



JÖNKÖPING INTERNATIONAL BUSINESS SCHOOL
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Quality Online Banking Services

Bachelor Thesis within Business Administration

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Abstract

Using an already developed model for measuring the quality of online services, the authors of this thesis have developed and later on modified a theoretical model (instrument) for measuring the quality of online banking services in particular. Using quantitative research method including the design and distribution of a questionnaire, empirical data was collected on which statistical analysis has been performed. As a result of the conducted analysis, the initial theoretical model has been modified, so that the final version of the model (instrument) for measuring quality of online banking services includes four quality dimensions (Service Performance, Website Characteristics, Communication and Efficiency) with total of 17 items (questions). Furthermore, based on the modified theoretical model, customer satisfaction with different aspects of the online banking services has been evaluated. Based on the results of the Analysis of the Empirical Data, managerial recommendations are given. Suggestions for further research on quality of online banking services are also offered.

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1 Introduction

This chapter has the aim to inform the reader about the increasing importance of Online Banking Services and their quality. In this chapter the authors discuss the problem, define their purpose and research questions and mention the delimitations of the presented study

1.1 Background

Globalization and deregulations have increased competition in the marketplace, as nowadays it has become much easier for companies to cross borders and compete internationally. The increased competition, on its behalf, has made organizations to constantly try to increase their productivity and decrease their costs. One way for them to achieve that is by investing in information technology (Fredriksson, 2003).

The recent development of information technology has led to major changes in the way services are delivered to the customers. Nowadays, customers are using more and more self-service options, which are more convenient and fast. In addition, the advent and use of the Internet has changed considerably the daily activities of most people, such as shopping and banking. The popularity of banking services delivered over the Internet (online banking services) is increasing in recent years (Fredriksson, 2003). According to the figures presented by the Statistical Central Bureau (SCB) in Sweden (**Appendix I**), during the first quarter of 2005, 51% of the population aged between 16 and 74 has used online banking services.

Online services, including online banking services, are becoming an attractive alternative to visiting service outlets or phoning call centers for increasing number of customers (HR-Focus 2000; Tracking 2001). Some of the reasons for customers to prefer online services (as online banking services) are: convenience (Meuter, Ostrom, Roundtree & Bitner, 2000; Szymanski & Hise, 2000), feeling more in control of the service process (Bateson, 2000; Dabholkar, 1996) and avoiding human contact and saving time (Dabholkar 1996; Meuter et Al., 2000). As far as online services are concerned, it is quite easier for customers to evaluate and compare the benefits of competing services (Santos, 2003). In addition, the switching costs are very low, that is why retaining the customer in the Internet space is of vital importance (Reichheld & Scheffer, 2000). In order for service providers to retain their e-customers, they should have better understanding of how customers perceive and evaluate the quality of the electronically offered services. Businesses that have been experienced and successful in offering e-services are starting to apprehend that besides website presence and low price, the important success or failure factors also include the electronic service quality (Yang, 2001; Zeithaml, 2002). Although the literature on service quality is abundant (Parasuraman, Berry & Zeithaml, 1991; Cronin & Taylor, 1992; Zeithaml, Berry & Parasuraman, 1996; Carman, 1990), very little research has been conducted on the evaluation of the quality of services delivered over the Internet (Cox & Dale, 2001).

As far as banks in particular are concerned, during the second half of 1990s, the way of operating in the banking industry has undergone a fundamental change because of the advent of the Internet (Gunasekaran & Love, 1999). Taking into consideration the huge investments banks make in Internet infrastructure, customer satisfaction and retention are

turning into the crucial factors for success in online banking meaning that the generation of positive customer value on the Internet requires the establishment of long-term customer relationships (Bauer, Hammerschmidt & Falk, 2005). In today's oversupplied world, where customers have very high demands, the financial services organizations are trying to become more customer-focused (Gonzales, Quesada, Picado & Eckelman, 2004). In order for the E-banking to be profitable, banks should focus not only on acquiring new customers but also on the retention of existing customers (Reichheld & Schefer, 2000). According to Mols (2000) the introduction of E-banking services may change crucially the way banks build and maintain their customer relationships. The increased use of the Internet in the future will heighten the expectations and perceptions of customers, thus making e-service quality an increasingly important issue. Thus, understanding service quality issues within the new delivery channel becomes crucial.

In addition, delivering high quality services is a way companies manage to improve their customer relationships. Delivering high quality services is a prerequisite for achieving customer satisfaction and only through customer satisfaction can the company gain loyal customers (Grönroos, 2000). Because of the highly undifferentiated products and services that financial organizations, and specifically banks, offer, service quality becomes main tool for competing in this marketplace (Stafford, 1996; Kim, Han, Choi & Kim, 1998). In general, because of the higher profits and higher customer retention to which they lead, high-quality services are believed to provide banks with competitive edge in the marketplace (Bennett & Higgins, 1988).

From the mentioned above, it becomes obvious that high service quality is essential for surviving in the highly competitive banking environment (Wang, Lo & Hui, 2003). This leads to the fact, that a good understanding of the attributes that customers use to judge service quality is necessary in order for the company to be able to monitor and enhance its service performance and improve its overall service quality.

A lot of research has been conducted about key service quality dimensions and customer requirements in the traditional banking environment, where personal interaction between the customers and the bank employees takes place (Cowling & Newman, 1995; Johnston, 1995; Bahia & Nantel, 2000; Oppewal & Vriens, 2000). However, the service quality attributes and customer requirements involved in Internet banking, where the interaction between the customers and the bank is impersonal, have not been studied enough, which can be implied by the fact that there has not been available a precise measurement instrument for online services quality (Cox & Dale, 2001). Thus, it is really important for Internet banking providers to learn more about their customers' perceptions of the online banking services quality and the attributes, the customers find essential for a quality financial service delivery on the Internet. Customers have some expectations and criteria when they judge whether the provided E-banking service is satisfactory or not. This is what banks, which provide E-banking services should try to find out, so that they can improve their online services and gain competitive advantage in the banking industry.

In addition, as the service delivery process on the Internet differs significantly from that in the traditional brick-and-mortar banks' environment mainly because of the lack of direct contact between the employees and the customers in the Internet space, the attributes for defining a high quality service delivery are expected to differ in the two contexts.

1.2 Problem Discussion

When judging the quality of the provided E-banking services, customers consider a lot of factors which influence their judgment. For some customers the response and efficiency of the service providers would be of greatest importance, for others the security and privacy issues might be more important, and still for others what matters most may be the website design and ease of use. In reality, customers have different expectations and requirements. They deem different aspects of the service delivery process for essential in order for them to be satisfied with the service. Nevertheless, there should be some common requirements among users of online banking services, some overall valid expectations, which are of interest in this study.

As the service delivery process on the Internet differs significantly from that in the traditional brick-and-mortar banks' environment mainly because of the lack of direct contact between the employees and the customers, the attributes for defining a high-quality service delivery are expected to differ in the two contexts. According to Li, Tan and Xie (2002), because of the existing difference between online and traditional services, there exists real challenges in measuring the quality of online services. Although there is a lot of research, made on evaluation of traditional banking services quality (Cowling & Newman, 1995; Johnston, 1995; Bahia & Nantel, 2000; Oppewal & Vriens, 2000), the research on online services quality, in this respect also online banking services quality, is in its infancy (Santos, 2003). As the use of online banking steadily increases over the years (Fredriksson, 2003), knowledge about defining high-quality service delivery over the Internet becomes crucial for banks, which want to stay competitive on the marketplace. If banks have knowledge about the quality attributes they can use to measure the quality of their online services and the overall satisfaction of their customers with each of these attributes, it would be much easier for them to take necessary measures and steps to improve the overall service quality.

For example, if the efficiency of the service provider is deemed very important for the quality of the delivered online services and customers turn out to be unsatisfied with this aspect of the service delivery, it means that banks and their managers should consider that issue carefully and try to improve it. Additionally, this knowledge will also help banks allocate their resources in a way that maximum service quality improvement is achieved. This will eventually lead to gaining competitive advantage, which will help them retain their customers and increase their profitability (Bennett & Higgins, 1988).

Finally, looking at the Swedish context in particular, the issue mentioned above seems to be very important and relevant as according to a report of the Swedish Bankers' Association, by the end of 2004, more than 5.3 million banks' customers of a total population of 9 million in the country have been using online banking services. Some surveys have also shown that between 40 and 45 percent of the total population of Sweden communicate with their banks through the Internet (Swedish Bankers' Association, 2005). Furthermore, according to the Statistical Central Bureau (SCB) in Sweden (**Appendix I**), during the first quarter of 2005 48% of the people aged between 16 and 24 and 74% of those aged between 24 and 34 have used online banking services. Taking these facts into consideration, looking at the problem of how to measure the quality of online banking services and customers' perception of their quality seems quite appropriate and reliable to be conducted in Sweden, as Swedish people show high rate of usage of this kind of services and therefore are expected to have sufficient experience in using them. Finally, although older people might be expected to use online banking services more intensively, it would be interesting to consider the younger clients of the banks (those aged below 34) as they are

the ones who are going to use the banks' services for longer time in the future and they should be attracted to stay customers of the bank they use and not switch to another one.

1.3 Purpose

The purpose of this study is:

to provide insight into how customers perceive the quality of online banking services and to develop an instrument consisting of different service quality dimensions that can be used to measure the quality of such services

1.4 Research Questions

To be able to accomplish the purpose stated above, the research questions of this study are defined as follows:

1. Which service quality dimensions should banks consider when evaluating the quality of their online banking services?
2. How these service quality dimensions of online banking services can be used to measure the quality of online banking services?
3. How do customers perceive the quality of different aspects of the online banking services they use?

1.5 Delimitations

This study is delimited to gathering empirical data through a questionnaire from a sample of the population in the University area and other random areas in Jönköping, aged below 34, who are using online banking services. In addition, choosing only 200 people aged below 34 may to some extent delimit the generalization of the results and bias the results towards the experiences of only people pertaining to the above-mentioned age range. Despite that the authors believe that the selected age range is a good representative sample of the users of online banking services as according to the Statistical Central Bureau (SCB) in Sweden (**Appendix I**), during the first quarter of 2005 48% of the people aged between 16 and 24 and 74% of those aged between 24 and 34 have used online banking services.

Furthermore, the authors of the thesis decided to focus the study on people aged below 34, but banks may not be interested that much in people from this age range, but more on older people who are probably more expected to take higher loans, trade stocks etc. Despite that the authors assume, that banks should not disregard their younger clients aged below 34. Actually they should consider very carefully the satisfaction level of these customers as they are the ones who are going to use the banks' services for longer time in the future. That is why they should be attracted to stay customers of the bank they use and not switch to another one.

Another delimitation of the underlying study is that the questionnaire used includes only 20 questions and some of the quality dimensions are described with only two questions each. The questionnaire was developed shorter on purpose because of the time constraints and the conditions under which the study was conducted. The authors are aware that all this might have effect on the collected data and the analysis done on each of the dimensions later on as the more elaborately the dimensions are described, the better it would have been for the reliability of the study.

Finally, the authors of the thesis decided to exclude the questionnaires including non-Swedish banks as the underlying study is applied to the Swedish context, which means that only the responses from people using Swedish banks were included into the analysis.

1.6 Definitions

The authors will present a short description of the following terms which appear a lot throughout the thesis so that the reader has clear understanding of their meaning and can follow more easily the contents of the thesis.

- **Online Banking Services (E-banking Services)**

Banking services delivered over the Internet. These include opening/closing of account, domestic/foreign money transfer, standing orders, direct debit, debit card application, loan application, credit card application, insurance investment, mutual funds investment, foreign/domestic equity investment, deposit account opening, life insurance contract, traffic insurance contract and etc (Centeno, 2003).

- **E-Service Quality**

“Consumers’ overall evaluation and judgment of the excellence and quality of e-service offerings in the virtual marketplace” (Santos, 2003, p. 235)

- **SERVQUAL**

A 22-item instrument for measuring customers’ expectations and perceptions from a service along five quality dimensions: tangibles, reliability, responsiveness, assurance and empathy. (Parasuraman et. Al., 1991)

- **E-SQ (E-S-Qual and E-RecS-Qual) Instrument**

An instrument similar to the SERVQUAL scale, developed specifically for measuring online services (e-services) quality. It includes two scales: the *E-S-QUAL* scale consists of 4 dimensions with 22 attributes, including efficiency, fulfillment, system availability and privacy and the *E-RecS-QUAL* scale which consists of 3 dimensions with 11 attributes, including responsiveness, compensation and contact (Parasuraman, Zeithaml & Malhotra, 2005).

Furthermore, the following terms will be used interchangeably along the thesis as they are used to represent the same things:

- **E-services and Online services**
- **E-services quality and Online services quality**
- **Model and Instrument**
- **Items and Questions and Variables**
- **Factor and (quality) Dimension**

1.7 Disposition of the Thesis

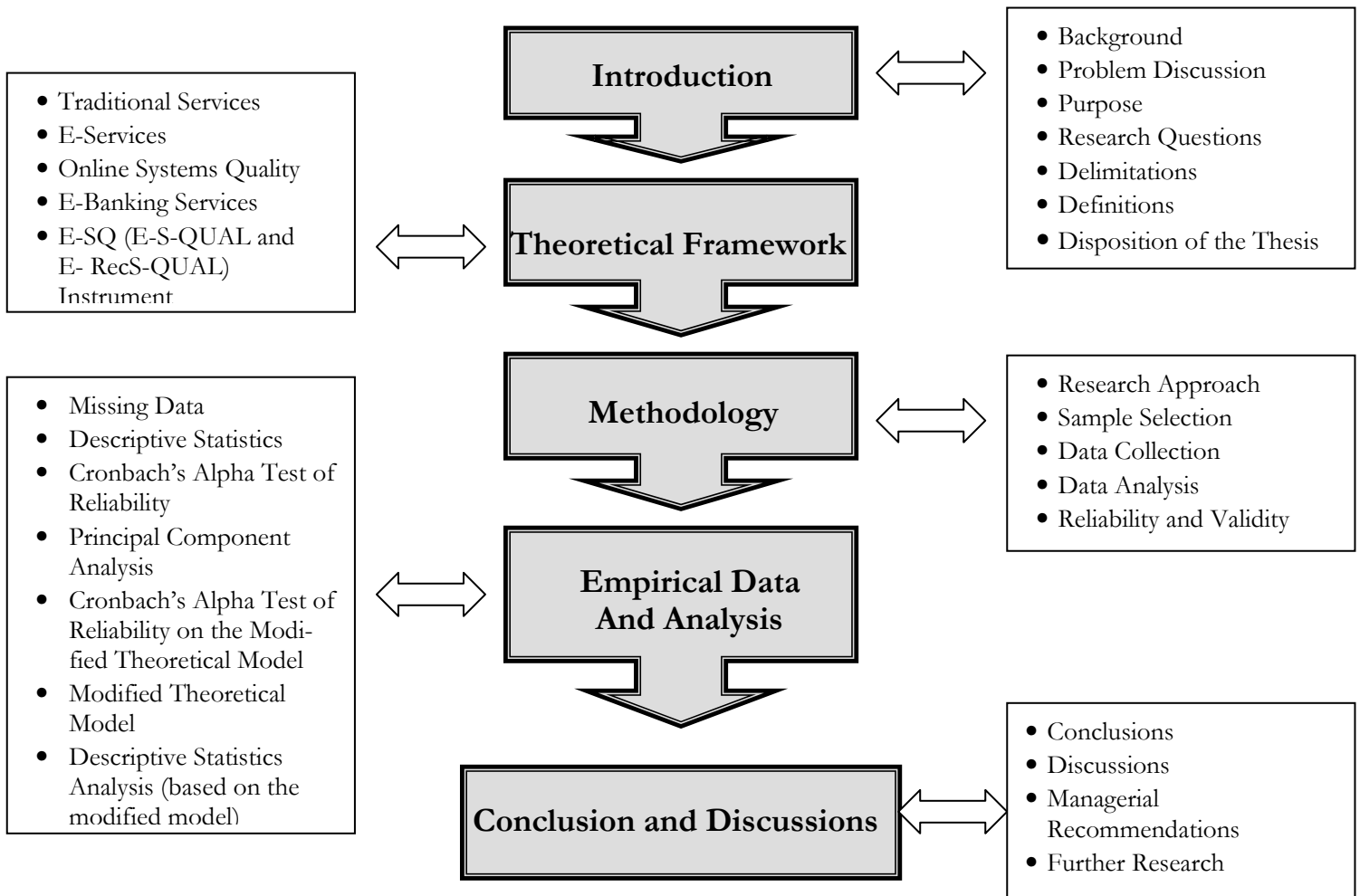


Figure 1.1 Outline of the Thesis (Disposition Model according to JIBS writer, 2006).

2 Theoretical Framework

*The second chapter includes the Theoretical Framework of the study, including basic knowledge in services, service quality, e-services, e-service quality, E-Banking services and online systems quality. Furthermore, the authors present to the reader two models, namely the **SERVQUAL** and **E-SQ (E-S-QUAL and E-RecS-QUAL)** models, on the basis of which the study will be further developed.*

2.1 Traditional Services

2.1.1 Definition and Characteristics of Services

The importance of the service sector in recent years is reflected in the increased part of services of the national economies. There is a dramatic shift toward services in the world economy and the number and diversity of service providers increases constantly. In this competitive environment, the service companies have to be faster, leaner, work more efficiently and provide better service quality in order to stay competitive.

In the 1960s, 70s and 80s a range of definitions of services was suggested. In 1990 the following definition was proposed:

“A service is a process consisting of a series of more or less intangible activities that normally, but not necessarily always, take place in interactions between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems”

(Grönroos, 2000, p. 46)

Services have many characteristics that distinguish them from physical goods. As stated by Grönroos (2000, p. 47) some of the main differences between services and physical goods are that services are processes; they are intangible and heterogeneous; they cannot be kept in stock and there is no transfer of ownership; production, distribution and consumption are simultaneous processes in the service context; the core value is produced in buyer-seller interactions and most importantly in service contexts customers participate in the production process. This last characteristic of services that customers participate in the production process is of utmost importance when the issue of service quality is discussed. The reason is that because of the participation of customers in the production of the service, the quality of the service is directly perceived by the customer in the time of production. That is why service quality can be defined as the *quality as it is perceived by customers* (Grönroos, 2000, p. 63) and therefore the measurement of service quality has been a real challenge for service providers.

2.1.2 Traditional Services Quality

During the past two decades many researchers have made investigation about service quality and its importance for the differentiation of the service and for gaining competitive advantage has been recognized (Zeithaml et Al., 1996; Ennew, Reed & Binks, 1993). “*Early scholarly writing on service quality suggested that service quality stems from a comparison of what customers feel a company should offer (their expectations) with the company’s actual service performance*” (Zeithaml et. al., 2000, p. 5). One of the first researchers to suggest that the concept of service quality was strongly related to trust and perceptions was Gummesson (1979). Later, Grönroos

introduced the notion of “Total Perceived Service Quality” which defines how a customer perceives the difference between the expected service and the experienced service.

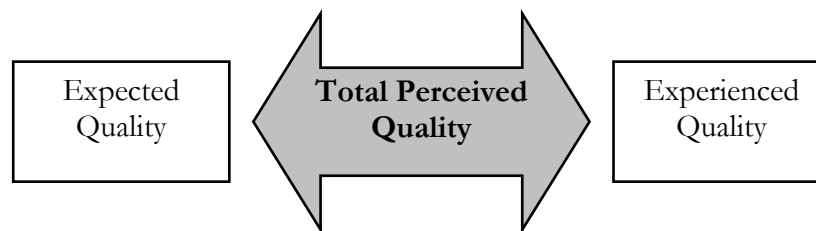


Figure 2.1 Total Perceived Quality.

Source: Adapted from Grönroos C. (2000), “Service Management and Marketing: A customer Relationship Management Approach”, p. 67.

According to all these early findings, service quality was accepted as a measure of how well the customer expectations were met by the delivered service. Parasuraman, Zeithaml and Berry (1988, p. 15) defined service quality as “*the overall evaluation of a service firm that results from comparing that firm’s performance with the customer’s general expectations of how firms in that industry should perform*”.

Many researchers have tried to define the dimensions of service quality. There are two main used methods to define the dimensions of service quality (Santos, 2003). According to the first method, service quality is defined in terms of functional quality (“*how*” the service is delivered = process) and technical quality (“*what*” service is delivered = outcome) (Grönroos, 2000). The second method tries to define service quality with the help of specific characteristics of a given service. For example, Parasuraman et Al. (1988) describe service quality in five to ten dimensions (responsiveness, reliability, assurance, tangibles and empathy). These five dimensions for defining service quality constitute the SERVQUAL instrument developed by Parasuraman et Al. This instrument has been developed to measure service quality based on the difference of customers’ expectations and perceptions for a given service (the so called disconfirmation method). It has been very popular and widely used in the field of Service Marketing and Management.

The idea of measuring service quality by comparing customers’ expectations and perceptions of a given service has been criticized in recent years. Opponents of this approach argue that measuring only customers’ perceptions is more reliable. Some of the opponents are Cronin and Taylor, who developed the SERVPERF instrument in 1992. This instrument is similar to the SERVQUAL instrument, but it measures service quality only on the basis of customers’ perceptions of a given service. Other opponents to the disconfirmation method are Dabholkar, Shepherd and Thorpe (2000) who have found that measuring only the perception of customers can better evaluate their intention and evaluation. Furthermore, Dabholkar et Al. (2000) state that in this way, detailed service quality studies can be performed with the use of more efficient, simpler and cross-sectional designs. All the above findings have led to defining service quality as an overall evaluation of service performance.

Looking at both ways of defining service quality, based on expectation and perceptions, it becomes obvious that service quality is a multi-dimensional concept, which means different things to different people (Brady & Cronin, 2001).

2.1.3 SERVQUAL

SERVQUAL is an instrument for measuring how customers perceive the quality of a service (Grönroos, 2000). In the mid-1980s Berry and his colleagues Parasuraman and Zeithaml began to investigate what determines service quality and how it is evaluated by customers (Grönroos, 2000). As a result of their study they developed the SERVQUAL instrument for measuring service quality, which initially included 10 service quality dimensions, which were later reduced to the following five: tangibles, reliability, responsiveness, assurance and empathy. The following **Table 2.1** describes the initial 10 elements of the SERVQUAL instrument.

