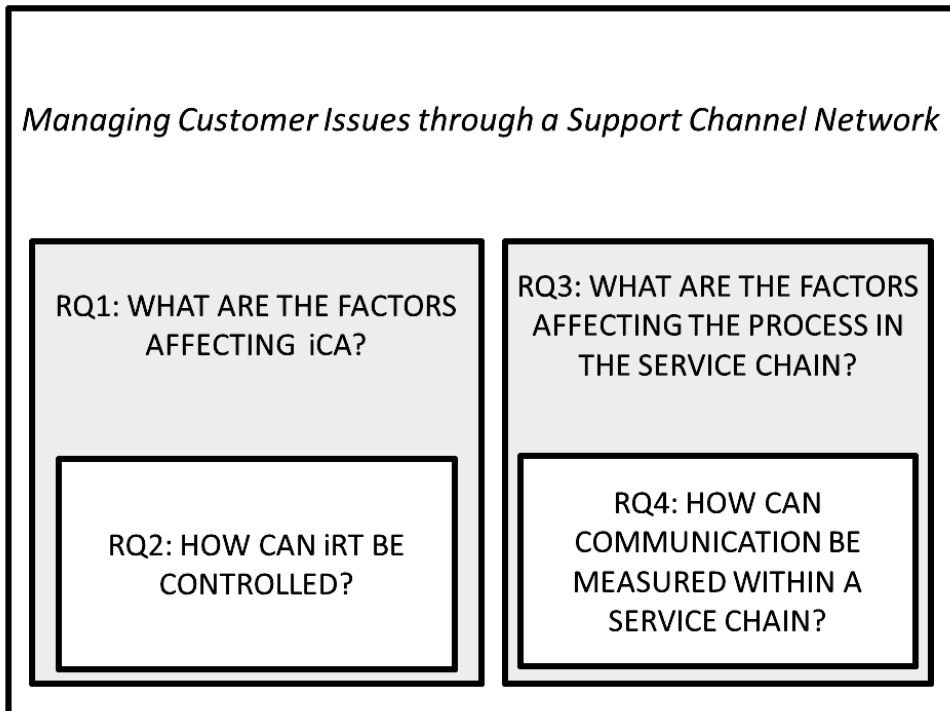
This chapter concludes the research of this dissertation. The dissertation has mostly focused on customer issue corrective actions (iCA) and issue resolution time (iRT) with reference to the existing literature and study cases presented in five different articles. The case studies were conducted at Nokia. The chapter gives the answers to the research questions and summarizes the findings from the literature, the conceptual contributions of the research, and the managerial impact. The research identifies future research topics and practical implications as well as reflecting on the limitation of the research.

## **6.1. Answers to the Research Questions**

The study case articles in this thesis have attempted to address, using mathematical and statistical methods through which the whole service chain could be managed as a process and can be modeled. If it succeeds, this could bring great savings in service costs during the warranty period, and the customers would experience the

service activity as fast and high in quality. The models established in the thesis contribute to the existing knowledge of customer issues after-sales process for mobile phones.

Answers to the research questions are synthesized in Figure 26.



**Figure 26:** The Cross-sectional Frame of the Research Questions.

**RQ1:** *What are the factors affecting corrective actions?*

This question is answered with reference to the existing literature Chapter 4 and Articles 2 and 3. In Chapter 4 specifically competence, education, and the knowledge chain are discussed. These variables have a wide meaning in general, but they can also be used to define factors that affect or can slow down the process of accomplishing corrective actions for customer issues within a desirable timeframe. Competence is defined by Mirabile (1977) as “a knowledge, skill, ability or characteristic associated with high performance on a job, such as resolving issues, analytical thinking or

*leadership.*” Education is a vital element for the issue resolvers. Education has a wide range of learning scope. Informal learning is related to resolving daily issues (Agyris and Schön 1996). The third parameter that affects CA is the knowledge chain of every individual who is in the chain dealing with customer issues. Shawn (2012) states that “*the knowledge chain is the information sharing process, from the creation to the ultimate use and reuse of knowledge, linking the individuals, the functions, the discipline, the company(ies) and organization(s), both internal and external, to the company.*” According to Carlucci et al. (2004), the knowledge chain acquired by workers helps to build their employer’s unique competitive advantage.