Table 2.1 Dimensions of perceived service quality (SERVQUAL instrument)

Service Quality Dimension	Definition
Reliability	Involves consistency of performance and dependability
Responsiveness	Willingness or readiness of employees to provide service (timeliness of service, giving prompt service)
Competence	Possession of the required skills and knowledge to perform the service
Access	Approachability and ease of contact
Courtesy	Politeness, respect, consideration and friendliness of contact personnel
Communication	Keeping customers informed in language they can understand and listening to them
Credibility	Trustworthiness, believability, honesty, and having the customers' best interests at heart
Security	Freedom from danger, risk and doubt
Understanding/Knowing the customer	Making the effort to understand the customer's needs
Tangibles	Physical evidence of the service

Source: Grönroos, "Service Management and Marketing: A customer Relationship Management Approach", 2000, p.75

Table 2.2 presents the final five service quality dimensions which came as a result of the reduction of the initial ten dimensions.

Table 2.2 Dimensions of perceived service quality (SERVQUAL instrument revised)

Service Quality Dimension	Definition
Tangibles	The appeal of facilities, equipment, material and employees which the service firm uses to deliver its services to the customer
Reliability	Consistency of performance and dependability
Responsiveness	Willingness or readiness of employees to provide service
Assurance	The knowledge and courtesy of employees and their ability to convey trust and confidence
Empathy	The providing of caring, individualized attention to customers

Source: Grönroos, “Service Management and Marketing: A customer Relationship Management Approach”, 2000, p.74

The instrument is based on the idea of the disconfirmation model, in other words on the comparison of customers’ expectations with their experiences from the service. Usually, the five dimensions of the instrument are described through the use of 22 attributes and “respondents are asked to state (on a seven-point scale from “Strongly disagree” to “Strongly agree”) what they expected from the service and how they perceived the service” (Grönroos, 2000, p.76).

Very satisfied	Furthermore, the reasoning of the SERVQUAL instrument is based on the concept “ Zone of Tolerance ”, suggested by Berry and his colleagues. This concept assumes that customers do not have expectations for a service attribute on one given level, but rather can accept a range in the real experience and still regard the service as satisfactory. The borders of the customer’s “ Zone of tolerance ” are formed by a Desired Level – the level on which the customers believe the service <i>should be</i> , and an Adequate Level – the minimum level of service that customers are willing to accept. Customers consider the service performance which falls within the borders of this “ Zone of Tolerance ” to be good (Grönroos, 2000).
Desired Level	
Zone of Tolerance	
Adequate Level	
Dissatisfied	

This instrument has been widely used by researchers, but still, there are some controversies in its applicability across different service industries. In some studies the five dimensions of the instrument (determinants) have been found to be unstable across different types of services. Therefore, the SERVQUAL tool should be applied very carefully and the set of determinants and attributes used should be adapted to the specific situation (Grönroos, 2000).

2.1.4 Studies on Traditional Banking Services Quality

Researchers have used the SERVQUAL scale to measure the quality of various services, including bank services (Cowling & Newman, 1995). According to the study conducted by Cowling and Newman in 1995 concerning the SERVQUAL scale, one bank found out that the highest disparity between the expectations and perceptions of customers was found to exist for reliability, responsiveness, and empathy, and the lowest for tangibles. Also, concerning the banking industry, by using the critical incident technique, Johnston (1995) examined the service quality perceptions of the customers. He found out 18 service quality attributes: access, aesthetics, attentiveness/helpfulness, availability, care, cleanliness/

tidiness, comfort, commitment, communication, competence, courtesy, flexibility, friendliness, functionality, integrity, reliability, responsiveness and security.

Furthermore, an alternative measure of service quality in retail banking that comprises 31 items with six underlying key dimensions was proposed by Bahia and Nantel (2000). These six dimensions are: effectiveness and assurance, access, price, tangibles, service portfolio and reliability.

In addition, by using conjoint experiments to measure the service quality of retail banks, Oppewal and Vriens (2000) proposed the use of 28 attributes including four service quality dimensions to evaluate service quality. These four dimensions are: accessibility, competence, accuracy and friendliness, and tangibles. Of those four dimensions, the most important in determining banking preference turned out to be the accuracy and friendliness, followed by competence, tangibles and accessibility.

2.2 E-Services

2.2.1 Definition and Characteristics of E-services

E-services are services delivered over the Internet. The fact that the services are delivered over the Internet pose some challenges to the service providers. First of all, the direct contact between service employees and customers is missing and secondly the service delivery setting is completely changed. In the case of e-services, websites become the “*moment of truth*” between customers and the company (Iwwarden, Wiele, Ball & Millen, 2003). As a result the websites (user-interface) determine to high extent *how* the service is delivered to the customers. Customers evaluate both *what* the company offers and *how* it offers it. Because of the lack of face-to-face interaction with service representatives, the user interface (site design) is what customers of e-services interact with, and as such it can be expected to influence their evaluation of the overall service quality. That is why it is advisable that companies consider very well the design and function of their websites as well, because customers might get frustrated and eventually be discouraged of visiting the website if it cannot be accessed easily or the work with it is very slow. Additionally, the information content of the website is considered to be important for online evaluations (Grönroos, 2000).

2.2.2 E-services Quality

E-service quality is defined as overall customer assessment and judgment of e-service delivery in the virtual marketplace (Santos, 2003). Businesses that have been experienced and successful in offering e-services are starting to apprehend that besides website presence and low price, the important success or failure factors also include the electronic service quality (Yang, 2001; Zeithaml, 2002). One of the reasons for the increase importance of e-services quality is that over the Internet, it is much easier for customers to compare different service offerings than through traditional channels (Santos, 2003). Thus, customers of online services expect equal or higher levels of service quality than the customers of traditional services (Santos, 2003).

The importance of delivering high quality e-services has been recognized by many companies, but still there is the problem of how the quality of online services is defined, which its determinants are and how it can be actually measured. There exist many models and methods for measuring the quality of traditional services (Cowling & Newman, 1995; Johnston, 1995; Bahia & Nantel, 2000; Oppewal & Vriens, 2000), but there is not that

much research made on the quality of services delivered over the Internet (Cox & Dale, 2001). Recently, there have been two approaches to studying e-services that can be distinguished. The first approach suggests the study of e-service quality on the basis of already existing service quality theory (Grönroos, 2000; Zeithaml et Al., 2000). The other approach suggests the study of e-service quality through empirical research and the development of new categories of e-services (Szymanski & Hise, 2000).

For example, according to Van Riel, Liljander and Jurriens (2001) some researchers have tested the SERVQUAL instrument on different e-services as web-based service, internet retail and electronic banking. Despite that, there are still some doubts among researchers whether the SERVQUAL instrument can be applied for measuring the quality of online services. Parasuraman and Grewal (2000, p. 171) propose that research is needed on whether *“the definitions and relative importance of the five service quality dimensions change when customers interact with technology rather than with service personnel”*. Because the SERVQUAL tool dimensions and attributes were developed for traditional services where direct contact between the employees and the customers occur, many researchers believe that the items of the instrument and their content would need to be refined before they can be meaningfully applied in the online service context. According to Zeithaml et Al. (2000) additional dimensions may also be needed in order for the full construct of e-service quality to be captured.

Yang (2001) proposed in his research the use of seven online service quality dimensions which align with those of the SERVQUAL scale. These dimensions include reliability, responsiveness, access, ease of use, attentiveness, credibility and security. Besides the application of already existing models on the e-service quality measurement, some researchers have recently proposed new quality dimensions, specific for the online services.

For example, in a recent study on the quality of online services of 23 travel agencies, Kaynama and Black (2000) have used seven quality dimensions derived from SERVQUAL: responsiveness, content and purpose (derived from reliability), accessibility, navigation, design and presentation (all derived from tangibles), background (assurance), and personalization and customization (derived from empathy).

Furthermore, Zeithaml et Al. (2000) made research with focus groups consisting of people with experience in online shopping. As a result of the study they defined eleven e-quality dimensions (the so-called E-SQ instrument): reliability, responsiveness, access, and flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics and customization/personalization. Later in 2002, Zeithaml et Al. revised the E-SQ model and decreased the online service quality dimensions to seven. These dimensions are as follows: efficiency, fulfillment, system availability, privacy, responsiveness, compensation and contact (Parasuraman et Al., 2005).

Based on the SERVQUAL scale, Barnes and Vidgen (2001) have developed the WebQual Index with 24 measurement items, which is specifically established for online service quality measurement. The Index includes the following seven online service quality dimensions: reliability, competence, responsiveness, access, credibility, communication and understanding the individual. Similarly, Madu and Madu (2002) made a literature review, on the basis of which they proposed 15 dimensions of online service quality: performance, features, structure, aesthetics, reliability, storage capacity, serviceability, security and system integrity, trust, responsiveness, product differentiation and customization, Web store policies, reputation, assurance and empathy.

2.3 Online Systems Quality

2.3.1 Definition and Importance in Relation to the Study of E-service Quality

Discussing online services, we cannot measure their quality, simply from researching the online service quality dimensions. The reason for that is that online services are quite different from the traditional services, where an interpersonal service encounter takes place. In an interpersonal service encounter, where customers have direct contact with service personnel, the way service personnel behaves, talks, smiles and etc. will influence to a high extent the satisfaction of the customers with the service delivered. In the virtual space customers communicate with the company through an information system. By using the Internet as a service delivery channel, companies should be aware of the fact that some aspects of the human interaction of traditional service settings cannot be replaced by technology (Cox & Dale, 2001). Such aspects, according to Cox and Dale (2001) are for example courtesy, friendliness, helpfulness, care, commitment, flexibility and cleanliness. The absence of these aspects of human interaction through which quality can be delivered to customers will have to be compensated by other quality factors, for example different features of the company's website, through which the online services are delivered. That is why a literature review on the online systems quality is necessary for the purpose of this study.

2.3.2 Studies on Online Systems Quality

There is much research done on the quality of online information systems and websites in particular. Doll and Torkzadeh (1988) suggested five quality dimensions that influence customer satisfaction with the Website of a given company. These dimensions are: content, accuracy, format, ease of use and timeliness. In recent years, many studies have been conducted on the success features of websites. According to a study done by D'Angelo and Little in 1998, when designing a website the following factors should be considered: navigational characteristics, visual characteristics, and practical consideration including images, background, color, sound, video, media and content. Other researchers, Liu and Arnett (2000) propose that major determinants of a website success are the following factors: system use, system design quality, information quality and playfulness.

Studying websites' quality, Cox and Dale (2001) have found out and proved four quality factors of a website: ease of use (the design of the Web site), customer confidence (how the website generates customer trust), online resources (capabilities of the website to offer products/services) and relationship services (how the website bonds with the customer and inspires loyalty) (from Yang, Jun & Peterson, 2004). According to Abels, White and Hahn (1999) user criteria for a good website design include use, content, structure, linkage, search and appearance. Later, using the finding from Abels et Al. (1999), Santos (2003) has discovered five dimensions of online systems quality: ease of use, appearance, linkage, structure and layout, and content.

The features that a website should possess in order to be successful and contribute to the service quality depend to a high extent on the type of service provided. For example, the features of a website for purchasing music and books are expected to differ from those of a bank's website. As far as Internet banking websites are concerned, Jayawardhena and Foley (2000) proposed website features critical to enhance customer satisfaction: the speed to download, content, design, interactivity, navigation and security. Furthermore, Waite and Harrison (2002) have found seven dimensions that influence customer satisfaction with

banks' websites: transaction technicalities, decision making convenience, interactive interrogation, specialty information, search efficiency, physical back-up and technology thrill.

For summary of conducted research on online systems quality please refer to **Appendix II**.

2.4 E-Banking Services

2.4.1 Definition and Types of E-Banking Services

E-Banking services are banking services delivered over the Internet. The services provided by banks over the Internet which once included only checking of accounts, have recently evolved to include a full range of banking services. It is not rare the case nowadays, when nearly all services accessible at the branch or by phone can be accessed on the Internet as well. The development of technology allows banks to offer not only "branch-based" services over the Internet, but also new added-value services which are available only online such as electronic commerce, real-time brokerage, financial information menus, e-mail alerts and third party services (tax payment, portals or management of electricity bills) (Centeno, 2003). **Figure 2.2** below shows a possible classification of Internet banking services (Centeno, 2003).

Figure 2: Classification of Internet banking services

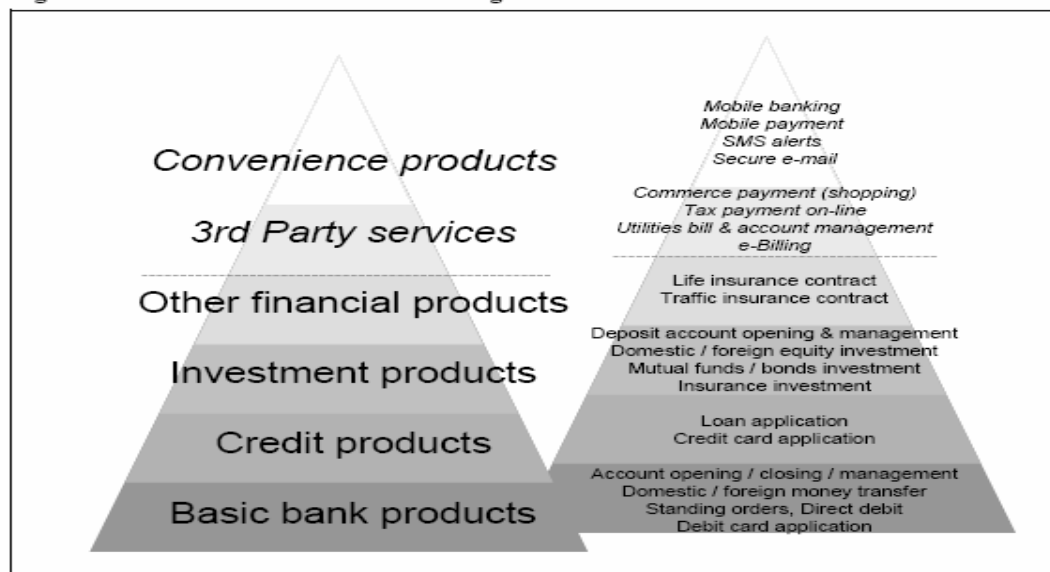


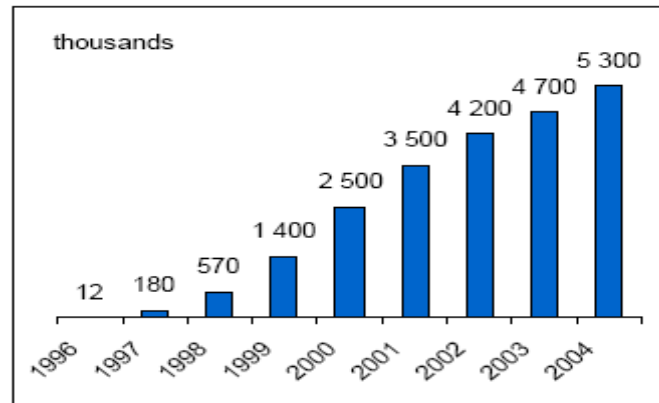
Figure 2.2 Classification of Internet Banking Services.

Source: Centeno, C., "Adoption of Internet Services in the Enlarged European Union: Lessons from the Internet Banking case", *European Commission Joint Research Centre*, Report EUR 20822 EN, June 2003.

The number of people using online banking services is steadily increasing. In the mid-2001, Sweden had the highest E-banking adoption rate. At that time 54% of all Internet users used E-banking services (Fredriksson, 2003) According to a report of the Swedish Bankers' Association, by the end of 2004, more than 5.3 million banks' customers of a total population of 9 million in the country have been using online banking services. Some surveys have also shown that between 40 and 45 percent of the total population of Sweden communicate with their banks through the Internet (Swedish Bankers' Association, 2005).

Figure 2.3 below, presented in a report of the Swedish Bankers' Association from September, 2005 clearly shows the steady increase in E-banking services users from 1996 to 2004.

No. of private internet customers of Swedish banks at the end of each year



Source: Swedish Bankers' Association

Figure 2.3 Number of people (in thousands) in Sweden who have used Internet banking in each given year (Swedish Bankers' Association, 2005).

This is an evidence of the evolution of E-banking services in Sweden. The increased use of online banking services has many advantages for both customers and banks. For customers, E-banking services allow them to have better overview of their banking business and help them to manage their banking transactions more conveniently and fast. Additionally, customers who use Internet banking prove to be involved in more banking transactions, which is beneficial for the banks themselves. Moreover, through the Internet, the bank productivity increases as well, as the distribution and production of their services become more efficient (Swedish Bankers' Association, 2005).

As a whole, customers' motivation to use E-banking services comes from a number of factors: freedom of time and space, speed, convenience, 24 hours a day availability and price incentives (Mattila, Karjaluoto & Pentto, 2002). Despite all the advantages the Internet offers to both banks and their customers in terms of increased productivity and reduced costs, it also hides a lot of disadvantages and challenges for the service providers. On the Internet, the comparison between different service offerings is much easier and switching costs are lower, which makes it easier for customers to change service providers (Santos, 2003). This, on its behalf, posts a challenge for the banks to not only acquire new customers, but retain their existing ones as well. To retain its customers, banks should try to make them satisfied with their services and offerings and this can be achieved through delivering high quality services. Delivering high quality online services requires understanding of the online service quality dimensions considered crucial and trying to improve the quality of the services provided over the Internet, so that a competitive advantage is gained.

2.4.2 Studies on E-banking Service Quality

The increased importance of information and communication technology for the delivery of financial services has led to the growing interest of researchers and managers in E-banking quality issues (Jayawardhena, 2004). Different studies consider particular service quality dimensions of simple banking websites.

For example, Jun and Cai (2001), by using the critical incidents method in online banking, distinguish three central quality categories, namely the customer service quality, online systems quality and banking service products quality. Other researchers, Broderick and Vachrapompuk (2002) tracked the usage pattern of members of an internet banking community. They found out that what influenced the service evaluation most were cues in the service setting, key events in the service encounters and the level and nature of customer participation. Unfortunately, they were not able to deduct from their research a precise and testable measurement of E-banking service quality.

Jayawardhena (2004) did a research on the service quality in E-banking by using an adopted version of the SERVQUAL instrument for the Internet context. The study resulted in 21 items which were reduced to five quality dimensions: access, website interface, trust, attention and credibility. Conclusively, it should be said that some research has been done to identify service quality dimensions in E-banking, but so far no model has been developed, that can be universally used and applied as far as E-banking services quality is concerned. More research in the field is necessary, in order for this to be done.

2.5 E-SQ (E-S-QUAL and E-RecS-QUAL) Instrument for Measuring Online Services Quality

E-SQ Instrument is an instrument similar to the SERVQUAL scale, developed specifically for measuring online services (e-services) quality. The model has been developed in 2000 and tested and revised in 2002 by Parasuraman, Zeithaml and Malhotra who made an exploratory study on quality perceptions of customers as far as online shopping is concerned. The development of this instrument went through three stages. During the *first stage* the researchers used qualitative study with six focus groups with six to seven participants in each group (Zeithaml et Al., 2000). Furthermore, they claim that

“the responses of focus-group participants to e-service quality (e-SQ) dimensions were remarkably consistent across the groups, experience levels, and e-service businesses discussed. The focus groups revealed that consumers use basically similar dimensions in evaluating e-SQ regardless of the type of product or service being evaluated on the Internet” (Zeithaml et Al., 2000, p.15).

The dimensions for measuring e-service quality, found out at that stage were eleven: **reliability, responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics and customization /personalization.** Table 2.3 below contains description of each of the above-mentioned dimensions of e-service quality.

Table 2.3 Dimensions of perceived e-SQ

E-Service Quality Dimension	Description
Reliability	Involves the correct technical functioning of the site and the accuracy of service promises (delivering when promised) and product information
Responsiveness	Quick response and the ability to get help if there is a problem or question
Access	The ability to get on the site quickly and to reach the company when needed
Flexibility	Choice of ways to pay, ship, buy, search for and return items

Ease of Navigation	The site contains functions that help customers find what they need without difficulty, possesses a good search engine, and allows the customer to maneuver easily and quickly back and forth through the pages
Efficiency	The site is simple to use, structured properly, requires minimum of information to be input by the customer
Assurance/Trust	The confidence the customer feels in dealing with the site and is due to the reputation of the site and the products or services it sells as well as clear and truthful information presented
Security/Privacy	The degree to which the customer believes the site is safe from intrusion and personal information is protected
Price Knowledge	The extent to which the customer can determine shipping price, total price and comparative prices during the shopping process
Site Aesthetics	The appearance of the site
Customization/Personalization	How much and how easily the site can be tailored to individual customers' preferences, histories and ways of shopping

Source: V. Zeithaml, A. Parasuraman and A. Malhotra, "A conceptual framework for understanding e-service quality: implications for future research and managerial practice", *Marketing Science Institution*, report No. 00-115, 2000, p. 16.

The above described model resembles a lot the SERVQUAL instrument (Parasuraman, Berry & Zeithaml, 1991), but it also includes few new dimensions specific for the online space.

First of all, the quality dimensions of reliability, responsiveness, access, assurance and customization/personalization are also key quality dimensions of the SERVQUAL instrument for traditional service settings. These five dimensions have the same perceptual attributes as those in traditional service quality evaluations, besides the access and reliability dimensions. These two dimensions have some attributes which deal with online-specific issues as well (Zeithaml et Al., 2000)

Secondly, several of the quality dimensions of perceived e-SQ are new and most of them are related to technology: ease of navigation, flexibility, efficiency, site aesthetics and price knowledge (Zeithaml et Al., 2000). The dimensions ease of navigation, efficiency and site aesthetics have been proved to be important for evaluating online systems quality (website quality in particular) by many researchers as shown by the authors of the thesis in the part dealing with online services quality (Doll & Torkzadeh, 1988; Abels et Al., 1999; Jayawardhena & Foley, 2000; Liu & Arnett, 2000; Santos, 2003). One of the new dimensions that do not involve technology is *price knowledge*, which is probably specific for the case of online shopping, investigated in this study (Zeithaml et Al., 2000).

Later, the attributes pertaining to the above-mentioned 11 dimensions of e-service quality found out in the research by Zeithaml, Parasuraman and Malhotra in 2000 were used as the e-service quality (E-SQ) domain from which the researchers drew items for the E-SQ instrument. As a *second stage* in the development of the E-SQ instrument Zeithaml et Al developed a preliminary scale consisting of 121 items which was incorporated into two questionnaire versions. These questionnaires were evaluated with the help of focus groups and as a result a final, revised questionnaire consisting of 113 items was constructed. Then the researchers hired a marketing research firm to distribute the questionnaire to a random sample of Internet users who had sufficient online shopping experience. After the

collection of the survey data, the data was subject to scale-reduction and refinement analyses. As a result of this procedure the initial 11 dimensions from 2000 were reduced to total of 7 dimensions (Parasuraman et Al., 2005).

During the research Parasuraman et Al. observed that there was missing data on some items. After an analysis of these items they concluded that they were all related to service recovery. That is why they separated those items to develop a separate e-service recovery scale (E-RecS-QUAL). The rest of the items formed an e-core service quality scale (E-S-QUAL). The E-S-QUAL scale consists of 4 dimensions with 22 attributes and the E-RecS-QUAL consists of 3 dimensions with 11 attributes. After the development of these scales, they were empirically tested by using questionnaires distributed to sample of users of the most visited at that time web sites in the USA – amazon.com and walmart.com (Parasuraman et Al., 2005).

The E-S-QUAL and E-Recs-QUAL’ dimensions and their description are presented in **Table 2.4** and **Table 2.5** below.

Table 2.4 E-S-QUAL dimensions and their description

E-S-QUAL scale	
Dimension	Description
Efficiency	The ease and speed of accessing and using the website
Fulfillment	The extent to which the site’s promises about order delivery and item availability are fulfilled
System Availability	The correct technical functioning of the site
Privacy	The degree to which the site is safe and protects customer information

Source: Parasuraman, A., Zeithaml, V. and Malhotra A. (2005), “E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality”, p. 220.

Table 2.5 E-RecS-QUAL dimensions and their description

E-RecS-QUAL	
Dimension	Description
Responsiveness	Effective handling of problems and returns through the site
Compensation	The degree to which the site compensates the customers for problems
Contact	The availability of assistance through telephone or online representatives

Source: Parasuraman, A., Zeithaml, V. and Malhotra A. (2005), “E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality”, p. 220.

2.6 Summary of the Theoretical Framework

The Theoretical Framework of the thesis has been developed in a way to introduce the reader in the field of services, introducing first the concepts of services and traditional services in general as well as what kind of research has been done on measuring the quality of traditional services. Furthermore, the concepts and the studies concerning the measurement of the quality of E-services and E-banking services in particular have also been presented in order to give theoretical background and deeper information about the

subject of the underlying study. Presenting theoretical background on both E-services and traditional services has been done with the intention for the reader to understand the importance of measuring service quality, how it has developed in time and how it is changing because of the increased use of online services, where the conditions and characteristics of the service itself change. Finally, the authors have presented to the reader the E-SQ instrument for measuring online services, based on which the rest of the thesis will be developed.

In order to develop an instrument for measuring the quality of online banking services, the authors of the thesis would like to use as a basis the E-SQ (E-S-QUAL and E-Recs-QUAL) instrument created by Zeithaml, Parasuraman and Malhotra in 2002 for measuring quality of online services.

However, the authors of the thesis find the modified E-S-QUAL and E-Recs-QUAL scales not completely covering all the issues for measuring quality of online banking services. That is why a modified version of these scales will be used in the underlying study. In **Table 2.6** below, the authors make comparison (according to the presented above definitions of the different quality dimensions) between the dimensions of the scale from 2000 and those from 2002. The aim of this is to show which dimensions from the research in 2000 are covered in the final version of the scales from 2002 and which are not. Through support from other studies, the authors of the thesis would like to show the importance of some of the dimensions from the research in 2000 which are not present in the scales from 2002. The authors have decided to add some of these dimensions to the dimensions of the E-S-QUAL scale in order for a better picture of the service delivery process to be captured.

Table 2.6 Comparison of E-SQ (2000) versus E-S-QUAL and E-RecS-QUAL (2002) dimensions

E-SQ Instrument dimension	E-S-QUAL and E-RecS-QUAL scales dimensions (2002)
Reliability	Fulfillment, System Availability
Responsiveness	Responsiveness
Access	Efficiency, Contact
Flexibility	
Ease of navigation	Efficiency
Efficiency	Efficiency
Assurance/Trust	
Security/Privacy	Privacy
Price knowledge	
Site aesthetics	
Customization/personalization	
	Compensation

From **Table 2.6** above it can be seen that more than half of the dimensions from 2000 are covered in the modified version of the instrument from 2002. Still, there are some dimensions which have not been included and which the authors of the thesis deem important for the evaluation of the quality of online banking services.

For example, the authors find the issue of assurance and trust (credibility) of high importance as far as financial services are concerned. That is why the assurance/trust dimension is included in the underlying study. Furthermore, many researchers have found assurance (credibility) to be considered as a quality dimension for the evaluation of

e-services quality (Madu & Madu, 2002; Jun, Yang & Kim, 2004; Cox & Dale, 2001; Jayawardhena, 2004; Jun & Cai, 2001).

In addition, the studies on online systems quality (**Appendix II**) and those on online service quality show that site aesthetics (appearance) is considered important for evaluating the quality of a website and the service delivered through that website (Doll & Torkzadeh, 1988; D'Angelo & Little, 1998; Liu & Arnett, 2000; Jayawardhena & Foley, 2000; Jun & Cai, 2001; Yang, 2001; Abels et Al., 1999; and Santos, 2003). For that reason, the authors of the thesis will include the site aesthetics dimension into their study. Both, the assurance/trust and site aesthetics dimensions have been added to the E-S-QUAL scale's dimensions.

Finally, as measurement on the compensation dimension of online services quality requires the customers' experiences of problems with the given service and complaining about that. As this implies difficulty in evaluating this dimension because of the lack of enough people encountering problems (Parasuraman et Al., 2005), the compensation dimension of the E-RecS-QUAL scale has been dropped from this study.

Conclusively, the authors of this thesis have used adapted and slightly modified versions of the E-S-QUAL and E-RecS-QUAL scales developed by Parasuraman et Al. in 2002 in order to help them develop an instrument for measuring the quality of online banking services. The authors have added the assurance/trust and site aesthetics dimensions from the e-SQ instrument from 2000 to the E-S-QUAL scale and they have dropped the compensation dimension from the E-RecS-QUAL scale. All the dimensions included in the underlying study have been described and used based on the researches of Parasuraman, Zeithaml and Malhotra from both, 2000 and 2002. As a result of the slight changes made, the authors constructed the following model for measuring the quality of online banking services.

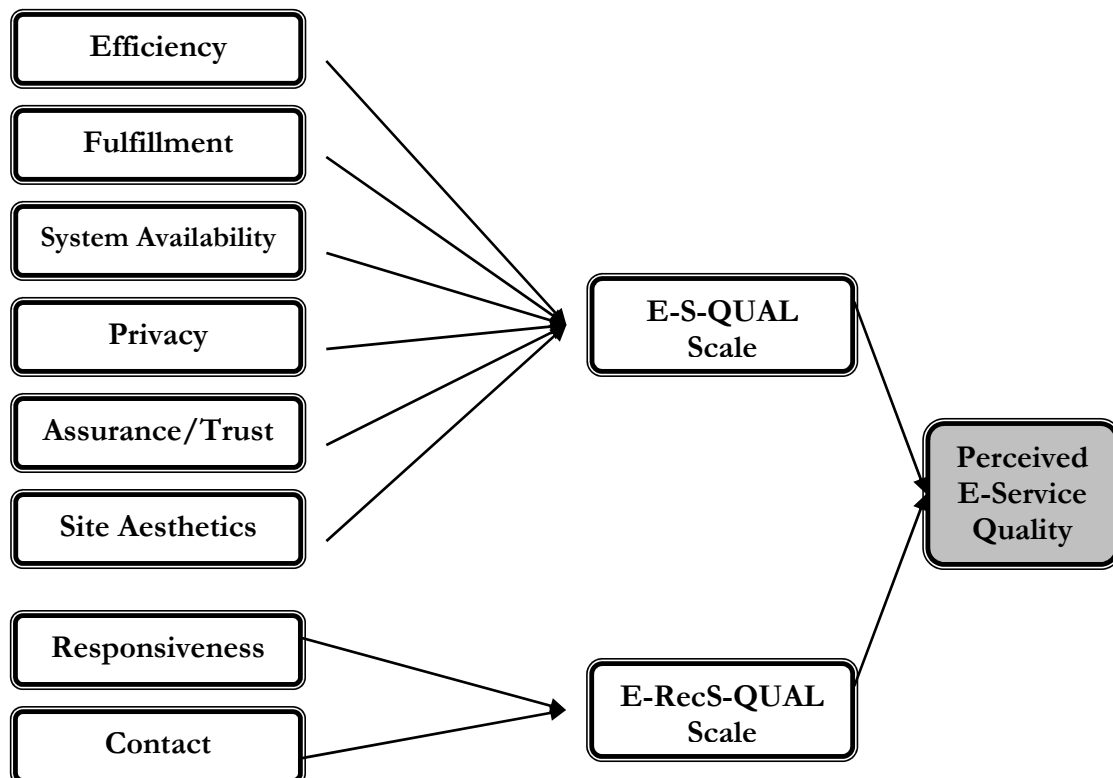


Figure 2.4 Model for measuring the quality of online banking services (adapted from Parasuraman et Al., 2000 and 2002).

3 Methodology

The following chapter on Methodology describes different research methods and gives explanation of the chosen method of this study and the reasons for this choice. Furthermore, this chapter describes the chosen sampling technique, the way the data for the study has been collected and the statistical techniques used to analyze the data. In addition, the issue of the reliability and validity of the presented study is discussed.

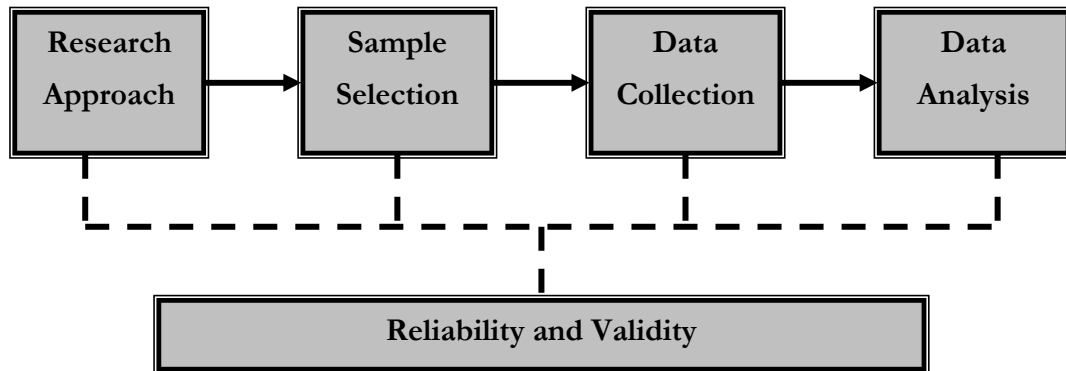


Figure 3.1 Schematic Presentation of the Methodology.
Source: Foster (1998, p. 81), adapted

3.1 Research Approach

For the underlying study the authors of the thesis have chosen quantitative approach for achieving the purpose of the study.

3.1.1 Quantitative and Qualitative Research Methods

The research strategy should be chosen according to the research questions in the particular situation (Yin, 1994). Each strategy has its own advantages and disadvantages, because of its specific approach to collect and analyze empirical data. According to Yin (1994) the type of question posed; the degree of focus on historical or contemporary events and the control over actual behavioral elements should be the main grounds on which the appropriate research method is chosen.

Qualitative research requires strong contact with real situation, which is usually reflecting the everyday life of individuals, societies, groups or organizations (Miles & Huberman, 1994). According to Amaratunga, Baldry, Sarshar & Newton (2002), this type of research has few favourable features: this type of studies allows revealing of what the “*real life*” is by studying events occurring in natural settings; the information gathered through qualitative research is complete and rich and has potential to reveal complexity and finally this type of studies are quite flexible in nature. Furthermore, qualitative approach is found appropriate for discovery, exploring a new area, developing hypotheses and qualitative data are useful when “*one needs to supplement, validate, explain, illuminate or reinterpret quantitative data gathered from the same setting*” (Amaratunga et Al., 2002, p.22).

Quantitative research approach is based on the development of testable hypotheses and theory which can be generalized across settings. Quantitative investigations tend to measure “*how often*” or “*how much*”. This approach allows generalization of conclusions and flexibility in the treatment of data, in terms of comparative analysis, statistical analyses and repeatability of data collection in order to verify reliability (Amaratunga et Al., 2002).

Taking into consideration the description of the quantitative research approach stated above, which is used to measure “*how much*” across settings and allows for statistical analysis on the collected data, the authors of the thesis have chosen this method for the purpose of this thesis. First of all, through the use of quantitative research method, the authors would like to measure “*how much*” customers of online banking services are satisfied with the provided online services. Furthermore, this method will allow statistical analysis of the collected data, on the basis of which an instrument for measuring quality of online banking services will be developed. To collect the quantitative data the survey method has been used and eventually the data has been analyzed by using statistical techniques. The combination of the quantitative method with the survey method is found appropriate from the authors, as a large population has been studied and general conclusions have been drawn for the entire population.

3.2 Sample Selection

According to the figures presented by the Statistical Central Bureau (SCB) in Sweden (**Appendix I**), during the first quarter of 2005 48% of the people aged between 16 and 24 and 74% of the people aged between 25 and 34 have used Internet Banking. Because of the relatively high proportion of the population in the age ranges mentioned above that use Internet Banking services, the authors of the thesis decided to focus the investigation on this section of the population.

As the authors of the thesis have focused the investigation on people aged between 16 and 34, people attending the University area and other random areas in Jönköping were selected as the sampling populations of this study. The University area in Jönköping was selected as there were expected to be found mainly people in the age between 19 and 25. In order for the sample concentration around 21 and 22 to be avoided, the authors of the thesis decided to distribute part of the questionnaires in other random areas in Jönköping where people aged between 25 and 34 were expected to be found. The sample technique used by the authors is random sampling, which means that “*every member of the target population has an equal chance of being selected*” (Oakshott, 1998, p.41). This sampling method was also chosen in order to avoid the occurrence of bias in the chosen sample population.

3.3 Data Collection

For the purpose of the thesis, the authors have decided to collect primary and secondary data. Primary data include data through a survey with customers of online banking services aged below 34. For that purpose a questionnaire has been designed. Secondary data include data from academic literature, books, journals, reports and Internet sources.

Over the years, different methods have been developed on how to measure service quality. Unfortunately, there is still not that much research made in the field of measuring quality of e-services. Nevertheless, there are some attempts made by researchers to develop models for measuring e-service quality. Based on these models they try to evaluate the quality of online services by using the disconfirmation approach stating that quality is perceived

through the comparison between expectations and perceptions of customers for a given service over a number of quality attributes.

Although perceptions-only measures have been shown to demonstrate better predictive validity than perception-expectation measures (Cronin & Taylor, 1992), the perception-expectation measures do seem to yield data about the quality of given service which is richer and more informative (Schneider & White, 2004). Despite its benefits, survey including the measurement of expectations and perceptions individually is too complicated, time-consuming and tedious. Taking into consideration the time- and resource- limits of this study, the authors have decided to measure directly the divergence between customers' expectations and perceptions using only one scale. Using this approach makes the questionnaire much easier to construct, administrate and analyze. In addition, it is thought to be easier for the customers to respond to such questionnaire including only one scale.

When constructing the questionnaire, the authors of the thesis have used a slightly modified version of the E-SQ instrument (E-S-QUAL and E-RecS-QUAL) for measuring e-service quality (E-SQ), developed by Parasuraman et Al. in 2002. The authors have added the assurance/trust and site aesthetics dimensions from the e-SQ instrument from 2000 to the E-S-QUAL scale and they have dropped the compensation dimension from the E-RecS-QUAL scale. All the dimensions and their attributes included in the questionnaire have been described and used based on the researches of Parasuraman, Zeithaml and Malhotra from both, 2000 and 2002.

As mentioned above the questionnaire is designed to measure the divergence between the expectations and perceptions (perceived quality) of customers of the online banking services they use along the quality dimensions found in the E-SQ instrument developed by Parasuraman et Al. in 2002. This is expected to help the authors evaluate the overall satisfaction of customers with the online banking services they use and to give an insight into the important quality dimensions that can be used to measure quality of online banking services in general. For this purpose, the authors have used the seven-point Likert Scale, ranging from "1=*Very dissatisfied*" to "7=*Very satisfied*".

Before the questionnaire was distributed, it went through a thorough pre-testing. The pre-test included two steps. During the first step, the preliminary version of the questionnaire was tested on five students at Jönköping International Business School, who have been using online banking services for a long time and have experience as users of such services. During this first step, the questionnaire was modified, including the use of only one scale and some paraphrasing of words. In the second step, the modified questionnaire was given for inspection to the authors' supervisor and few more slightly changes have been made, including paraphrasing of two of the questions. Finally, the questions included in the questionnaire do not follow the same order as the underlying model, but have been grouped differently so that the different quality dimensions and their attributes are measured throughout the whole questionnaire. For full description of the questions pertaining to each quality dimension and their number in the questionnaire please refer to **Appendix III**

The questionnaire consists of 20 questions and demographic information about the respondents, including name of the bank they use, gender, age, length of Internet Banking usage and frequency of Internet Banking transactions per month. Furthermore, in order for the respondents to be easier to answer the questions, the authors used the "**Zone of tolerance**" concept, shaded in grey and including points three, four and five in the questionnaire. For full view of the questionnaire please refer to **Appendix IV**.

3.4 Data Analysis

The collected data in the study has been presented and analyzed using Descriptive Statistics, Cronbach's Alpha Test of Reliability and Factor Analysis with Principal Component Analysis as an extraction method. In order to prove the internal reliability of the instrument used, the authors of the thesis performed Cronbach's Alpha Test of Reliability. When performing this test, the authors have grouped the different items (questions) pertaining to the different quality dimensions and performed the test on each dimension. Applying this test specifies whether the items pertaining to each dimension are internally consistent and whether they can be used to measure the same construct

Furthermore, using the Principal Component Analysis (PCA) helps the authors to decide whether the division and description of the initial dimensions pertaining to the theoretical model are appropriate. With the help of the PCA, some of the items of the initial theoretical model were removed and the number of dimensions was reduced to four. Using the above stated techniques resulted in modification of the initial model. For the convenience of the reader, a brief description of Cronbach's Alpha Test of Reliability and Principal Component Analysis is presented below.

3.4.1 Cronbach's Alpha Test of Reliability

Cronbach's Alpha Test of Reliability is the most popular estimate for measuring the internal consistency (reliability) of items in a scale, in other words it measures the extent to which the responses collected for given item correlate highly with each other (Garson, 2002). The results of this test produce an α -score, which is a number between 0 and 1. According to Garson (2002), the higher the α -score is, the more reliable the measured construct is. Furthermore, according to Nunnally and Bernstein (1994) α -score exceeding 0.7 indicates high internal reliability of the scale items, but there are still researchers who use different cut-off α -scores like 0.8 or even 0.6 (Garson, 2002). Finally, what is important to be considered is that the α -scores increase when the number of items in a scale increases (Garson, 2002).

3.4.2 Principal Component Analysis

The Principal Component Analysis (PCA) is a method involving mathematical procedure used to identify patterns in a data set. It means that the method is used to reduce the dimensionality of the original data, which means to summarize the original data that is initially contained into a given number of variables (questions on the different quality dimensions in this case) into a new set of dimensions so that minimum amount of information is lost (Grosuch, 1983). This is done by defining the so called Principal Components (PC) also called factors that are variables explaining the maximum variability of a data set (Li, Shi, Liao, & Yang, 2003). The first principal component explains the most variance in the data and each succeeding principal component explains as much of the remaining variability as possible.

According to Chatfield and Collins (1980), there are two main reasons for using Principal Component Analysis (PCA): reduction of the dimensionality of the data set and formulation of new meaningful variables to describe the problem. In the underlying study each quality dimension pertaining to the used theoretical model is described with the help of given number of questions which customers are asked to answer. The use of PCA in this case is expected to show the authors whether the used questions describe each quality dimension adequately and whether some groups of questions pertaining initially to given

quality dimensions can be regrouped into less number of dimensions so that the conducted study becomes more precise.

3.5 Reliability and Validity

When developing and evaluating an instrument and when conducting research in general, there are two important issues that have to be examined - the reliability and validity of the study.

3.5.1 Reliability

An instrument is considered reliable when the outcome of the measuring process is reproducible. According to Zikmund (2000, p. 280), reliability can be defined as:

“The degree to which measures are free from error and therefore yield consistent results”

There are two aspects of the reliability issue: *external and internal reliability*. According to Hardy and Bryman (2004), *external reliability* means that the studied variable does not fluctuate greatly over time which means that it is stable. This kind of reliability can be tested through test-retest reliability, which means measuring the same scale twice in different time frames and see to what extent the two sets of data have yielded the same replies of the respondents. This method of measuring the reliability is time-consuming and tedious and will not be applied in the underlying study.

Furthermore, according to Hardy and Bryman (2004), *internal reliability* means that all the constituent indicators of a variable are measuring the same thing which means that the variable is coherent. One of the most popular methods for estimating internal reliability, also applied in this thesis, is Cronbach’s Alpha (α) Test of Reliability.