This question is also answered in articles 2 and 3. In these articles it was established that the perceived quality of the description and additional information (P-QoiDesAI) affects the perceived quality of the issue corrective actions (P-QoiCA). It was also established that poor responses for requested extra information to clarify the issues reported, negatively affected the quality of the corrective actions

**RQ2:** *How can issue resolution time be controlled?*

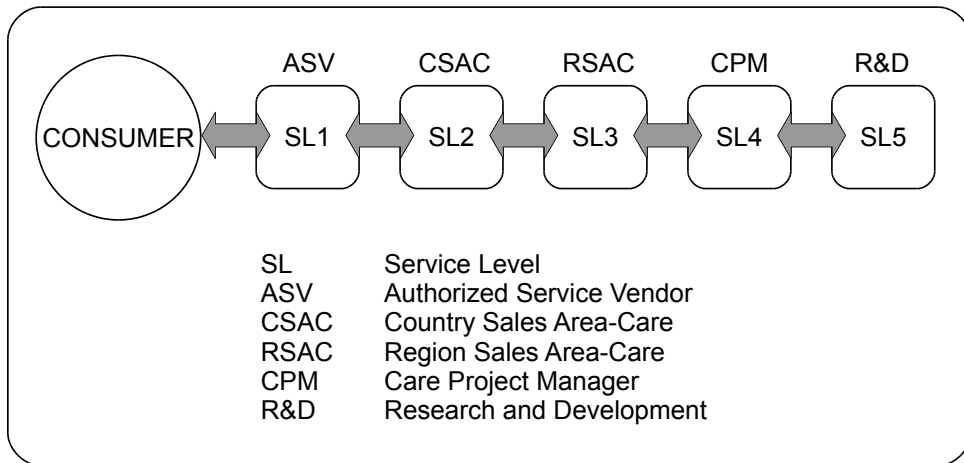
This question is dealt with in article 1, where CAs provided for customers were analyzed. In addition, activities at different correction levels in the chain model were analyzed, and it was observed that most of the actions took place at L2 and L4 and that these levels were the major contributors to the total issue resolution time (iRT). Hence, optimization was focused on L2 and L4 according to the CA categories deemed to contribute to a high iRT. The modeling procedure applied in L2 for optimizing iRT was also found to be applicable to forthcoming products.

To some extent article 5, also answers this question, because the duration of iRT depends on some of the explanatory variables chosen for predicting iRT.

**RQ3:** *What are the factors affecting processes in a service chain?*

This question is discussed with reference to the literature in chapters 2, 3 and 4 of this thesis. The organizational quality dimension affects the service chain in performance, knowledge management, teamwork, and continuous learning of the staff working in the service chain organization (Basu, 2011). Performance management includes the selection, quantifying, examination, and usage of key performance indicators. Knowledge management consists of the education, training, and development of the employees and communication by the sharing of best practices. Teamwork should be

practised in service and cross-functional groups to encourage a borderless organization. Continuous learning should be created through an ongoing learning process that seeks to incorporate the lessons learned earlier from issues, e.g. in a preventive action process (PAP), that is then formalized into a continuous improvement program.



**Figure 27:** A simplified service chain block diagram

To provide effective and desirable service for the customer, the following factors should be controlled for staff working in the chain (see Figure 27): 1) the service staff's competence, 2) continuous learning, i.e. updating education to improve competence, and 3) use of the proper instruments and methods to ensure the swiftness of the work and development.

A well-organized issue management philosophy in terms of the observable process and structures, strategies, goals, and philosophies or instinctive attitudes, thoughts, and feelings (Schein, 1985) exercises a powerful influence on organizational and operational processes. According to Johnson and Scholes (1993), the organizational culture reinforces the creation of a customer-focused organization or an organization dedicated to service distinction. Whether the issues are seen as a nuisance or a gift has an influence on the quality and strength of issue process management (Barlow and Moller, 1996; Handy, 1995; Kakabadse and Kakabadse, 1999). The commitment of top management must be available to ensure that the quality of work done in the service chain is maintained at a high level.