3.5.2 Validity

An instrument is valid when the outcome of the measuring process has really measured what it was designed to measure. According to Eriksson and Wiedersheim-Paul (1997, p. 38), validity can be defined as:

“The ability of a scale or measuring instrument to measure what is intended to be measured”

According to Hardy and Byrman (2004), there are different types of validity:

- *Face validity* – requires a thorough examination of the wording of the items included in the instrument and their connection to the relevant frame of reference used in the particular study. Face validity can also be examined through the use of the opinion and judgment of experts concerning the items and wording used
- *Criterion-related validity* – evaluates a scale in terms of a criterion on which people tend to differ. This includes concurrent and predictive validity
- *Construct validity* – requires “an examination of the theoretical inferences that might be made about the underlying construct” (Hardy and Byrman, 2004, p. 24)

In this thesis, the face validity has been applied, where the validity of the study has been proven through thorough pre-testing, rewording and reevaluation of the instrument used.

4 Empirical Data and Analysis

In the following chapter on Empirical Data and Analysis, the results from the conducted survey and the following analysis will be presented. The results of the survey include Descriptive Statistics of the collected data and Cronbach's Alpha Test of Reliability to test the reliability of the used model (instrument). The collected data will be analyzed by using Principal Component Analysis. Furthermore, analysis of the Descriptive Statistics based on a modified theoretical model is presented

4.1 Missing Data

Conducting the survey of this study, 200 questionnaires have been distributed. Some of them had missing answers, some of them did not fit into the age range between 16 and 34 which is of interest in this study and few others included non-Swedish banks in the field *Name of your bank*. When starting the analysis of the data, the authors decided to dismiss from the very beginning those questionnaires that did not fit into the studied age range and those that included non-Swedish banks as they were not usable in this case. Then, Cronbach's Alpha Test of Reliability and Principal Component Analysis (PCA) were performed both, with and without the questionnaires that had missing data. In the case of PCA for missing data *Exclude cases pairwise* option was used. The intention was for the authors to see whether there would be some differences in the results. Based on this pre-analysis, in the case of the *a-scores* (Cronbach's Alpha Test of Reliability results), the values from the test *with missing data* are correspondingly slightly lower than those in the case *without missing data*, but the difference is so small that it can be disregarded.

In the PCA case, the pre-analysis showed that there were differences in the Principal Component Analysis results for both cases – *with and without missing data*. In the case *without missing data*, the pre-analysis showed that only three factors should be extracted and in the case *with missing data*, four factors should be extracted. Taking into consideration that missing data can be treated as well in such analysis and also that using the questionnaires with missing data would give the authors more realistic and reliable results (also the total number of analyzed responses would be higher), the authors of the thesis have decided to base the analysis in the thesis on the responses from the questionnaires including those with missing data, only dismissing those responses that did not fit into the studied age range and which have stated non-Swedish bank in the field *Name of your bank*.

4.2 Descriptive Statistics

The authors of the thesis have conducted a survey with 200 distributed questionnaires from which 172 (86%) were initially used. This number exceeds the suggested number of five cases for each studied item (Tabachnick & Fidell, 2001). From the collected 200 questionnaires, those where the respondents did not fit into the age range between 16 and 34 and those who have stated that they use banks outside Sweden, were excluded from this study. The authors of the thesis decided to exclude the questionnaires including non-Swedish banks as the underlying study is applied to the Swedish context, which means that only people using Swedish banks were included into the analysis. In **Table 4.1** below the descriptive statistics are illustrated.

Table 4.1 Descriptive Statistics

Variable	Percentage of the total number(172)
Age	
16-24	0.70
25-34	0.30
Gender	
Male	0.419
Female	0.581
Length of Internet Banking Use	
< 3 months	0.035
3-12 months	0.128
> 12 months	0.837
Frequency of Internet Banking Transactions	
< 5 per month	0.40
5 or more per month	0.59
Average number of Transactions per month	7.41
Name of the Customer's Bank	
Föreningsparbanken	0.523
Nordea Bank Sverige AB	0.192
SEB	0.116
Svenska Handelsbanken	0.110
SkandiaBanken	0.023
Länsförsäkringar Bank	0.012
Eskilstun Rekarne Sparbank AB	0.006
Ulricehamns Sparbank	0.006
Sidensjö Sparbank	0.006
Hallands Provinsbank	0.006

From **Table 4.1** above, it can be seen that 70% of the respondents are aged between 16 and 24, and 30% are in the age between 25 and 34, which is understandable as half of the questionnaires were distributed in the University area in Jönköping where the majority of people are aged between 19 and 25. In the studied sample 41.9% are male and almost 58.1% are female. According to the table above, from all respondents only 3.5% have been using online banking services for less than 3 months, 12.8% have been using such services between 3 and 12 months and the majority of the respondents – **83.7%** have been using online banking services for more than a year. This is quite satisfactory as most of the people seem to have been using Internet Banking for more than 12 months, which according to the authors shows that they have enough experience to judge the quality of the provided online banking services and their overall satisfaction with those services.

The experience of the customers with the online banking services can be observed also from the frequency of their transactions, which for 40% of them are less than 5 times per month and for 59% of them, those transactions are more than 5 per month. Three respondents (1%) have not specified *Frequency of Internet Banking Transactions* that is why the sum does not total to 100%. What is interesting to be observed is the average number of transactions per month - **7.41**, which according to the authors is a satisfactory number,

implying that on average people have satisfactory experiences with Internet Banking transactions. As far as the customers' banks are concerned, **52.3%** of the respondents use the services of **Föreningssparbanken**, followed by 19.2% for Nordea Bank Sverige AB, 11.6% for SEB, 11.0% for Svenska Handelsbanken, 2.3% for SkandiaBanken, 1.2% for Länsförsäkringar Bank, followed by 0.6% for each of Eskilstun Rekarne Sparbank AB, Ulricehamns Sparbank, Sidensjö Sparbank and Hallands Provinsbank. This means that the analysis presented in this study is mainly based on the responses of customers of Föreningssparbanken.

For full view of the descriptive statistics of the empirical data please refer to **Appendix V**.

4.3 Cronbach's Alpha Test of Reliability

In order to prove the internal reliability of the model used, the authors of the thesis performed Cronbach's Alpha Test of Reliability. When performing this test, the authors have grouped the different items pertaining to the different quality dimensions and performed the test on each dimension. For reminding about the quality dimensions and the items that they include, please refer again to **Appendix III**.

Applying this test specifies whether the items pertaining to each dimension are internally consistent and whether they can be used to measure the same construct (dimension). Performing this test results in a so-called *a-score*, a number between 0 and 1, which interpretation determines the internal reliability of the measured variables. According to Nunnally and Bernstein (1994) *a-score* exceeding 0.7 indicates high internal reliability of the scale items. Despite that, there are still researchers who use different cut-off *a-scores* like 0.8 or even 0.6 (Garson, 2002). **Table 4.2** below shows the *a-scores* estimated based on the collected data.

Table 4.2 Cronbach's Alpha Scores

Dimension	Cronbach's Alpha (α -score)
Efficiency	.801
Fulfillment	.777
System Availability	.620
Privacy	.690
Assurance/Trust	.634
Site Aesthetics	-
Responsiveness	.618
Contact	.555

What can be seen from **Table 4.2** is that the *a-scores* on Efficiency and Fulfillment are both above 0.7, which indicates that these dimensions are quite reliable and that the items pertaining to each of these dimensions can be used to measure the constructs to which they pertain.

The *a-score* of the Privacy dimension is 0.69 which is so close to 0.7 that it can be regarded as pretty reliable.

The *a-score* on System Availability is only 0.62, which is less than 0.7. The same goes for Assurance/Trust with *a-score* of 0.634. As far as the Responsiveness dimension is concerned, it has an *a-score* of 0.618 and the Contact dimension has an *a-score* of 0.555. The Site Aesthetics dimension has no corresponding *a-score*, because there is only one item (question) pertaining to this dimension.

According to Garson (2002), the *a-scores* increase when the number of items in the scale increases, which implies the assumption that the yielded lower than 0.7 *a-scores* on some of the dimensions could be the very small number of items pertaining to each of these dimensions. All of the dimensions with lower than 0.7 *a-scores* have 2 items each, but that is so because the size of the questionnaire was expected not to be that long and because of

the time constraints and the conditions under which the survey was conducted. The authors assume that if each of these dimensions was described using more items, the results would have been different, but that was confined by the conditions under which the survey was performed.

Furthermore, performing the Cronbach's Alpha Test of Reliability showed that removal of any of the items pertaining to the dimensions that include more than two items would not increase the *a-score* of the given dimension.

Finally, the Responsiveness and Contact dimensions caused some problems when performing the survey. As mentioned earlier in this work, 200 questionnaires were distributed and from them 172 were initially used. Some of the questionnaires had missing data. The results of the survey indicated that the most missing data appeared on the questions pertaining exactly to the Responsiveness and Contact dimensions (total of 32 unanswered questions pertaining to the Responsiveness dimension and total of 31 for the Contact dimension). This can be explained by the fact that these dimensions are mainly related to cases when the customers had some problems with the online services provided by the bank they use and many people seem not to have encountered such problems. Conclusively, the facts mentioned above might have also been a reason for the yielded lowest *a-scores* on these dimensions.

4.4 Principal Component Analysis

In order to analyze the collected data and confirm the usefulness of the theoretical model to the banking context, the authors of the thesis performed Factor Analysis on the items of the model with the Principal Component Analysis as an extraction method and Varimax as Rotation method with Kaiser Normalization. Before starting the Factor Analysis, a check for outliers was also carried out in order to be examined whether there are outliers and whether they can influence the results of the data analysis. Furthermore, Bartlett's Test of Sphericity and KMO Measure of Sampling Adequacy were performed to confirm the suitability of the data for Factor Analysis. After that, when performing the Factor Analysis, in order to decide what number of factors (dimensions in this case) to retain, the authors used the Kaiser's criterion. Then serious iterations were used in order for the items with low loadings on each of the factors to be eliminated. For the convenience of the reader, a brief theoretical explanation and the results of the performed Bartlett's Test of Sphericity, KMO Measure of Sampling Adequacy and Principal Component Analysis (PCA) are shown in **Appendix VI**, which includes tables on **KMO and Bartlett's Test, Communalities, Correlation Matrix, Total Variance Explained, Component Matrix, Rotated Component Matrix as well as a Scree Plot**. The analysis of the data in these tables is presented below.

Before starting the analysis, a check for outliers was performed. The results from this check showed that there are few cases appearing as outliers for the different variables (questions) with two cases appearing as extreme outliers. As suggested by some statistics writers, the extreme outliers have been removed from the data file (Pallant, 2005), thus leaving 170 cases to be used in the Principal Component Analysis. Furthermore, as suggested by Pallant (2005), in order to see whether the outliers can cause much problem when analyzing the data, the authors of the thesis compared the 5% Trimmed Mean with the original mean for each of the variables (questions) and it has been observed that the difference between these two values is not significant, meaning that the outlying cases cannot cause a problem during the analysis of the whole data.

After the exclusion of the extreme outliers, Bartlett's Test of Sphericity and KMO Measure of Sampling Adequacy have been performed. The table on **KMO and Bartlett's Test** in **Appendix VI** shows that the result of the Bartlett's Test of Sphericity is **0.000**, which meets the criteria of value lower than 0.05 in order for the Factor Analysis to be considered appropriate. Furthermore, the result of the KMO Measure of Sampling Adequacy is **0.894**, which exceeds the minimum value of 0.6 for good factor analysis (Tabachnick & Fidell, 2001).

After these preliminary steps, Factor Analysis with Principal Component Analysis as an extraction method has been performed using 170 cases. The analysis of the yielded results is presented below.

First of all, besides the Bartlett's Test of Sphericity and the KMO Measure of Sampling Adequacy, presented above, the **Correlation Matrix** also confirms the suitability of the data for Factor Analysis as it includes considerable number of correlation coefficients higher than 0.3.

Looking at the table on **Communalities** for all variables together, it can be observed that the extraction value of the communalities of all the variables is sufficiently high. The lowest values pertain to Q11*, Q1* and Q3* which have communalities lower than 0.5, with 0.398 the lowest one. From these values, the communality of Q11* is pretty low - 0.398, which shows that only 39.8% of the variance of this variable is explained by all factors in the analysis meaning that this variable might be considered for removal from the model. The same goes for Q1* with communality value of 0.418 and Q3* with communality value of 0.457.

Furthermore, the column Total under Initial Eigenvalues in the table **Total Variance Explained** shows different eigenvalues - what amount of the variance in all variables is explained by the corresponding number of components (dimensions in this case). One of the methods for extraction when performing Principal Component Analysis and used in this study is the Kaiser's criterion, according to which the number of factors to be extracted equals the number of eigenvalues higher than 1. In this case, there are four such numbers, meaning that four factors should be extracted from the whole data set. The table also shows that 40.801% of the total variance in all the variables of the model is explained by one factor, 48.082% of their variance is explained by two factors, 54.367% of the total variance of all variables is explained by three factors and four factors explain 59.767% of the total variance of all variables pertaining to the theoretical model. Using the Kaiser's criterion for extraction of factors, the performed Principal Component Analysis in this case leads to the extraction of only four factors, meaning that all the 20 variables (questions) should be regrouped to form only four quality dimensions.

Looking at the **Scree Plot**, which is another method for deciding the number of factors to extract, it seems that only one factor should be extracted, as the slope of the graph is steep only until number 2 on the horizontal axis. Despite that, the authors of the thesis, as mentioned earlier, are going to use the Kaiser's criterion for extraction (with eigenvalues higher than 1) and based on this criterion four factors will be extracted.

The explanations given above lead to the conclusion, that extraction of four factors seems appropriate in this case. What is the most appropriate way to split the variables in four different dimensions (factors) can be found by analyzing the data presented into the **Rotated Component Matrix (Appendix VI)**.

* Q stays for **Question**. Ex. Q1* represents Question 1 in the questionnaire, which is one item (variable) pertaining to the first Efficiency dimension (factor)

The **Rotated Component Matrix** shows the correlation between each variable (row) and the different factors (column). Each variable should pertain to that factor with which it correlates best. In case one variable has similar correlation values to more than one factor, this means that this variable can pertain almost equally well to few factors which implies that the variable itself is not very clearly defined and as such can be dismissed from the model. For convenience, the **Rotated Component Matrix** included in **Appendix VI**, presents only those correlations higher than 0.3.

Looking at the data presented in the **Rotated Component Matrix**, it can be observed that the following variables are best correlated to the first factor meaning that the highest percentage of the variance of these variables is explained by the first factor and as such they should be grouped together to represent that factor: Q1* (50.5%); Q3* (62.5%); Q4* (71.%); Q5* (60.8%); Q10* (62.7%); Q12* (65.9%); Q13* (62.7%) and Q14* (59.3%). All of these values besides Q1* and Q14* meet the favorable level of 60% for factor loadings in Likert Scale cases. Furthermore, although the communalities values for Q1* and Q3* are a bit lower than 0.5, because of the good correlations (higher than 50%) presented in the **Rotated Component Matrix**, these items have been retained in the model.

Following the same reasoning, the following variables correlate best to and should be grouped together to represent the second factor: Q6* (63.0%); Q9* (51.4%); Q18* (58.2%); Q19* (82.8%) and Q20* (58.5%). Q6* and Q19* meet the favorable level of 60% for factor loadings in Likert Scale cases. Q18* with 58.2% and Q20 with 58.5% are relatively close to 60% and can be considered to be explained enough from the second factor. Only Q9* is a bit lower than 60% with its 51.4%. Based on the fact that 60% is arbitrary level for good factor loadings in Likert Scale cases and the sufficiently high communality value of Q9* - 0.575 meaning that 57.5% of the variance in this variable is explained by all factors in the model, Q9* will be kept in the model

The third factor should include the following variables which best correlate to this factor: Q7* (76.7%) and Q8* (64.5%). Both values meet the favorable level of 60% for factor loadings in Likert Scale cases.

Finally, the fourth factor should be represented by the following variables: Q15* (69.2%); Q16* (79%) and Q17* (70.9%). All these values meet the favorable level of 60% for factor loadings in Likert Scale cases.

Furthermore, according to the data presented in the **Rotated Component Matrix**, two variables should be dismissed from the model, as their correlation values are almost equal for few factors, implying that these variables are not clearly defined. The first one is Q2*, which has correlation values of 59% with both, the first and the third factors, meaning that this variable is equally well explained by both these factors. The second variable is Q11*, which has correlation values of 40% with the first factor, 37.8% with the second factor, 24% with the third factor and 19.3% with the fourth factor. These numbers show that this variable does not only correlate almost equally well with the first and the second factors, but these correlation values are also pretty low – all of them are below 50%, indicating that each of the factors explains less than 50% of this variable. Taking also into consideration the pretty low communality value of Q11* which is only 39.8%, this variable will be dropped from the model.

As a result, according to the analysis of the collected data presented above, the number of dimensions included into the presented in the Theoretical Framework chapter model should be decreased. The performed Factor Analysis with Principal Component Analysis as an extraction method showed that all the variables that pertain to the initial theoretical model are not well grouped to represent the initial eight dimensions and thus should be

rearranged to represent four new quality dimensions. Conclusively, the new four quality dimensions should include the following variables: first quality dimension - Q1*, Q3*, Q4*, Q5*, Q10*, Q12*, Q13* and Q14*; second quality dimension - Q6*, Q9*, Q18*, Q19* and Q20*; third quality dimension – Q7* and Q8*; fourth quality dimension – Q15*, Q16* and Q17*. As the initial variables were almost completely rearranged to form four new quality dimensions, these new dimensions should be defined and labeled in a new way. Reviewing the content of the variables (**Appendix III**), the authors of the thesis suggest the following labels for the newly created dimensions showed in **Table 4.3** below.

Table 4.3 Labels for the newly created dimensions

Items (Questions)	Content of each question	New dimension label
Q1*	I am able to get on the site quickly	Service Performance (Availability, Access, Accuracy (fulfillment), Privacy, Assurance, Recovery)
Q3*	The site is always available for business	
Q4*	The bank does not misuse my personal information	
Q5*	I have confidence in the bank's service	
Q10*	My online transactions with the bank are always accurate	
Q12*	I feel safe in my transactions with the bank	
Q13*	The bank's name is well-known and has good reputation	
Q14*	The bank quickly resolves problems I encounter with my online transactions	
Q6*	The website design is aesthetically attractive	Website Characteristics (design (appearance), content, structure and layout, ease of navigation (use))
Q9*	It is easy to find what I need on the website	
Q18*	Using the bank's website does not require a lot of effort	
Q19*	The organization and structure of online content is easy to follow	
Q20*	The bank's site makes accurate promises about the services being delivered	
Q7*	The bank gives prompt responses to my requests by e-mail or other means	Communication
Q8*	The bank is easily accessible by telephone	
Q15*	The site has customer service representatives available online	Efficiency (speed of service performance)
Q16*	It is quick to complete a transaction through the bank's website	
Q17*	The service delivered through the bank's website is quick	

The questions pertaining to the first quality dimension are eight and at first sight seem to be quite different in content. Some of the questions regard the easiness to get on the website and the availability of the website; other questions regard the privacy and assurance issues concerning customers' information, safety and confidence; still others consider the accuracy of the performed online services (transactions) and one of the questions consider the quick solution of customers' problems. Reviewing carefully the content of these questions, it can be observed that all of them consider different basic aspects of the performance of the online services itself – the website being available, getting on the website quickly, confidence and safety of customers to use the bank's online services, accurate transactions performed and finally recovery in case of problems and mistakes. Based on this reasoning, the authors of the thesis have decided to label this quality dimension **Service Performance**. Although it might seem a bit broad, it captures the converging point among all the questions included in this dimension. Despite the fact that some of the other questions, not pertaining to this dimension might also seem suitable to be part of the Service Performance, they seem to be aspects that are not basic, but rather

that can enhance the quality of the Service Performance and as such are given different labels.

Looking at the questions included in the second quality dimension, all of them concern issues related to the website of the bank - the design of the website; accurate promises on the website; organization, structure and content of the website and the ease of navigation (use) of the website. Based on this, the authors of the thesis labeled this quality dimension **Website Characteristics**.

Both questions – Q7* and Q8* presented in the table above, concern the prompt responses to customers’ requests by e-mail or other means and the easiness to access the bank by telephone when needed. Based on the contents of these questions, the authors consider both of them to be part of the communication of the bank with its customers and that is why the third dimension has been labeled **Communication**.

Finally, as far as the fourth quality dimension is concerned, taking into consideration the fact that based on the analysis presented below, the item Q15* would be dismissed from the model, the other two questions both consider the speed of completing a transaction and that of the online services delivery itself. As such these questions are considered to evaluate how efficient the provided online banking services are and based on this reasoning the fourth quality dimension is labeled **Efficiency**.

4.5 Cronbach’s Alpha Test of Reliability on the Modified Theoretical Model

In order to prove the reliability of the modified theoretical model, the authors of this thesis performed once again Cronbach’s Alpha Test of Reliability. This time the test was conducted on the new modified model consisting of the four quality dimensions shown in the table above. The results of the test are summarized in **Table 4.4** below.

Table 4.4 Cronbach’s Alpha Scores on the Modified Theoretical Model

Dimension	Cronbach’s Alpha (α -score)
Service Performance	.869
Website Characteristics	.807
Communication	.533
Efficiency	.760

What can be seen from **Table 4.4** is that the *a-scores* on Service Performance, Website Characteristics and Efficiency are significantly higher than 0.7, which indicates that those dimensions are highly reliable and that the items pertaining to each of these dimensions can be used to measure the constructs to which they pertain.

Furthermore, it can be seen that the Communication quality dimension has relatively low *a-score* of 0.533, which is below 0.7. As mentioned earlier, according to Garson (2002), the *a-score* increases when the number of items increases. Thus, the explanation for the low *a-score* on this dimension can probably be found in the small number of items pertaining to it (only two items) and also in the fact that the items included in this dimension (Q7* and Q8*) are two of the items with most missing data (8.82% for Q7* and 4.12% for Q8* from 170 cases used in the analysis).

Furthermore, conducting Cronbach’s Alpha Test of Reliability of the new four quality dimensions has shown that for the Efficiency dimension, the *a-score* would increase from 0.760 to 0.771 if the item Q15* is removed from the dimension, meaning that the dimension would be more reliable without Q15*. Furthermore, considering the fact, that

Q15* is the variable with the highest number of responses with missing data (23 out of 170 cases used in the analysis (13.53%)), the authors of the thesis decided to remove this item from the modified model.

Finally, from the results from the Cronbach's Alpha Test of Reliability conducted on the modified theoretical model, it can be concluded that as the new *a-scores* are significantly higher than those of the initial theoretical model, the modified theoretical model can be considered much better constructed and much more reliable than the initial theoretical model.

4.6 Modified Theoretical Model

Based on the conducted Principal Component Analysis and Cronbach's Alpha Test of Reliability, a modified theoretical model has been developed. Below is a short summary of the above presented analysis which has led to the development of an instrument for measuring quality of online banking services.

The authors of the thesis have conducted Factor Analysis with Principal Component Analysis as an extraction method in order to eliminate some of the items of the initial model and to prove whether the division and description of the initial factors (dimensions) included into this model are appropriate. The analysis based on the collected data showed that changes to the initial model are required.

First of all, the Principal Component Analysis has proven the incongruity of the division of the initial eight quality dimensions, thus requiring the rearrangement of the items into four new quality dimensions. Based on the results presented in the tables in **Appendix VI** it can be concluded that from the initial eight dimensions the following four dimensions can be constructed: **Service performance**, including Q1*, Q3*, Q4*, Q5*, Q10*, Q12*, Q13 and Q14*; **Website Characteristics** including Q6*, Q9*, Q18*, Q19* and Q20*; **Communication** including Q7* and Q8*; and **Efficiency** including Q15*, Q16* and Q17*.

Furthermore, given the fact that based on the analysis presented above the authors of the thesis rearranged all variables to form four new quality dimensions, the division of the model into two separate scales does not seem appropriate anymore.

Moreover, the Cronbach's Alpha Test of Reliability conducted on the modified theoretical model showed that the *a-score* for the Efficiency dimension would increase if Q15* is removed from that dimension. Based also on the fact that Q15* is the item with most missing data (23 out of 170 responses used in the analysis (13.53%)), the authors of the thesis decided to remove this item from the modified model. Thus, the modified theoretical model (instrument) which can be used to measure quality of online banking services consists of only one scale with four quality dimensions including total of 17 items (variables).

Conclusively, the analysis presented in this chapter has led to changes in the initial theoretical model and to the development of an instrument (the modified theoretical model) for measuring quality of online banking services. The initial and the modified theoretical models are graphically illustrated below.

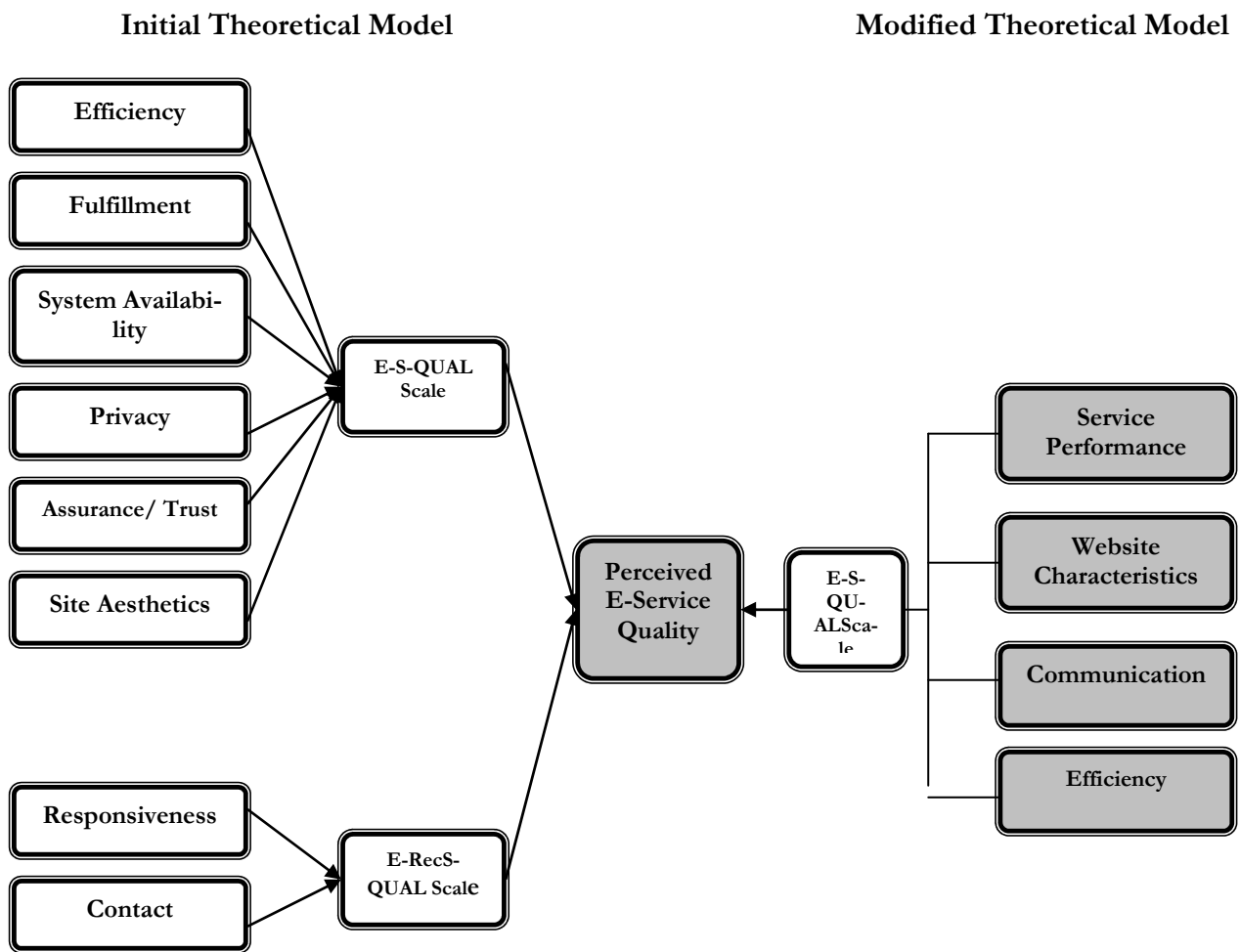


Figure 4.1 Initial and Modified Theoretical Models.

4.7 Descriptive Statistics Analysis (based on the modified theoretical model)

In this part of the chapter the authors will analyze the Descriptive Statistics information on the collected data based on the modified theoretical model

4.7.1 Analysis by Quality Dimension

Analyzes of the Graphs in **Appendix VII** showing Frequency of Survey Responses in Percentage according to the seven-point Likert Scale and interpretation of the medians of the collected data (**Appendix V**) will be given in order for the authors and the readers to be able to get deeper insight into how customers perceive the quality of the online banking services they use based on the different quality dimensions included in the modified theoretical model. Furthermore, as the median values of all the items used in the modified theoretical model did not change after the exclusion of the extreme outliers, the median values used in the analysis are the same as those presented in **Appendix V**.

The graphical and median analysis will be done separately for each quality dimension. Before presenting the analysis the authors would like to present their interpretation of the seven-point Likert Scale: **1** – *very dissatisfied*; **2** - *dissatisfied*; **3** – *slightly dissatisfied*; **4** - *nor satisfied*,

nor dissatisfied; 5- *slightly satisfied*; 6- *satisfied*; 7 – *very satisfied*. Furthermore, as explained in the Theoretical Framework, numbers **3, 4 and 5** on the Likert Scale comprise the so-called **Zone of Tolerance**, which means that at **3** people get the *minimum level* of service quality they are ready to accept (**adequate level**) and at **5**, customers get the so-called **desired level** of service quality (the level on which the customers believe the service *should be*). In other words, in the range from 3 to 5 people find the service more or less good. Above 5, including 6 and 7, customers' expectations are exceeded and they are satisfied and very satisfied with the quality of the delivered service. Numbers 1 and 2 on the other hand show that the quality of the service people receive is below their expectations and does not even meet their minimum adequate level. What is important for the analysis is that achieving **adequate level** of service quality *is always required but not enough* for service providers to retain their customers and make them involve in positive word-of-mouth which would enhance the company's image and reputation (Grönroos, 2000). What banks as service providers should strive for is quality level of their services which exceeds their customers' expectations (6 and 7 on the Likert Scale).

The analysis will be conducted based on the interpretations of the scale and the **Zone of Tolerance** stated above.

- **Service Performance (Q1*, Q3*, Q4*, Q5*, Q10*, Q12*, Q13* and Q14*)**

The analysis of this quality dimension starts by looking at the data for Q1*. The median of this item is 6, which means that at least 50% of the respondents are satisfied or very satisfied with this aspect of the online banking services, namely the ability to get on the bank's website quickly (Q1*). Looking at **Graph 1 in Appendix VII**, it can be observed that only 3.5% of the respondents have stated 3 or below on the Likert Scale, meaning that only 3.5% of the respondents were not satisfied or got the minimum level of service quality as far as the ability to get on the bank's website quickly is concerned. This means that in general banks' websites are easy to find and it is relatively fast to get on them.

Referring to item Q3*, the data shows that in general customers are satisfied with the availability of the bank's website for business (Q3*) which has median of 6. Nevertheless, **Graph 2 in Appendix VII** illustrates that 24% of the respondents have answered 4 or below on Q3*. This number indicates that almost one fourth of the respondents do not receive the desired level of service quality as far as the availability of the bank's website is concerned, thus implying that almost 25% of the banks' customers probably have had problems with launching the website. The authors of the thesis assume that this is an aspect of the online banking services which is important as the availability of the bank's website leads to the use of the online banking services, and when problems with this occur, customers might get frustrated and that might lead to negative word-of-mouth (complaining to friends etc.); stop using the online banking services of their bank or eventually to switching to another bank.

Furthermore, both Q4* and Q12*, pertaining to this dimension, have medians of 6, which means that at least 50% of the respondents stated 6 or 7 on the Likert Scale, showing that banks have exceeded the expectations (the desired level of service quality) of 50% and even more of their customers, which can be considered as a rather high quality on this aspect of the delivered online banking services. Furthermore, no one respondent have stated 1 or 2 on the Likert Scale for both Q4* and Q12*. 83.1% of the respondents have stated slight

***Q** stays for **Question**. Ex. Q1* represents Question 1 in the questionnaire, which is one item (variable) pertaining to the first Efficiency dimension (factor)

satisfaction (desired level of service quality) or above as far as the treatment of their personal information from the bank's side is concerned (Q4*) (**Graph 3 in Appendix VII**). This number is 90% for the aspect of feeling safe in their transactions with their bank (Q12*) (**Graph 6 in Appendix VII**). These extremely high numbers and the lack of respondents stating 1 or 2 on the Likert Scale for both Q4* and Q12* imply that in general banks are quite successful in assuring the privacy and safety of their customers' accounts and personal information.

In addition, both Q5* and Q13*, pertaining to this dimension, have also medians of 6 indicating that at least 50% of the respondents feel confident and very confident with their bank (Q5*) and consider their bank's name to have very good reputation and to be well-known (Q13*). Furthermore, the data shows that 89.3% of the respondents feel desired or even higher level of confidence in their banks (Q5*) (5 or more on the Likert Scale in **Graph 4 in Appendix VII**). 92.9% of the respondents consider their banks to have high or very high reputation and to be well-known (Q13*) (5 or more on the Likert Scale in **Graph 7 in Appendix VII**). These extremely high numbers show that in general banks are rather successful in gaining the assurance and trust of their customers and building good name and reputation.

According to the median value 6 for Q10*, respondents are relatively satisfied with the accuracy of their transactions with the bank (Q10*). This number shows that at least 50% of the respondents are satisfied and very satisfied with the accuracy of their online transactions. It can be observed on **Graph 5 in Appendix VII**, the high percentage of respondents – 34.9%, that have stated very high satisfaction with this aspect of the online banking services (7 on the Likert Scale). In addition, only 9.5% of the respondents have stated 4 or below on the Likert Scale as far as accuracy of online transactions is concerned (Q10*), meaning that only 9.5% have not received their desired level of service quality on this aspect of the banks' online services. Concluding, banks seem to be relatively successful in providing accurate online services.

Analyzing the data for the last item pertaining to this quality dimension -Q14*, it has to be mentioned that this item is very delicate to measure as it involves the way and speed with which the bank resolves customers' problems. This aspect of the service delivery has been proved to be essential in the service delivery process, as the ways a company solves its customers' problems (called service recovery) influences the total perception of service quality and if done well and quickly can have positive impact on the development of trusting relationships with customers and can lead to increased customer satisfaction (Grönroos, 2000).

Furthermore, based on the conducted survey, the authors of the thesis assume that not that many customers have experience with that aspect of the online banking services and most of them have not had any problems with the provided online services so far. This assumption is based mainly on the fact that Q14* is one of the items with most missing data according to the conducted survey (15 missing answers out of 170 responses used in the analysis (8.82%)). All this makes the evaluation of this item a bit difficult.

Looking at the numbers presented in **Graph 8 in Appendix VII**, it can be observed that the respondents' level of satisfaction is not that high on this item, which can also be concluded from the fact that the median of Q14* is 5. This means that less than 50% of the respondents had their problems resolved on a satisfactory level (6 or 7 on the Likert Scale). Furthermore, turning back to the data, 35.5% of the respondents answered 4 or below on Q14*. This number indicates the percentage of the total number of respondents whose expectations about this feature of the online banking services were not met on a

desired level. Based on the presented numbers and the argument for the importance of this aspect of the service presented above, it is advisable that banks' managers pay higher attention to this feature of their online services as the percentage of not satisfied customers is considerable. From the conducted survey it becomes clear that banks should try to resolve their customers' problems more quickly and efficiently. Not solving problems quickly might lead to customers feeling that they have received poor quality, the quality of the relationship with them deteriorates and the risk of losing those customers increases (Grönroos, 2000).

Conclusively, looking at all items included into the Service Performance quality dimension, all of them besides Q14* have medians of 6, meaning that besides the solution of occurring problems, in general customers are relatively satisfied with the Service Performance aspect of the online banking services they use. Furthermore, referring to the table in **Appendix VIII**, where the different items are ranked according to levels of customers' satisfaction, it can be observed that most of the items pertaining to the Service Performance quality dimension rank lowest on dissatisfaction (3 or below on the Likert Scale) and highest on satisfaction of respondents (6 or 7 on the Likert Scale), thus confirming the relatively high satisfaction of banks' customers with this aspect of their online services.

- **Website Characteristics (Q6*, Q9*, Q18*, Q19* and Q20*)**

One of the questions, pertaining to this quality dimension, having one of the lowest median values as a result of the conducted survey is Q6*, concerning the design of the bank's website. The median of Q6* is only 4 indicating that at least 50% of the respondents are indifferent or even dissatisfied to different extent with this feature of the online banking services. According to the data 5.9% of the respondents are dissatisfied, 14.7% of them are slightly dissatisfied and 31.2% are not satisfied, nor dissatisfied with the design of their banks' websites (**Graph 9 in Appendix VII**). These numbers suggest apparent need for consideration of this aspect of the online banking services. Although the design of the website might be regarded as not that important part of the delivered online services, many researchers studying the quality of online services have confirmed the importance of this aspect for the overall customer satisfaction and have included it as part of their models for measuring quality of online services (Abels et Al., 1999; Jayawardhena & Foley, 2000; Liu & Arnett, 2000; Santos, 2003). Therefore, it can be recommended that banks' managers do not underestimate the importance of their websites' design and try to make improvements on this aspect, thus making their websites more attractive to use.

Looking at Q9* and Q19*, both questions have median of 5 which implies that at least 50% of the respondents have stated that according to the **Zone of Tolerance** interpretation they have received the desired (5) or even higher (6 or 7 on the scale) level of service quality from their banks along these online services' aspects. Nevertheless, the frequency distribution graphs illustrate that Q9* has more respondents stating slight dissatisfaction (3 on the Likert Scale) and dissatisfaction (2 on the Likert Scale) than has Q19*. For Q9*, 12.4 % of the respondents have stated slight dissatisfaction and below and this number is only 7.1% for Q19* (**Graph 10 and Graph 12 in Appendix VII**), which means that more people are satisfied with the organization and structure of the online content (Q19*) rather than with the ease of orientation on the website (Q9*). This leads to the conclusion that while the content of the banks' websites is rather well presented and organized, there is still some deficiency in the structure of the whole website. It seems that it is difficult for some people to orient on the bank's website and find easily what they need, which might sometimes lead to frustration. Therefore, it is advisable that banks' managers pay attention to these features and try to make the websites easier to orient and use, which can eventually increase the overall quality of their online services.

Turning to the respective numbers for Q18*, it can be seen from **Appendix V** that this item has a median of 6 which means that at least 50% of the respondent have stated that they are satisfied and very satisfied with this aspect of the online banking services and that their expectations have been exceeded. Still, the frequency distribution graph illustrates that 20% of the people have stated 4 or less on the Likert Scale (**Graph11 in Appendix VII**), which indicates that one fifth of the respondents are indifferent or dissatisfied with the effort required to use the bank's website (Q18*). This leads to the conclusion that there is still need for the banks' websites to be simplified and made easier to use as 20% of the respondents are not satisfied with the effort required to use their bank's website and this number is significant.

Now, looking at Q20*, it can be observed that this item has a median of 5 showing that at least 50% of the respondents have stated that according to the **Zone of Tolerance** interpretation they have received the desired (5) or even higher (6 or 7 on the scale) level of service quality. Nevertheless, the data on frequency distribution illustrated in **Graph13 in Appendix VII** reveals that 24.2% of the respondents have stated 4 or below on the Likert Scale. What this means, taking into consideration the **Zone of Tolerance** is that 24.2% of the respondents do not receive their desired level of service quality as far as the making of accurate promises from the bank's side is concerned (Q20*). Although, a high percentage of respondents seem to receive the desired level of online services quality (5 on the scale) and above, still 24.2% is a relative high percentage for customers not being satisfied with the accuracy of promises made by their bank, which is very dangerous in the contemporary business environment, because people can easily switch to another bank if they feel being lied from the bank.

Conclusively, three of the items included into the Website Characteristics quality dimension have median of 5, one has median of 6 and one - median of 4. Based on the interpretations made above, it is desirable that these features of the online service delivery are paid more attention as almost half of the customers do not receive their desired level of service quality along these quality aspects.

- **Communication (Q7* and Q8*)**

This quality dimension includes both Q7* and Q8*. Looking at these items, they are very delicate to measure as they involve the way the bank responds to customers' requests (Q7*) and the easiness with which the bank is reached by telephone when necessary (Q8*). These aspects have been proved to be essential in the service delivery process, because they can play an important part of the recovery processes of the service delivery and as such they can influence the total perception of service quality and if done well can have positive impact on the development of trusting relationships with customers and can lead to increased customer satisfaction (Grönroos, 2000).

Furthermore, the conducted survey showed that not all customers have experience with these aspects of the service as Q7* and Q8* were some of the questions with most missing data (15 out of 170 (8.82%) for Q7* and 7 out of 170 responses used in the analysis (4.12%) for Q8*). This makes the evaluation of this dimension a bit difficult.

Looking at the data presented in **Appendix V** and in **Graph 14** and **Graph 15 in Appendix VII**, it can be seen that the respondents' level of satisfaction is quite low on this dimension, as the median of Q7* is only 4 and the median of Q8* is 5. This means that at least 50% of the respondents had problems with getting prompt responses from the bank to their requests (Q7*) and less than 50% of the respondents could access the bank by telephone without difficulty when necessary (Q8*). Turning back to the data, 60% of the respondents answered 4 or below on Q7* and 32.5% answered 4 or below on Q8*. These

numbers show the percentage of the total respondents whose expectations about these aspects of the online banking services are not met on a desired level of quality. As these numbers are some of the highest of all such respective numbers on all the other items, it can be recommended that immediate correction of these features of the online banking services is undertaken, in order for the overall quality of the online services to be improved.

Based on the numbers and the argument for the importance of these aspects presented above, it is advisable that banks' managers give them higher consideration as the percentage of not satisfied customers is considerable. From the conducted survey it becomes clear that banks need to improve the communication aspect of their online services, because not answering promptly requests by email or other means and not being easily accessible by telephone might lead to not solving customers' problems well and quickly which on its behalf might lead to customers feeling that they have received poor quality, the quality of the relationship with them might deteriorate and the risk of losing those customers may also increase (Grönroos, 2000).

- **Efficiency (Q16* and Q17*)**

Starting with Q16*, this item has median of 6, meaning that at least 50% of the respondents have answered that they are satisfied or very satisfied with this feature of the online banking services and that their expectations have been exceeded. Furthermore, the frequency distribution graph shows that only 11.2% of the people have stated 4 or below on the Likert Scale for Q16* (**Graph16 in Appendix VII**). This indicates that only 11.2 % of the respondents are indifferent or dissatisfied with the speed of completing transactions through the banks' websites (Q16*) which implies that in general people seem relatively satisfied with the time required to complete a transaction through the bank's website. These results can be considered rewarding for the banks as this feature is fairly important, because it helps to determine the efficiency of the provided online banking services.

The other item pertaining to the Efficiency quality dimension - Q17*, has median of 5 which shows that at least 50% of the respondents receive the desired or even faster speed of online services delivery. It can be observed in **Graph 17 in Appendix VII** that 46.1% of the respondents have stated that they are satisfied or very satisfied with the speed of online services delivery. The corresponding number for Q16* is 65.3% (**Graph16 in Appendix VII**). Furthermore, while only 11.2% of the people have stated 4 or below on the Likert Scale for Q16*, the respective number is 20.4% for Q17* which is almost twice as much. These numbers imply that while transactions can be completed relatively quickly through the banks' websites, still more people are not satisfied enough with the speed of the overall delivery of the online banking services which is something on which managers can continue working on and try to improve.

Conclusively, although the speed of completing transactions through the banks' websites seems rather satisfactory for most of the respondents, the time it takes for the overall online services to be delivered should still be improved.