**RQ4:** *How can communication be measured in a service chain?*

This question focuses on communication between the people working in a chain resolving customers' issues. The discussion is conducted in article 2, where the importance of communication for achieving good results of corrective actions performed for customers is analyzed. The novelty of this article is that the whole chain presenting or resolving customer issues was involved in giving their opinions. In this article, 160 resolved issues were collected from the in-house database tool for evaluation by both issue resolvers and the customers who presented the issues, in this case the ASVs, through a questionnaire. The issue resolvers were requested to give their perceived opinions on the issue description quality and content, while the ASVs were asked to give their perceived opinions about quality regarding the iCA and iRT provided by the resolvers. By involving both parties in the discussion, more information was revealed than if only one part of the chain had responded to the survey. With the information from this survey, managers could potentially see the big picture of the whole communication chain and therefore have a chance to improve the chain processes.

As a result of this study, the company concerned implemented customer issue tools in the follow-up, a mandatory action whereby customers had to give their feedback on iCA and iRT before they could close the issue. Constant customer feedback in an organized way gives a company the opportunity continuously to improve their products as well as their services to the customers.

## **6.2. Contributions and Managerial Implications**

The case study articles in this thesis have attempted, using mathematical and statistical methods, to model the whole service chain which allows it to be managed as a single process. This could bring great savings in service costs during the warranty period, and customers would experience the service activity as fast and high in quality.

Through the case studies the perceived quality of issue corrective actions (P-QoiCA) was associated with the perceived quality of customers' issue descriptions

(P-QoiDes). Statistical methods were used to create a model that is useful for significantly optimizing issue resolution time (iRT).

Through the case studies and by examining all the associated literature, it appears that the process of setting up service operations in a chain is complex and challenging to put into operation.

A study of the related literature revealed that a company can differentiate itself from others by its core competence, which is the unique ability of organizations to deliver products and services. Specifically, by implementing effective after sales customer service, it can help increase an organization's competitive advantage. Especially because of the complex nature of creating an effective service process, it is difficult for competitors to copy or imitate it.

The possibility for creating customer loyalty can come from providing satisfying after sales service. Merely selling a working product is not as likely to create loyalty in a customer as providing exceptional after sales service will. Instead, it will likely just create indifferent customers who can easily be persuaded to purchase from another competitor, because the customer cannot differentiate between the company and its competitors. On the other hand, a poor after sales service performance can cause customers to defect to competitors at the first opportunity, and even possibly become so-called "terrorists" who, by word of mouth, spread negative information that may turn away some potential future customers.

Establishing an effective after sales process can create an opportunity for a company to improve its products and services if it includes a mechanism of effective communication and thus obtains more information about customer wishes and their perception of the quality of the company's products and services.

By modeling the service chain, and by attending to the important factors that enhance the competencies of the personnel in the chain, service quality can be improved more rapidly and with better results. At each point in the service chain, more accurate decisions can be made if the mobile phone issue can be resolved and then sent back down the chain or, if not resolved, then escalated further up the chain. The less able each service personnel is to make these decisions, the more it increases the risk that the mobile phone issue will move up and down the chain multiple times, which is a worst case scenario when attempting to respond quickly and with high perceived quality.

This dissertation draws on knowledge of after sales customer issue recovery from the marketing and customer relationship literature, and contributes to knowledge on after-sales customer issue recovery for mobile terminals in ICT. Specifically, the models presented in the thesis contribute to the existing knowledge of the after sales process for customer issues involving mobile phones.

It was found that samples for verifying issues provided by the customer neither improve the perceived quality of corrective actions nor the perceived quality of issue resolution time.

The findings also lay the foundation for the comprehensive objective of controlling the entire product development, starting from conceptualization. This implies that robust design should be applied to new products so that the same issues affecting customer quality negatively are not repeated.

The objective will be achieved when the entire service chain, from product development to the final user, can be modeled and this model can be used to support the organization at all levels.