4.7.2 Ranking Satisfaction and Dissatisfaction Levels of Customers on Different Quality Dimensions

Based on the collected data, the authors of the thesis have decided to find total percentage of people that have answered 4 or below on the Likert Scale for each of the items. The same has been done for people who have stated 3 or below and 6 or 7 (**Table 1 in Appendix VIII**). Furthermore, the authors have calculated those percentages for the different quality dimensions. This has been achieved by summing the relevant percentages

of all items pertaining to a given quality dimension and dividing the new total percentage into the number of items that have been summed up, assuming that all items have equal importance (weight) for the given dimension.

The idea behind these calculations is to make conclusions about the relative satisfaction of respondents with each of the items and the different quality dimensions respectively. The results of such an analysis will show which features of the online banking services need higher attention because of lower customer satisfaction and which features are considered satisfactory by most of the respondents. Based on the analysis and interpretations presented earlier in this chapter and the analysis presented below, managerial recommendations will be given in the next chapter of this work.

The calculated percentages used in this part of the analysis are summarized in **Table 4.5** below. For view of the respective percentages for the different items of the modified model, please refer to **Table 1** in **Appendix VIII**.

Table 4.5 Percentage of the total number of respondents that have stated 4 or below; 3 or below and 6 or 7 on the Likert Scale

People that have stated 4 or below on the Likert Scale (in ascending order)		People that have stated 3 or below on the Likert Scale (in ascending order)		People that have stated 6 or 7 on the Likert Scale (in ascending order)	
Dimension	Percentage of total respondents	Dimension	Percentage of total respondents	Dimension	Percentage of total respondents
Service Performance	15.7625	Service Performance	2.8375	Communication	31.8
Efficiency	15.8	Efficiency	3.85	Webiste Characteristics	40.4
Webiste Characteristics	29.84	Webiste Characteristics	9.68	Efficiency	55.7
Communication	46.25	Communication	12.3	Service Performance	61.475

Calculating the percentage of people that have chosen 4 or below on the Likert Scale of the questionnaire reveals how many people in percentage of the total number of respondents have been dissatisfied, received the minimum level of online services quality that they would accept or whose average expectations were met (nor satisfied, nor dissatisfied). The calculations reveal that *most* customers have shown dissatisfaction or indifference with the following features of the online banking services: prompt responses of the bank to customers' requests (Q7*) – 60% (of total number of respondents); design of the bank's website (Q6*)– 52.9%; quickly solution of customers' problems (Q14*) – 35.5%, the easiness to reach the bank by telephone (Q8*) – 32.5% and the easiness to find what the customer needs on the website (Q9*) – 30.2% (**Table 1** in **Appendix VIII**). These considerably high numbers show that banks do need to pay high attention to those aspects of the online services in order to improve their customers' total satisfaction with the offered online services.

On the other hand, the features of the online banking services with which *fewest* respondents have shown dissatisfaction or indifference are the following: well-known name and good reputation of the bank (Q13*) – 7.1% (of total number of respondents); accuracy of online transactions with the bank (Q10*) – 9.5%, feeling safe in transactions with the

bank (Q12*) – 10 %; and confidence in the bank (Q5*) – 10.7% (**Table1 in Appendix VIII**). Such an analysis on a quality dimension level reveals that *fewest* customers have shown dissatisfaction or indifference with the Service Performance dimension (15.7625%), followed by Efficiency (15.8%). The dimension on which *most* customers have shown dissatisfaction or indifference is Communication (46.25%), followed by Website Characteristics (29.84%) quality dimension of the offered online services.

Going now to the relevant numbers for people who answered 3 or below on the Likert Scale (which means that they have been dissatisfied or they have received the minimum level of service quality they would accept) and those who answered 6 or 7 on the Likert Scale (which means that they have been satisfied and their expectations have been exceeded), it can be observed an interesting fact. The reasons for studying exactly the responses of 3 or below and 6 or 7 on the Likert Scale are the following.

First of all, as the numbers 3 or below on the scale show dissatisfaction or minimum level of acceptable service quality, they are of high importance for banks' managers as the aspects of the online banking services (quality dimensions) that have most such responses are those that might need immediate amendment so that the total perceived service quality does not decrease (Grönroos, 2000).

Secondly, the 6 or 7 respondents present interest as they show the percentage of respondents whose expectations for the online banking services have been exceeded and they have been satisfied, which can be an indication of the relative success of the service provider to offer high quality to its customers as far as the different aspects of the online services are concerned.

The respective calculations based on the collected data show that *least* number of respondents have stated higher satisfaction (6 or 7 on the scale) for the following features of the online banking services: design of the website (Q6*) - 15.9% (of total number of respondents); prompt responses from the bank to customers' requests (Q7*) - 19.4%; quick solution of customers' problems (Q14*) - 38.1 % and ease of finding what is needed on the bank's website (Q9*) - 38.5 %. In comparison, *most* people have shown higher satisfaction (6 or 7 on the scale) with the well-known name and reputation of the bank (Q13*) - 74.7%; accuracy of online transactions (Q10*) - 71%, feeling safe in transactions with the bank (Q12*) – 70% and the non-misuse of personal information from the bank (Q4*) – 67.5% (**Table1 in Appendix VIII**).

If the relevant percentages for the whole dimensions are calculated, it can be observed that *fewest* customers have shown higher satisfaction (6 or 7 on the scale) for the Communication (31.8%) and Website Characteristics (40.4%) and *most* customers have shown higher satisfaction with the Service Performance (61.475%) and Efficiency (55.7%) quality dimensions.

Following the same reasoning for calculating the percentage of people that have stated 3 or below on the Likert Scale reveals that *fewest* respondents have stated dissatisfaction or received minimum acceptable level of service quality for the following aspects of the online banking services: well-known name and reputation of the bank (Q13*) - 1.2%; accuracy of promises on the bank's website (Q20*) – 1.2%; accuracy of online transactions (Q10*) - 1.8%; feeling safe in transactions with the bank (Q12*) – 2.4%. In comparison, *most* people have stated dissatisfaction or minimum acceptable level of service quality for the following features of the online banking services: design of the website (Q6*) – 21.8%; prompt responses from the bank to customers' requests (Q7*) – 14.2%; ease of finding what is needed on the bank's website (Q9*) – 12.4% and the easiness to reach the bank by telephone (Q8*) – 10.4%.

Calculating the respective percentages for the whole dimensions shows that *fewest* customers have shown dissatisfaction or received minimum acceptable level of online services quality for the Service Performance (2.8375%) and Efficiency (3.85%) quality dimensions and *most* customers have shown dissatisfaction or minimum acceptable level of online services quality for the Communication (12.3%) and Website Characteristics (9.68%) quality dimensions.

Presenting all these percentages reveals the interesting fact that Communication and Website Characteristics have been convincingly confirmed to be the aspects of the online banking services that need most attention from banks' managers. These are the quality dimensions on which the *fewest* respondents have shown higher satisfaction (6 or 7 on the scale) and the *most* respondents have shown dissatisfaction or received minimum acceptable level of online services quality (3 or below on the scale). These facts imply the need for higher concern of managers for these features of the online banking services.

Furthermore, as far as the Website Characteristics quality dimension is concerned, which includes the design of the website; the ease with which customers find what they need on the website, the ease to follow the organization and structure of online content, the easiness to use the bank's website and the presence of accurate promises for service delivery on the website, it is advisable that bank managers reconsider this aspect of their online services. As in the context of online services, there is no direct interaction between the customers and the bank's employees, the website is the medium of communication between the customers and the bank and customers do mainly interact with the bank's website in order to make use of the online banking services. According to Iwaarden, Wiele, Ball and Millen (2003), there are two reasons for companies to use high quality websites: the first is that as part of the connection between the customers and the company, the website should reflect the total quality efforts pervading in the company; secondly, because of the lack of human interaction in the delivery of online services, the website becomes the "*moment of truth*" between the company and its customers. Therefore, it can be recommended that the bank's website is organized, structured and designed so that it is made possibly easiest for customers to orient and make use of what the website has to offer. As these features of the online banking services are assumed to be of high importance for the online services delivery, they deserve high attention from banks' managers.

As far as the Communication quality dimension is concerned, which includes the prompt responses to customers' requests by email or other means and easiness to access the bank by telephone when needed, it has been proved to be essential in the service delivery process, as the ways a company communicates with its customers and answers any questions and inquiries they have can influence the total perception of service quality as it can be a crucial part of the service recovery process. On its behalf, the service recovery process if done well can have positive impact on the development of trusting relationships with customers and can lead to increased customer satisfaction (Grönroos, 2000). Furthermore, the prompt response to customers' requests by email is becoming more and more important for improving the overall quality of online services (Jun & Cai, 2001).

Finally, the analysis above also shows that customers tend to be rather satisfied with the Service Performance and Efficiency quality dimensions of the online banking services they use. This means that banks have been relatively successful in taking good care of the actual performance of the service and the speed of this performance. They have been quite successful in providing privacy and safety of their customers' accounts and personal information and have succeeded to a satisfactory extent to gain their trust in the bank.

What is interesting to observe is that the Service Performance and Efficiency quality dimensions are quality dimensions which mostly comprise service aspects, essential in the service delivery process not only for the Internet context, but for the traditional settings as well (Bahia & Nantel, 2000; Johnston, 1995; Parasuraman et Al., 1991). In comparison, the Website Characteristics quality dimension for example is highly specific for the Internet context. This means that banks should pay higher attention to those features of the service that are specific for the online space. A reason for the higher dissatisfaction of the customers with the Website Characteristics dimension of the online banking services might be that banks do not consider this aspect important for the quality of their online services and did not put enough effort to improve it. They might instead have concentrated their efforts on more traditional aspects as safety and privacy of transactions, accuracy of transactions, speed of service delivery and speed for completing a transaction through the website, all of which show higher customer satisfaction.

4.7.3 The Special Case of Föreningssparbanken (FSB)

Taking into consideration the fact that 52.3% of the respondents of the conducted in this study survey are customers of Föreningssparbanken (FSB), it would be interesting to see whether there are some significant differences between the satisfaction level of customers of FSB and all other customers along the different aspects and quality dimensions of the online banking services. This would help the authors judge to what extent the conclusions of the study can be generalized and to what extent they reflect the responses collected from the customers of FSB.

First of all, the results gained from the responses of the customers of FSB are compared with the general results. Doing this, no significant differences have been observed. For some of the items, the percentages of people who have stated different level of satisfaction differ with few percentage points at the most, which have led to slight changes in the ranking of items (questions), as far as the satisfaction level of customers with these items is concerned. Nevertheless, these changes are not significant and do not influence the final conclusions. What is important in this case is that according to the respective calculations, the rank of satisfaction of customers with the different quality dimensions does not change for both - FSB customers and all customers together, which have taken part in this study. In both cases, most customers have shown higher satisfaction with the Service Performance, followed by the Efficiency quality dimensions. At the same time, most customers have stated dissatisfaction with the Communication, followed by the Website Characteristics quality dimensions.

In order to see whether the responses of the customers of FSB could have influenced the overall conclusions of the analysis as they represent the majority of the responses, Frequency of Survey Responses in Percentage separately for both, only responses of customers of FSB and only responses of customers of other banks (non-FSB customers), have been calculated. The reason for performing these calculations is to help the authors compare the satisfaction level with the different items (questions) and quality dimensions of the two groups of respondents mentioned above. Such a comparison is a bit difficult, taking into consideration the fact that the number of items in this case is 17. Still, a look at the calculations performed for both cases has revealed that, although the satisfaction on different items differ with few percentage points in some cases, the differences are not significant and cannot change the final conclusions made based on the answers of all respondents. In this case, having differences in the satisfaction level of respondents is unavoidable, taking into consideration the fact that the satisfaction with 17 different items has been evaluated and that customers of 10 different banks are included in the study.

What is important in this case is to see the percentage of people that have stated 4 or below, 3 or below and 6 or 7 on the Likert Scale, for both cases along the different quality dimensions (Service Performance, Website Characteristics, Communication and Efficiency).

In both cases, considering only the responses of the customers of FSB and only the responses of those that use another bank, the results are almost the same. Looking at the data presented in **Table 2** in **Appendix VIII**, it can be seen that in both cases, most customers have shown higher satisfaction for the Service Performance, followed by the Efficiency quality dimensions. Moreover, most customers have stated dissatisfaction (3 or below on the Likert Scale) for the Communication, followed by the Website Characteristics quality dimensions. Although differences in the percentages exist between the two groups of customers, they are not that radical and should be considered acceptable, taking into consideration that in the second case the responses of the customers of a number of banks are included. Nevertheless, this comparison has been beneficial, because it has revealed that regardless of the bank, customers use, the ranking of the different quality dimensions as far as customers' satisfaction level is concerned does not change. This implies, that considering the satisfaction of customers with the different quality dimensions of the online banking services, the conclusions made and the recommendations given to banks' managers in this study can be considered applicable to different banks.

5 Conclusion and Discussions

In the following chapter on Conclusion and Discussions, final conclusions and discussions of the underlying study will be made. Furthermore, the authors of the thesis give their recommendations to banks' managers and give suggestions for further research in the field

5.1 Conclusions

Taking into consideration the huge investments banks make in Internet infrastructure, customer satisfaction and retention are turning into the crucial factors for success in online banking meaning that the generation of positive customer value on the Internet requires the establishment of long-term customer relationships (Bauer, Hammerschmidt & Falk, 2005). One of the ways for achieving high customer satisfaction and gaining the loyalty of customers is for banks to offer high quality services. That is why being able to measure and evaluate the quality of their online banking services is deemed important for banks in order for them to take action to correct those features of their online services which customers don't find that satisfactory.

Based on previously conducted studies, the authors of the thesis have decided to apply a slightly changed version of a model developed by Parasuraman, Zeithaml and Malhotra for measuring quality of online services to the banking context and see if and what should be changed in that model in order for an instrument to be developed for measuring the quality of online banking services in particular. Furthermore, based on the applied and later modified theoretical model, the authors made an attempt to evaluate the level of customers' satisfaction with the quality of different aspects of the online banking services the customers use.

For the purpose of the study, a survey has been conducted with 200 people, from which the responses from 170 have been used for the analysis. To analyze the data and test its reliability, Cronbach's Alpha Test of Reliability and Principal Component Analysis were conducted. The Cronbach's Alpha Test of Reliability proved the relative reliability of the dimensions used in the model. Conducting the Principal Component Analysis led to some changes in the initial theoretical model: the number of dimensions was decreased to four, including Service Performance, Website Characteristics, Communication and Efficiency; and three of the items pertaining to the initial theoretical model – Q2*, Q11* and Q15* were dropped from the model. Finally, the initial two scales of the model were combined into one final scale.

Thus, the final version of the developed in this study instrument for measuring the quality of online banking services consists of one scale with total of four quality dimensions: Service Performance, Website Characteristics, Communication and Efficiency. According to the conducted study, these are the service quality dimensions that banks should consider when evaluating the quality of their online banking services. Furthermore, seventeen items are used to describe these four dimensions. Banks might use the seventeen items described in this work to measure the quality of their online services along the four different dimensions of service quality presented in the study.

After modifying the theoretical model, in order to evaluate how customers perceive the quality of the different aspects of the online banking services they use, the authors of the thesis analyzed the Descriptive Statistics data presented in the study. Furthermore, the level

of satisfaction of customers with the different quality dimensions pertaining to the modified theoretical model was evaluated, in order to be concluded which aspects of the online banking services need improvement and attention and to give recommendations to banks' managers. In addition, the satisfaction level of customers with the different aspects and different quality dimensions have been evaluated separately for both, customers of Föreningssparbanken (FSB) and customers of all other banks included in the study. The results have shown that despite some slight differences, the overall conclusions and the ranking of the different quality dimensions as far as customers' satisfaction level is concerned does not change. This leads to the conclusion that considering the satisfaction of customers with the different quality dimensions of the online banking services, the conclusions made and the recommendations given to banks' managers in this study can be considered applicable to different banks.

Based on the performed evaluations mentioned above, the following conclusions can be made. First of all, most customers have shown dissatisfaction or indifference with the following aspects of the online banking services: prompt responses of the bank to customers' requests; design of the bank's website; quickly solution of customers' problems; the easiness to reach the bank by telephone and the easiness to find what the customer needs on the website. Secondly, banks seem to perform very well on the Service Performance and Efficiency dimensions of the offered online services as those dimensions rank highest on satisfaction of customers. Finally, the aspects consistently ranking highest on dissatisfaction are Communication and Website Characteristics which should be considered from banks' managers for immediate amendment.

Furthermore, what is interesting to be observed is that the aspects of the online services on which banks rank higher in satisfaction of customers like Service Performance and Efficiency are not specific for the Internet context, but are typical for the traditional settings as well. In comparison, the aspect of the online services on which banks rank higher in dissatisfaction like the Website Characteristics dimension is more Internet-specific. A reason for that might be that banks do not consider this feature important for the quality of their online services and have concentrated their efforts on the other aspects of the online services. Nevertheless, because of the lack of human interaction in the online space, it should not be forgotten that the website is the "*moment of truth*" between customers and their banks as far as online services are concerned, and as such the website should be consistent with the total quality efforts of the service provider, meaning that a high quality website is an important aspect of the offered online banking services.

5.2 Discussions

In the underlying study the authors have made an attempt to develop a model for measuring the quality of online banking services based on already developed model for measuring quality of online services. The conducted research showed that some changes were necessary to the initial theoretical model in order for higher reliability and consistency to be achieved. Furthermore, it should be taken into consideration that this attempt has led to a preliminary constructed model which needs to be further tested and modified based on surveys conducted with higher number of respondents from different age-groups and national contexts.

In addition, because of the time- and resource- constraints of the conducted study, the model was constructed to include limited number of quality dimensions and especially items (20 questions in total) so that the survey would be more convenient and easy to conduct. Although, the authors believe that such surveys with banks' customers (for the specific case) are better to be short and as precise as possible, it would be also good if this

thesis provokes interest in other researchers to develop more elaborated model based on the presented in this work instrument for measuring online banking services.

Finally, it should be considered also that the developed instrument can be used to measure the satisfaction level of customers with different aspects of online banking services, but does not show the relative importance of each of these aspects in relation to the others, which would be interesting to be measured and included in further researches as well. Next in this chapter the authors would present the practical implications of their findings and will give suggestions for further research.

5.3 Managerial Recommendations

As stated in the previous part on Discussions, there is need for further research and testing of the developed instrument in order for better understanding of the quality dimensions of online banking services and their relative importance to be achieved. Despite that, the findings from the present study have few important implications for practitioners.

The analysis of this work includes implications for banks' managers as far as the satisfaction level of their customers with different aspects of the online banking services is concerned. Showing with which features of the online services the customers are really satisfied and with which highly dissatisfied, can be used by banks' managers as a guideline for necessary actions leading to improvements of the quality of the online services they offer.

First of all, based on the analysis, customers have shown highest level of dissatisfaction or indifference with aspects of the online banking services such as: prompt responses of the bank to customers' requests by email or other means; design of the bank's website; quickly solution of customers' problems; the easiness to reach the bank by telephone and the easiness to find what the customer needs on the website. In comparison, customers seemed to be most satisfied with aspects of the service such as: well-known name and reputation of the bank; accuracy of online transactions; feeling safe in transactions with the bank and the non-misuse of personal information from the bank. What this means for practitioners is that they have been quite successful in building well-known name and reputation probably through well organized advertising campaigns; they are also quite successful in providing accurate and quick service and building confidence in customers. Nevertheless, what deserve their attention foremost are the aspects of the online banking services where most customers have shown dissatisfaction, namely the Communication and Website Characteristics quality dimensions.

Furthermore, what seems to be the case from the results of the analysis is that banks perform relatively well on issues of their online services such as Service Performance and Efficiency which are not specific for the Internet context but are typical for the traditional settings as well. In comparison, their performance seems to be not that satisfactory as far as an aspect of the online services such as Website Characteristics is concerned, which is highly specific for the online space. The conclusion is that managers might undervalue this aspect of the online services and concentrate their efforts on more traditional features of the services. This implies lack of understanding of and experience with the specific features and requirements of the online space. What is advisable for managers in this case is to gain better understanding and pay more attention to the Internet specific features of their online services, because they are very important part of the customer's experience and consequently of customer satisfaction with the online services. Because of the lack of human interaction over the Internet, banks' managers should not forget that the website is

the medium of interaction between the bank and its customers as far as the online banking services are concerned, and as such it should represent the total quality efforts of the bank.

In addition, the Communication dimension should be also given higher concern from managers, because it includes the way banks respond to their customers' requests and the easiness with which the bank is accessed by telephone when needed. Both these aspects might play crucial role in the recovery part of the service delivery process. Many studies have proven the importance of the recovery process for the total perception of service quality and if done well, the recovery can have positive effects on the development of trusting relationships with customers and can lead to increased customer satisfaction (Grönroos, 2000). As this dimension showed high dissatisfaction of customers and taking into consideration the importance it can have on the overall perceived quality, it can be recommended that managers make immediate corrections and improvements in order to enhance to total customer satisfaction.

Finally, it should be remembered that although the other dimensions such as Service Performance and Efficiency have relatively high percentage of people whose expectations have been met, in order for loyalty and positive word-of-mouth to be created, banks should strive to exceed their customers' expectations. Conclusively, the aspects connected with these dimensions can also be improved so that the expectations of customers are not only met, but exceeded, because in the contemporary competitive business environment, banks as service providers should strive for excellence.

5.4 Further Research

Because of the time-constraints and the specific conditions under which the study has been conducted, only 200 questionnaires were used to collect data and test the theoretical model used to measure quality of online banking services. Although the reliability and validity of the theoretical model used in the conducted study has been proven to be satisfactory, it should be accepted as a preliminary scale and tested further with higher number of respondents. Furthermore, because of the circumstances of the conducted study, the number of items used in the model to describe each quality dimension is limited and reduced on purpose because of resource- and time-constraints. Further research aimed at creating a more elaborated and detailed instrument for measuring quality of online banking services based on the developed in this work instrument might be conducted.

In addition, the authors of the thesis have chosen to target people aged between 16 and 34 in the underlying study. As banks might also be interested in people not included in this age range, a survey based on the developed instrument might be conducted to target respondents from different age ranges.

The underlying study was conducted in the Swedish context and as such is relevant only for the online services offered by Swedish banks and the experience of Swedish Internet banking users. It would be interesting to conduct similar researches in other national contexts as well.

Furthermore, the presented modified theoretical model was developed especially for the banking services in the online space. It would be interesting and challenging to test the model on other types of online services, of course with the necessary modifications and changes relevant for the new area of interest.

Finally, the developed instrument measures only the level of customer satisfaction with different quality dimensions characterizing online banking services, but does not show the relative importance of each dimension in comparison to the others. To what extent is given

aspect of the online banking services important for achieving customer satisfaction? Is there a difference in the requirements for given aspects of the online banking services among different kind of respondents- different age-groups, occupation, gender? These and other related questions seem worth investigating.

References

- Abels, E. G., White, M. D., & Hahn, K. (1999). A user-based design process for Web sites. *OCLC Systems and Services*, Vol. 15, No. 1, pp. 35-44.
- Amaratunga, D., Baldry, D., Sarshar, M. & Newton, R (2002). Quantitative and Qualitative research in the built environment: application of mixed research approach. *Work Study*, Vol. 51, No. 1, pp. 17-31.
- Bahia, K., & Nantel, J. (2000). A reliable and valid measurement scale for the perceived service quality of banks. *International Journal of Bank Marketing*, Vol. 18, No.2, pp. 84-91.
- Barnes, S.J., & Vidgen, R. (2001), An evaluation of cyber-bookshops: the WebQual method, *International Journal of Electronic Commerce*, Vol. 6, No.1, pp. 11-30.
- Bateson, J.E.G. (2000). *Perceived Control and the Service Experience*. Handbook of Service Marketing and Management from Swartz, T.A., & Iacobucci, D., (Eds.). Thousands Oaks, CA, pp. 127-144.
- Bauer, H., Hammerschmidt, M & Falk, T. (2005). Measuring the quality of E-banking portals. *International Journal of Bank Marketing*, Vol. 23, No. 2, pp. 153-175.
- Bennett, D., & Higgins, M. (1988). Quality means more than smiles. *ABA Banking Journal*, Vol. 46.
- Brady, M.K. & Cronin, J.J. (2001), "Some new thoughts on conceptualizing perceived service quality: a hierarchical approach", *Journal of Marketing*, Vol. 65, No.3, July, pp. 34-49.
- Broderick, A.J. & Vachrapompuk, S. (2002). Service quality in internet banking: the importance of customer role. *Marketing Intelligence and Planning* Vol. 20, No. 6, pp. 327-335.
- Bryant & Yarnold, (1995). Principal components analysis and exploratory and confirmatory factor analysis. In Grimm and Yarnold, *Reading and understanding multivariate analysis*. American Psychological Association Books
- Carman, J.M. (1990). Consumers' perceptions of service quality: an assessment of the SERVQUAL dimensions. *Journal of Retailing*, Vol. 66, spring, pp. 33-35.
- Centeno, C. (2003). Adoption of Internet Services in the Enlarged European Union: Lessons from the Internet Banking case. *European Commission Joint Research Centre*, Report EUR 20822 EN, June.
- Chatfield, C., & Collins, A.J., (1980). *Introduction to Multivariate Analysis*. London: Chapman & Hall.
- Cowling, A., & Newman, K. (1995). Banking on people: TQM, service quality, and human resources. *Personnel Review*, Vol. 24, No. 7, pp. 25-40.
- Cox, J., & Dale, B.G. (2001). Service quality and e-commerce: an exploratory analysis. *Managing Service Quality*, Vol. 11, No.2, pp. 121-131.
- Cronin, J.J., & Taylor, A.T. (1992). Measuring service quality: a re-examination and extension. *Journal of Marketing*, Vol. 56, July, pp. 55-68.

- D'Angelo, J., & Little, S.K. (1998). Successful Web pages: what are they and do they exist? *Information Technology and Libraries*, June, pp. 71-81.
- Dabholkar, P.A. (1996). Consumer Evaluations of New Technology-Based Self-Service Options: An Investigation of Alternative Models. *International Journal of Research in Marketing*, Vol. 13, No.1, pp. 29-51.
- Dabholkar, P. A., Shepherd, C. D., & Thorpe, D. I. (2000). A comprehensive framework for service quality: an investigation of critical conceptual and measurement issues through a longitudinal study. *Journal of Retailing*, Vol. 76, No. 2, summer, pp. 131-139.
- Doll, W.J., & Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *MIS Quarterly*, June, pp. 259-274.
- Ennew, C.T., Reed, G.V., & Binks, M.R. (1993). Importance-performance analysis and the measurement of service quality. *European Journal of Marketing*, Vol. 27, No. 2, pp. 59-70.
- Eriksson, L.T., & Wiedersheim-Paul, F. (1997). *Att Utreda, Forska och Rapportera*. Malmö: Liber Ekonomi.
- Foster, T. (1998). *Industrial Marketing Communication: An Empirical Investigation of the use of marketing communication tools*. Department of Business Administration and Social Sciences. Lulea University of Technology.
- Fredriksson, O. (2003). Internet-based self-services: Relational Aspects of E-Banking- a private client survey analysis. *IMIT working paper series*, 136.
- Garson, D. (2002). *Guide to writing empirical papers, theses and dissertations*. CRC Press.
- Gonzales, M., Quesada, G., Picado, F. & Eckelman, C. (2004). Customer satisfaction using QFD: an e-banking case. *Managing Service Quality*. Vol. 14, No. 4, pp. 317-330.
- Green, S., Salkind, N. and Akey, T. (2000), *Using SPSS for Windows: analyzing and understanding data*, NJ, Upper Saddle River: Prentice Hall.
- Grönroos, C. (2000). *Service Management and Marketing: a customer Relationship Management Approach*, 2nd Ed. England: John Wiley & Sons, ltd.
- Grosuch, R.L. (1983). *Factor Analysis*. Hillsdale, NJ: Erlbaum.
- Gummesson, E. (1979). The marketing of professional services – an organizational dilemma. *European Journal of Marketing*, Vol. 13, No
- Gunasekaran, A., & Love, P. (1999). Current and future directions of multimedia technology in business. *International Journal of Information Management*, Vol. 19, No.2, pp 105-120.
- Hardy, M., & Bryman, A. (2004). *Handbook of Data Analysis*. SAGE Publications
- HR-Focus (2000). Online recruiting: what works, what doesn't. *HR Focus*, Vol. 00, No. 3, pp. 1& 11-15.
- Hyde, K. (2000). Recognizing deductive processes in qualitative research. *Qualitative Market Research: an International Journal*, Vol. 3, No.2, pp. 82-89.

- Iwaarden, J., & Wiele, T., Ball, L. & Millen, R. (2003). Applying SERVQUAL to Websites: an exploratory study. *International Journal of Quality and Reliability Management*. Vol. 20, No.8, pp. 919- 935.
- Jayawardhena, C. (2004). Measurement of service quality in internet banking: the development of an instrument. *Journal of Marketing Management*, Vol. 20, pp. 185-207.
- Jayawardhena, C., & Foley, P. (2000). Changes in the banking sector – the case of Internet banking in the UK. *Internet Research: Electronic Networking Applications and Policy*, Vol.10, No.1, pp. 19-30.
- Johnston, R. (1995). The determinants of service quality: satisfiers and dissatisfiers. *International Journal of Service Industry Management*, Vol. 6, No. 5, pp. 53-71.
- Jun, M., & Cai, S. (2001). The key determinant of internet banking service quality: a content analysis. *International Journal of Bank Marketing*, Vol. 19, No. 7, pp. 276- 291
- Jun, M., Yang, Z. & Kim, D. (2004). Customers' perceptions of online retailing service quality and their satisfaction. *International Journal of Quality and Reliability Management*, Vol. 21, No.8, pp. 817-840.
- Kaynama, S.A., & Black, C.I. (2000). A proposal to assess the service quality of online travel agencies. *Journal of Professional Services Marketing*, Vol. 12, No. 1, pp. 63-68 .
- Kim, J.K., Han, C.H., Choi, S.H. & Kim, S.H. (1998). A knowledge based approach to the quality function deployment. *Computers and Industrial Engineering*, Vol. 35, No. 1/2, pp. 233-236.
- Li, W., Shi, T., Liao, G. & Yang, S. (2003). Feature extraction and classification of gear faults using principal component analysis. *Journal of Quality in Maintenance Engineering*, Vol.9, No.2, pp.132-143.
- Li, Y.N., Tan, K.C. & Xie, M. (2002). Measuring web-based service quality. *Total Quality Management*, Vol. 13, No. 5, pp. 685-700.
- Liu, C., & Arnett, K.P. (2000). Exploring the factors associated with Web site success in the context of electronic commerce. *Information and Management*, Vol. 38, pp.23-34
- Madu, C., & Madu A. (2002). Dimensions of e-quality. *International Journal of Quality and Reliability Management*, Vol. 19, No. 3, pp. 246-258.
- Mattila, M., Karjaluoto, H. & Pentto, T. (2002). Internet adoption factors in Finland. University of Lyvaeskyla.
- Meuter, M.L., Ostrom, A.L., Roundtree, R.I., & Bitner, M.J. (2000). Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters. *Journal of Marketing*, Vol. 64, July, pp. 50-64.
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative Data Analysis*. Thousand Oaks, CA: SAGE Publications.
- Mols, N.P. (2000). The Internet and banks' strategic distribution channel decisions. *International Journal of Bank Marketing*, Vol. 17, No. 6, pp. 295-300.
- Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric Theory*. New York: McGraw-Hill.

- Oakshott, L. (1998). *Essential Quantitative Methods for Business, Management and Finance*. PALGRAVE.
- Oppewal, H., & Vriens, M. (2000). Measuring perceived service quality using integrated conjoint experiments. *International Journal of Bank Marketing*, Vol. 18, No. 4, pp. 154-169.
- Pallant, J. (2005). *SPSS Survival Manual: a step by step guide to data analysis using SPSS for Windows, Version 12, 2nd Ed.* Buckingham: Open University Press.
- Parasuraman, A., & Grewal, D. (2000). The impact of technology on the quality-value-loyalty chain: a research agenda. *Journal of the Academy of Marketing Science*, Vol. 28, No. 1, pp. 168-174.
- Parasuraman, A., Berry, L., & Zeithaml, V. (1991). Refinement and assessment of SERVQUAL scale. *Journal of Retailing*, Vol. 67, No. 4, pp. 420-450.
- Parasuraman, A., Zeithaml V., & Malhotra A. (2005). E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality. *Journal of Service Research*, Vol.7, No.3, pp. 213-233.
- Parasuraman, A., Zeithaml V.A., & Berry, L.L. (1988). SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, Vol. 64, Spring, pp. 12-40.
- Reichheld, F.F., & Schefter, P. (2000). E-loyalty: your secret weapon on the Web. *Harvard Business Review*, July-August, pp. 105-13.
- Santos, J. (2003). E-service quality: a model of virtual service quality dimensions. *Management Service Quality*, Vol. 13, No. 3, pp. 233-46.
- Schneider, B., & White, S. (2004). *Service Quality: Research Perspectives*. Thousand Oaks: SAGE Publications.
- Stafford, M.R. (1996). Demographic discriminators of service quality in the banking industry. *Journal of Services Marketing*, Vol. 10, No. 4, pp. 6-22.
- Statistical Bureau Sweden (SBS). Retrieved February, 2006, from <http://www.scb.se>
- Swedish Bankers' Association (September, 2005). *Banks in Sweden*. Retrieved February, 2006 from http://www.bankforeningen.se/upload/banks_in_sweden2005_002.pdf.
- Szymanski, D.M., & Hise, R.T. (2000). E-satisfaction: an initial examination. *Journal of Retailing*, Vol. 76, No. 3, pp. 309-322.
- Tabachnick, B.G., & Fidell, L.S. (2001). *Using Multivariate Statistics (4th Ed)*. New York: Harper Collins.
- Van Riel, A., Liljander, V., & Jurriens, P. (2001). Exploring consumer evaluations of e-services: a portal site. *International Journal of Service Industry Management*, Vol. 12, No. 4, pp. 359-377.
- Waite, K., & Harrison, T. (2002). Consumer expectations of online information provided by bank Web sites. *Journal of Financial Services Marketing*, Vol.6, No.4, pp. 309-323

- Wang, Y., Lo, H., & Hui, Y. (2003). The antecedents of service quality and their influences on bank reputation: evidence from the banking industry in China. *Managing Service Quality*, Vol. 13, No.1, pp.72-83
- Yang Z., Jun M. and Peterson R., (2004): "Measuring Customer Perceived Online Service Quality: Scale Development and Managerial Implications", *International Journal of Operations and Production Management*, Vol. 24, No. 11, pp. 1149-1174.
- Yang, Z. (2001). Customer perceptions of service quality in internet-based electronic commerce. *Proceedings of the 30th EMAC Conference*, Bergen, pp. 8-11.
- Yin, K. (1994). *Case Study Research: Design and Methods*. Newbury Park, CA: SAGE Publications.
- Zeithaml, V.A., Parasuraman, A. & Malhotra, A. (2000). A Conceptual Framework for Understanding E-Service Quality: Implications for Future Research and Managerial Practice. Marketing Science Institute, *Working paper*, Report Number 00-115
- Zeithaml, A.V., Berry, L.L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of Marketing*, Vol. 60, April, pp.31-46
- Zeithaml, V.A. (2002). Service excellent in electronic channels. *Managing Service Quality*, Vol. 12, No. 3, pp.135-138
- Zikmund, W. G. (2000). *Business Research Methods, 6th Ed.* Orlando: Dryden Press.

Appendix I Users of Internet Banking in Percentage during the first quarter of 2005 (Statistical Central Bureau Sweden (SCB))

Table 1 Users of Internet banking during the first quarter of 2005 (English translation in brackets)

Ålder (Age)	Andel i procent (proportion in percent)			Absoluta tal (absolute numbers)		
	Totalt	Kvinnor	Män	Totalt	Kvinnor	Män
Utbildningsnivå (Education Level)	(Total)	(Women)	(Men)	(Total)	(Women)	(Men)
Sysselsättning (Occupation)						
Familjetyp (Family-type)						
16-24	48	43	53	500,340	207,211	293,129
25-34	74	70	77	811,756	394,264	417,492
35-44	61	57	65	823,270	365,499	457,772
45-54	48	45	52	529,014	247,477	281,537
55-74	33	25	41	642,446	249,980	392,466
Förgymnasial utbildning (pre-high-school education)	27	19	34	410,670	130,905	279,764
Gymnasial utbildning (high-school education)	50	43	56	1,514,655	665,122	849,534
Eftergymnasial utbildning (post-high-school education)	70	65	76	1,381,502	668,403	713,099
Studerande (Students)	42	40	44	304,789	147,416	157,373
Anställda (Employed)	60	54	65	2,342,357	1,061,596	1,280,761
Egna företagare (Business owners)	63	64	63	230,378	51,120	179,258
Arbetslösa (Unemployed)	42	43	40	150,764	72,609	78,155
Pensionärer och andra (Retired and others)	24	20	30	278,539	131,689	146,850
En vuxen utan barn (one adult without children)	45	36	54	610,321	232,881	377,440
En vuxen med barn (one adult with children)	46	49	39	79,210	59,548	19,662
Två vuxna utan barn (two adults without children)	48	43	54	1,008,878	456,641	552,237
Två vuxna med barn (two adults with children)	67	61	73	875,429	408,894	466,535
Tre eller fler vuxna utan barn (three or more adults without children)	43	42	44	383,053	153,098	229,955
Tre eller fler vuxna med barn (three or more adults with children)	49	42	56	349,936	153,368	196,567
Totalt (Total)	51	45	56	3,306,827	1,464,430	1,842,397

Source: Statistical Bureau Sweden (<http://www.scb.se>)

Appendix II Online Systems Quality Studies

Names of researchers and year of conducted research	Online systems quality dimensions
Doll and Torkzadeh (1988)	Content, accuracy, format, ease of use, timeliness
D'Angelo and Little (1998)	Navigational characteristics, visual characteristics and practical considerations (images, background, color, sound, video, media and content)
Abels et. Al. (1999)	Use, content, structure, linkage, search, appearance
Jayawardhena and Foley (2000), Internet Banking	speed to download, content, design, interactivity, navigation and security
Liu and Arnett (2000)	System use, system design quality, information quality, playfulness
Cox and Dale (2001)	Ease of use, customer confidence, online resources, relationship services
Waite and Harrison (2002) (Internet Banking)	technicalities, decision making convenience, interactive interrogation, specialty information, search efficiency, physical back-up and technology thrill
Santos (2003)	Ease of use, appearance, linkage, structure and layout, content

Appendix III Ddescription of the questions pertaining to each quality dimension and their number in the questionnaire

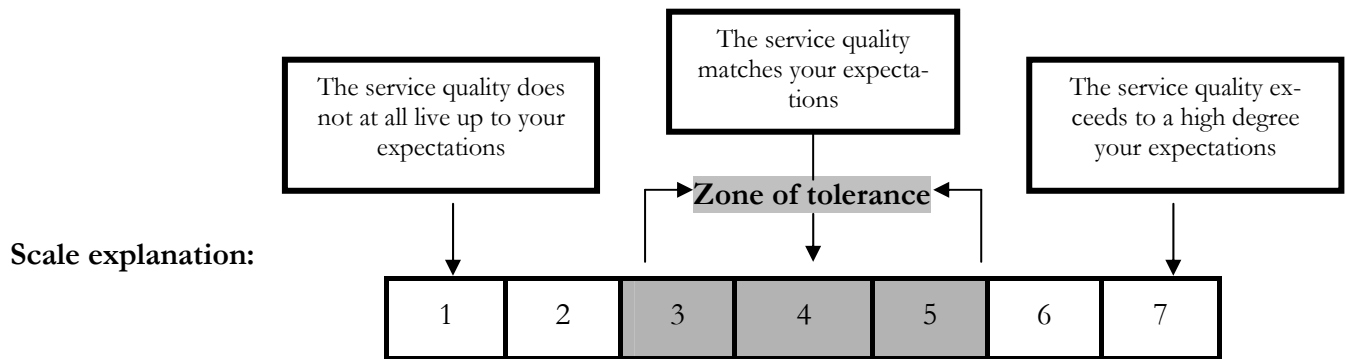
Quality Dimension	Question	Position number of the question in the questionnaire
Efficiency	I am able to get on the site quickly	1
	It is easy to find what I need on the website	9
	It is quick to complete a transaction through the bank's website	16
	Using the bank's website does not require a lot of effort	18
	The organization and structure of online content is easy to follow	19
Fulfillment	When the bank promises to do something by a certain time, it does so	2
	My online transactions with the bank are always accurate	10
	The service delivered through the bank's website is quick	17
	The bank's site makes accurate promises about the services being delivered	20
System Availability	The site is always available for business	3
	This site launches and runs right away	11
Privacy	The bank does not misuse my personal information	4
	I feel safe in my transactions with the bank	12
Assurance/ Trust	I have confidence in the bank's service	5
	The bank's name is well-known and has good reputation	13
Site Aesthetics	The website design is aesthetically attractive	6
Responsiveness	The bank gives prompt responses to my requests by e-mail or other means	7
	The bank quickly resolves problems I encounter with my online transactions	14
Contact	The bank is easily accessible by telephone	8
	The site has customer service representatives available online	15

Appendix IV Questionnaire on the Quality of Online Banking Services

Questionnaire on the Quality of Online Banking Services

Based on your experiences as a consumer of **online banking services**, please provide information on how you perceive the quality of the online banking services you use **in comparison to** your expectations. Please circle the number of your choice.

If you do not use online banking services, please do not fill out the questionnaire!



- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 1. I am able to get on the site quickly | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. When the bank promises to do something by a certain time, it does so | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. The site is always available for business | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. The bank does not misuse my personal information | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I have confidence in the bank's service | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. The website design is aesthetically attractive | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. The bank gives prompt responses to my requests by e-mail or other means | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. The bank is easily accessible by telephone | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. It is easy to find what I need on the website | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. My online transactions with the bank are always accurate | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. This site launches and runs right away | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I feel safe in my transactions with the bank | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 13. The bank's name is well-known and has good reputation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. The bank quickly resolves problems I encounter with my online transactions | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. The site has customer service representatives available online | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 16. It is quick to complete a transaction through the bank's website | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. The service delivered through the bank's website is quick | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. Using the bank's website does not require a lot of effort | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. The organization and structure of online content is easy to follow | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. The bank's site makes accurate promises about the services being delivered | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Please provide the following information:

Name of your bank

Gender: Male Female

Age:

Length of Internet Banking Use: < 3 months

3-12 months

> 12 months

Frequency of Internet Banking Transactions: per month

Thank you for your time!

Appendix V Descriptive Statistics of the Empirical Data

	Q (ques- tion)	Variable	Median	Mean	Standard Deviation	N
Efficiency	Q1*	I am able to get on the site quickly	6	5.5291	1.126	172
	Q9*	It is easy to find what I need on the website	5	4.9708	1.365	171
	Q16*	It is quick to complete a transaction through the bank's website	6	5.7209	1.151	172
	Q18*	Using the bank's website does not require a lot of effort	6	5.4709	1.272	172
	Q19*	The organization and structure of online content is easy to follow	5	5.2515	1.293	171
Fulfillment	Q2*	When the bank promises to do something by a certain time, it does so	5	5.2275	1.269	167
	Q10*	My online transactions with the bank are always accurate	6	5.9240	1.046	171
	Q17*	The service delivered through the bank's website is quick	5	5.3491	1.171	169
	Q20*	The bank's site makes accurate promises about the services being delivered	5	5.3353	1.051	167
System Availability	Q3*	The site is always available for business	6	5.3905	1.337	169
	Q11*	This site launches and runs right away	5	5.2632	1.244	171
Privacy	Q4*	The bank does not misuse my personal information	6	5.8683	1.195	167
	Q12*	I feel safe in my transactions with the bank	6	5.9070	1.077	172
Assurance /Trust	Q5*	I have confidence in the bank's service	6	5.7588	1.128	170
	Q13*	The bank's name is well-known and has good reputation	6	6.000	0.991	172
Site Aesthetics	Q6	The website design is aesthetically attractive	4	4.3779	1.285	172
Responsiveness	Q7*	The bank gives prompt responses to my requests by e-mail or other means	4	4.4295	1.24	156
	Q14*	The bank quickly resolves problems I encounter with my online transactions	5	5.0962	1.163	156
Contact	Q8*	The bank is easily accessible by telephone	5	5.1524	1.399	164
	Q15*	The site has customer service representatives available online	4	4.4698	1.402	149

Appendix VI Theory and Tables supporting the statistical analysis of the thesis (Principal Component Analysis results)

For the underlying study Factor Analysis with Principal Component Analysis as an extraction method has been applied. According to Bryant and Yarnold (1995), in order for researchers to apply Factor Analysis, the subjects-to-variables ratio should be no lower than 5. In this study, the authors use 170 responses (subjects) to perform Factor Analysis with Principal Component Analysis as an extraction method on 20 variables, which means that the rule for applicability of this analysis is achieved.