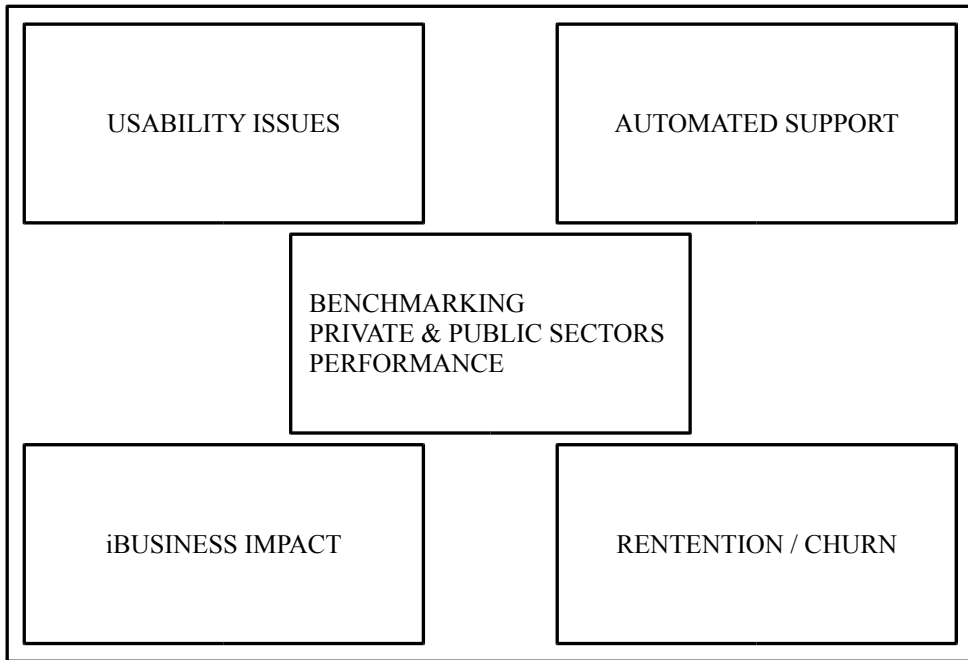
There are several managerial implications for service process managers suggested by this study. It suggests that managers could focus more on communication and the training provided to the staff, as new technology evolves rapidly. They could also formulate strategies for how customers can be kept informed of the status of their issues that have been escalated for corrective action on a regular basis.

### **6.3. Limitations and Suggestions for Future Studies**

As with any work, there is always room for improvement. This work has some limitations and shortfalls. The study cases include only one company, which makes it difficult to generalize the results obtained to other companies. Future work and limitations are visually displayed in Figure 28.

A benchmark comparison could be made of how customer issues are handled by different product and service providers. A wider view would open up new areas of discussion. A longitudinal survey could be conducted to identify customers who are satisfied and loyal and to check the iRT and iCA for any issues that they may have had. This would give more concrete justification for the effect of iRT and iCA

on customer retention. A method could be identified to calculate business impact losses in terms of monetary and brand damage for companies that have not provided iCA in a reasonable amount of time.



**Figure 28:** Future Research Work Topics for Studies on Mobile Terminals.

The magnitude of business impact in terms of monetary value would provide issue resolvers with good visibility when prioritizing customer issues.

Customer satisfaction levels may be studied in relation to the recent greater availability of self-service provided by companies over the Internet and, in the case of mobile terminals, “over-the-air.” Self-service is usually provided as a means for a company to save costs in customer care, so examining whether both an increase in customer satisfaction and a reduction in customer care costs do actually occur would be of great benefit to include in a study.

This study focused only on technical issues concerning products rather than usability issues. Usability can include how simple or complicated the user interface is or how easy it is to obtain applications for “smart” mobile terminals. Features such as connecting mobile terminals to personal computers or automobile radios can be



complicated even if they work flawlessly as designed, so usability experiences of this kind could be examined as to how they affect customer satisfaction.

The aforementioned limitations have opened several research questions:

- (1) What are the measures of customer retention in a problem situation?
  - a. How can we tell that a customer has been retained after he/she has had a problem situation?
  - b. How can we tell when the customers are satisfied enough after a problem situation so that they are retained?
- (2) How does the usability of the product affect customer satisfaction?
- (3) How can we compare different private sectors and public sectors' handling of customer issues?
- (4) How can customer issues be prioritized based on business impact, and how can the business impact be measured?
- (5) What different kinds of automated support can be used to accelerate iRT and hence enhance customer satisfaction?

The topic of resolving customer issues is an utmost important one, as it is very much contemporary and dynamic, and it integrates both theoretical understandings and practical implications. In this doctoral dissertation, I have tried my best to push the existing boundary of knowledge regarding this phenomenon and to create new knowledge, which I hope will contribute to theory, practice, and overall, society. I hope that researchers in the future will address the aforementioned questions to extend our current knowledge even further.

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