Before Factor Analysis is performed, a check for outliers should be carried out. Outliers are cases with values significantly below or above the majority of all other cases (Pallant, 2005). Using SPSS, a check for outliers can be done, which shows those cases that are outliers (cases that extend more than 1.5 box-lengths from the edge of the box of a Box plot) and those that are extreme outliers (cases that extend more than 3 box-lengths from the edge of the box of a Box plot). According to some statistics writers, all extreme outliers should be removed from the data file, before performing an analysis of that data (Pallant, 2005).

Furthermore, before the conduction of Factor Analysis, Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy should be performed to confirm the adequacy and suitability of the data for Factor Analysis. In order for the data to be considered appropriate for conducting Factor Analysis, the result of the Bartlett's Test of Sphericity should be significant ($p < 0.05$) and the result of KMO Measure of Sampling Adequacy should exceed the minimum level of 0.6 for good Factor Analysis (Tabachnick & Fidell, 2001). The results of these tests in the underlying study are presented in the table **KMO and Bartlett's Test** below.

Factor analysis is a data-reduction method "*used to identify factors that statistically explain the variation and co-variation among measures*" (Green, Salkind & Akey, 2000, p. 292). The variables in such an analysis preferably should be quantitative, have a wide range of scores and be symmetrically distributed. Factor analysis includes two steps to be performed: make initial decision about the number of factors (Principal Component Analysis is used in this step) and then manipulate the outputs to make the factors more easy to understand and to make final decisions about the number of factors (Varimax Rotation Method can be used in this step) (Green, Salkind & Akey, 2000).

Conducting the Principal Component Analysis with Varimax Rotation Method has led to the results presented in the tables entitled **Communalities, Correlation Matrix, Total Variance Explained, Component Matrix, Rotated Component Matrix as well as a Scree Plot**.

The Correlation Matrix shows the correlation coefficients between the different variables included in the analysis. **The Correlation Matrix** should include at least some correlation coefficient of 0.3 or above, in order for it to be considered suitable for Factor Analysis. The suitability of the data for Factor Analysis can also be proven by conduction of Bartlett's Test of Sphericity and KMO Measure of Sampling Adequacy presented above (Pallant, 2005)

The Component Matrix contains *factor loadings* which represent the correlation coefficients between the variables (rows in the table) and the factors (columns in the table). The percent of variance in the variable explained by given factor is represented by the squared factor loading (Garson, 2002).

The value that a factor loading should have in order for that variable to be considered a defining part of that factor is purely arbitrary. Nevertheless, a minimum of 0.3 or 0.35 is used by common social science practice. According to the research context the value of the factor loadings can have different interpretation. For a Likert Scale studies a 0.6 might be required for the factor loading to be considered high (Garson, 2002).

Communality is used to measure the percent of variance in a given variable explained by all the factors together. It can be interpreted as the reliability of the indicator. If the communality value of given variable is low, then this variable should be probably removed from the model, because the factor it pertains to cannot explain its variance enough. Nevertheless, the interpretation of the values of communalities should be done in relation to the interpretation of the factors. Sometimes, communality of **0.75** can be considered high and under other circumstances communality of **0.25** can be considered sufficient. What is important is the role that this variable plays in explaining given factor, and when the communality is higher, this role is also greater. The table on **Communalities** consists of Initial and Extracted Values. The Initial Values will be always 1.0 as in this case the number of factors is equal to the number of variables. The extracted value represents the percent of variance in a given variable explained by the extracted factor. As in this case the extracted factors will be less than all possible values, the extracted value will be lower than 1.0 (Garson, 2002).

In the table **Total Variance Explained**, **eigenvalues** are presented. The variance in all the variables which is accounted for by given factor is measured by the eigenvalue for this factor. If the eigenvalue of a given factor is low, this means that this factor explains little of the variance in the variables and can be dismissed from the model. Thus, the eigenvalue measures the amount of variation in the variables which is explained by a given factor (the total variance in the table **Total variance explained** should be equal to the number of variables). Furthermore, in the table **Total variance explained**, the initial eigenvalues and those after extraction are the same when Principal Component Analysis is performed, and the eigenvalues in the column “Rotated Sums of Squared Loadings” will be lower (Garson, 2002). The data presented in the table **Total Variance Explained** can be used to determine the number of factors to extract, following one of the most common techniques for extraction of factors – Kaiser’s criterion (eigenvalue rule). According to the Kaiser’s criterion the number of factors to be extracted should equal the number of eigenvalues higher than 1 (Pallant, 2005).

Another approach for determining the number of factors to be extracted is by using the **Scree plot** (Catell’s scree test). According to this method, the number of factors to be extracted should equal the number of points above the point at which the shape of the curve on the **Scree plot** changes its direction and becomes more horizontal (Pallant, 2005).

In order to make the output of the analysis easier to understand **Rotation** can be used which is also necessary to help for the interpretation of factors. After Rotation is performed, the eigenvalues of given factors and the factor loadings will be changed. There are exists number of Rotation Methods and one of the most common ones is the **Varimax Rotation Method**, which makes it possibly easiest to associate given variable with a single factor (Garson, 2002).

The tables presented in this Appendix show the results of conducted Principal Component Analysis in tabular and graphical form. Tables on **Communalities**, **Correlation Matrix**, **Total Explained Variance**, **Component Matrix**, **Rotated Component Matrix** as well as a **Scree Plot** for the whole data set are presented.

Bartlett's Test of Sphericity and KMO Measure of Sampling Adequacy

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.894
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.
	1338.487
	190
	.000

Principal Component Analysis

(the tables presented below are the result of conducted Principal Component Analysis on all variables (items) with four factors extracted)

Communalities

	Initial	Extraction
Q1	1.000	.418
Q2	1.000	.700
Q3	1.000	.457
Q4	1.000	.595
Q5	1.000	.519
Q6	1.000	.602
Q7	1.000	.641
Q8	1.000	.525
Q9	1.000	.575
Q10	1.000	.569
Q11	1.000	.398
Q12	1.000	.658
Q13	1.000	.550
Q14	1.000	.609
Q15	1.000	.655
Q16	1.000	.711
Q17	1.000	.743
Q18	1.000	.655
Q19	1.000	.783
Q20	1.000	.590

Extraction Method: Principal Component Analysis.

Correlation Matrix

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Correlation	Q1	1.000	.420	.351	.399	.349	.288	.329	.321	.309	.440	.354	.371	.368	.370	.267	.332	.406	.480	.259	.360
	Q2	.420	1.000	.376	.450	.331	.224	.450	.383	.305	.399	.259	.322	.320	.580	.242	.170	.359	.230	.263	.398
	Q3	.351	.376	1.000	.492	.388	.291	.235	.190	.308	.447	.404	.334	.331	.466	.250	.309	.400	.335	.257	.296
	Q4	.399	.450	.492	1.000	.496	.237	.227	.292	.358	.448	.277	.506	.479	.490	.260	.337	.471	.436	.466	.475
	Q5	.349	.331	.388	.496	1.000	.321	.243	.255	.308	.388	.293	.643	.406	.459	.328	.376	.373	.435	.396	.411
	Q6	.288	.224	.291	.237	.321	1.000	.448	.336	.430	.343	.323	.318	.204	.323	.304	.180	.229	.360	.515	.376
	Q7	.329	.450	.235	.227	.243	.448	1.000	.366	.348	.301	.311	.242	.175	.426	.336	.214	.329	.179	.324	.228
	Q8	.321	.383	.190	.292	.255	.336	.366	1.000	.505	.369	.314	.300	.238	.370	.366	.220	.224	.255	.346	.278
	Q9	.309	.305	.308	.358	.308	.430	.348	.505	1.000	.413	.317	.352	.226	.377	.393	.353	.394	.359	.536	.409
	Q10	.440	.399	.447	.448	.388	.343	.301	.369	.413	1.000	.517	.622	.533	.474	.309	.378	.489	.434	.382	.490
	Q11	.354	.259	.404	.277	.293	.323	.311	.314	.317	.517	1.000	.428	.347	.458	.364	.208	.418	.467	.377	.468
	Q12	.371	.322	.334	.506	.643	.318	.242	.300	.352	.622	.428	1.000	.496	.511	.308	.388	.444	.485	.472	.501
	Q13	.368	.320	.331	.479	.406	.204	.175	.238	.226	.533	.347	.496	1.000	.377	.386	.357	.499	.352	.230	.353
	Q14	.370	.580	.466	.490	.459	.323	.426	.370	.377	.474	.458	.511	.377	1.000	.393	.401	.487	.410	.399	.485
	Q15	.267	.242	.250	.260	.328	.304	.336	.366	.393	.309	.364	.308	.386	.393	1.000	.449	.513	.378	.343	.382
	Q16	.332	.170	.309	.337	.376	.180	.214	.220	.353	.378	.208	.388	.357	.401	.449	1.000	.629	.463	.314	.340
	Q17	.406	.359	.400	.471	.373	.229	.329	.224	.394	.489	.418	.444	.499	.487	.513	.629	1.000	.563	.425	.502
	Q18	.480	.230	.335	.436	.435	.360	.179	.255	.359	.434	.467	.485	.352	.410	.378	.463	.563	1.000	.608	.493
	Q19	.259	.263	.257	.466	.396	.515	.324	.346	.536	.382	.377	.472	.230	.399	.343	.314	.425	.608	1.000	.616
	Q20	.360	.398	.296	.475	.411	.376	.228	.278	.409	.490	.468	.501	.353	.485	.382	.340	.502	.493	.616	1.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.160	40.801	40.801	8.160	40.801	40.801	4.291	21.454	21.454
2	1.456	7.281	48.082	1.456	7.281	48.082	2.881	14.404	35.859
3	1.257	6.285	54.367	1.257	6.285	54.367	2.399	11.996	47.855
4	1.080	5.400	59.767	1.080	5.400	59.767	2.382	11.912	59.767
5	.880	4.402	64.169						
6	.826	4.132	68.301						
7	.762	3.809	72.110						
8	.748	3.739	75.849						
9	.721	3.604	79.452						
10	.615	3.074	82.526						
11	.585	2.926	85.452						
12	.470	2.349	87.801						
13	.433	2.165	89.967						
14	.374	1.871	91.837						
15	.350	1.751	93.588						
16	.333	1.664	95.253						
17	.269	1.345	96.597						
18	.250	1.249	97.846						
19	.232	1.159	99.005						
20	.199	.995	100.000						

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component			
	1	2	3	4
Q1	.607			
Q2	.582		.575	
Q3	.585		.301	
Q4	.684			
Q5	.650			
Q6	.541	.478		
Q7	.508	.524		
Q8	.529	.469		
Q9	.623	.376		
Q10	.729			
Q11	.623			
Q12	.724			
Q13	.607	-.379		
Q14	.731			
Q15	.588			.501
Q16	.585			.469
Q17	.728			.358
Q18	.695		-.369	

Q19	.675		-.433	-.302
Q20	.707			

Extraction Method: Principal Component Analysis.
a 4 components extracted.

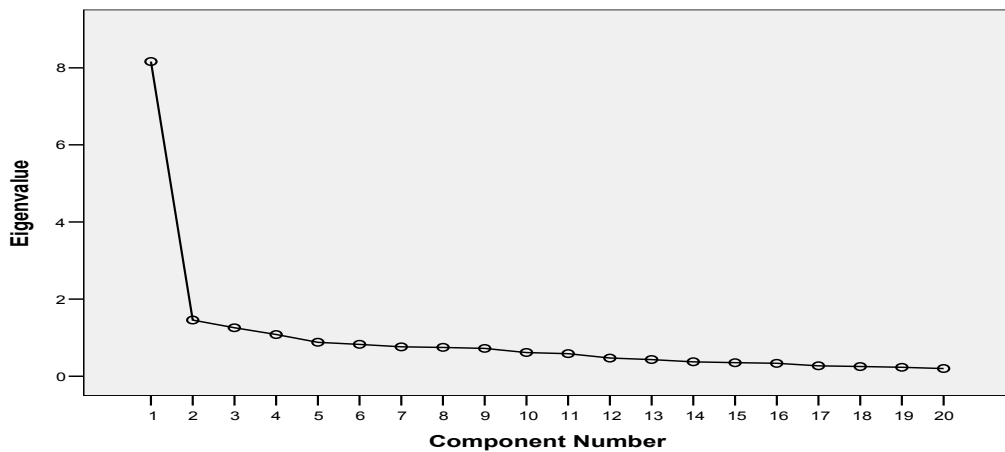
Rotated Component Matrix(a)

	Component			
	1	2	3	4
Q1	.505		.308	
Q2	.590		.590	
Q3	.625			
Q4	.710			
Q5	.608	.355		
Q6		.630	.444	
Q7			.767	
Q8			.645	
Q9		.514	.474	
Q10	.627			
Q11	.400	.378		
Q12	.659	.441		
Q13	.627			.393
Q14	.593		.425	
Q15			.352	.692
Q16				.790
Q17	.428			.709
Q18	.373	.582		.420
Q19		.828		
Q20	.437	.585		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 13 iterations.

Scree Plot

Scree Plot



Appendix VII Tables and Graphs on Frequency of Survey Responses in Percentage

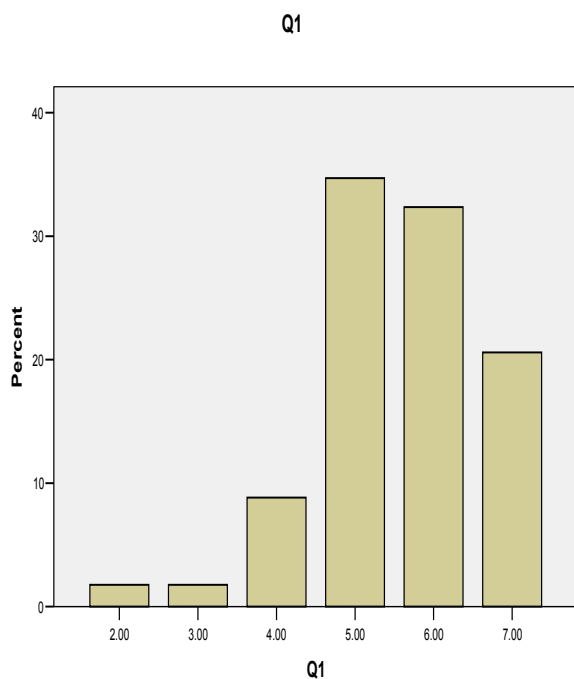
Table 1 Frequency of Responses in Percentage (Valid Percentages)

Frequency of Responses in Percentage																	
Scale	Q1	Q3	Q4	Q5	Q10	Q12	Q13	Q14	Q6	Q9	Q18	Q19	Q20	Q7	Q8	Q16	Q17
1		.6							1.2	1.8	.6	1.2		1.9	1.2		.6
2	1.8	1.2		.6					5.9	2.4	.6	1.2		3.2	1.8	1.2	
3	1.8	6.0	3.0	2.4	1.8	2.4	1.2	3.9	14.7	8.3	4.7	4.7	1.2	9.0	7.4	2.9	3.0
4	8.8	16.2	13.9	7.7	7.7	7.6	5.9	31.6	31.2	17.8	14.1	14.8	23.0	45.8	22.1	7.1	16.8
5	34.7	21.6	15.7	26.2	19.5	20.0	18.2	26.5	31.2	31.4	24.7	33.1	28.5	20.6	23.3	23.5	33.5
6	32.4	31.7	26.5	32.7	36.1	34.1	38.2	24.5	10.0	27.2	31.8	27.8	33.3	12.9	23.9	38.2	28.1
7	20.6	22.8	41.0	30.4	34.9	35.9	36.5	13.5	5.9	11.2	23.5	17.2	13.9	6.5	20.2	27.1	18.0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Missing Number of Responses		3	4	2	1			15		1		1	5	15	7		3

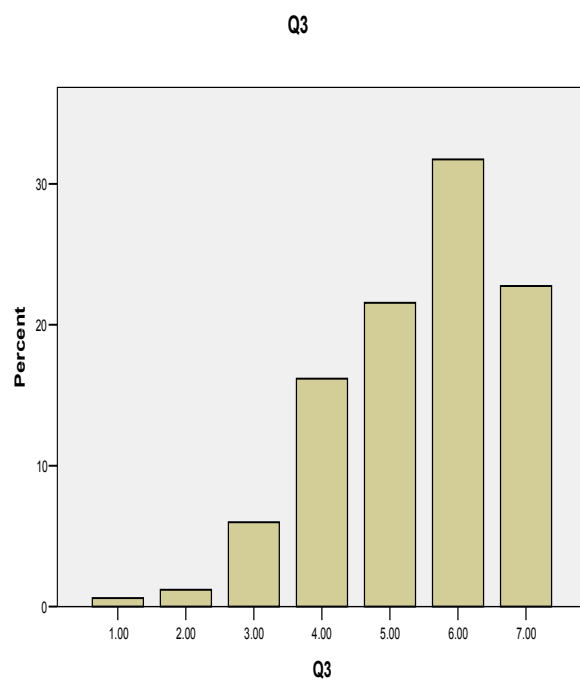
Graphs on Frequency Distribution of Survey Responses in Percentage (divided according to quality dimension)

Service Performance

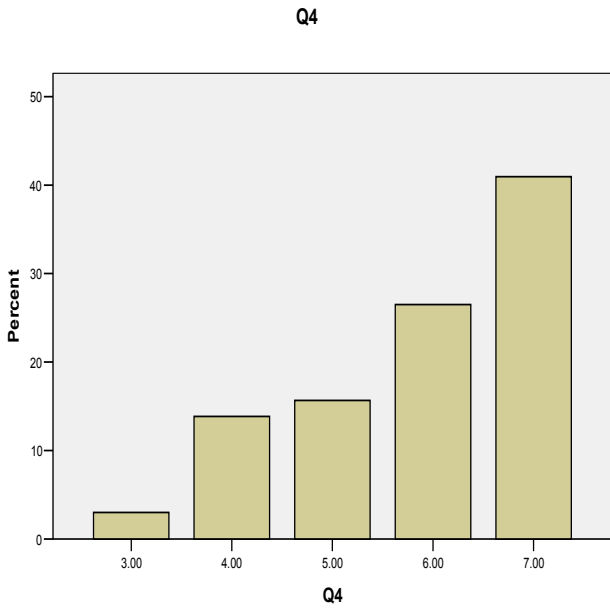
Graph 1 Q1*



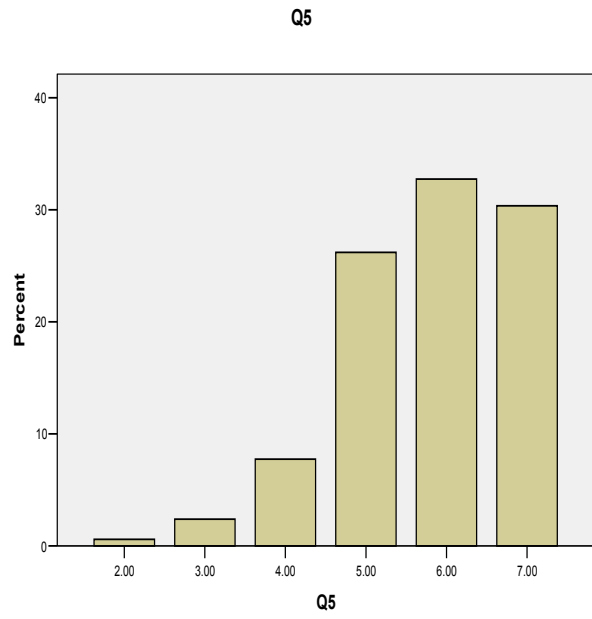
Graph 2 Q3*



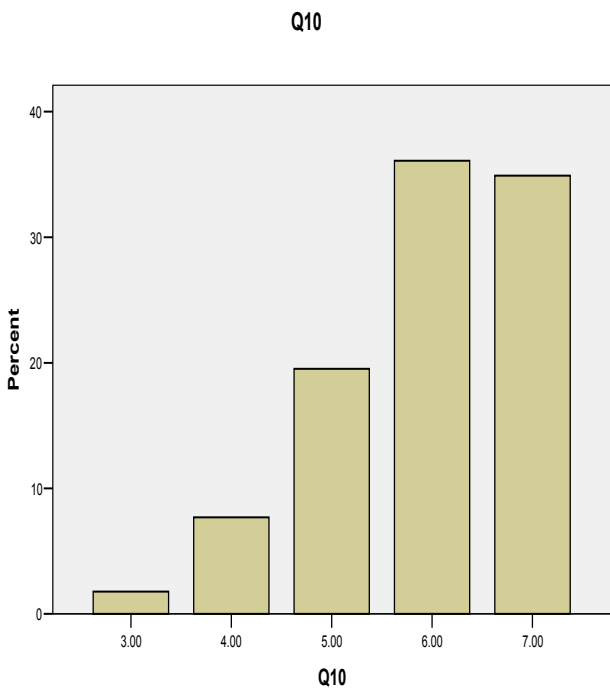
Graph 3 Q4*



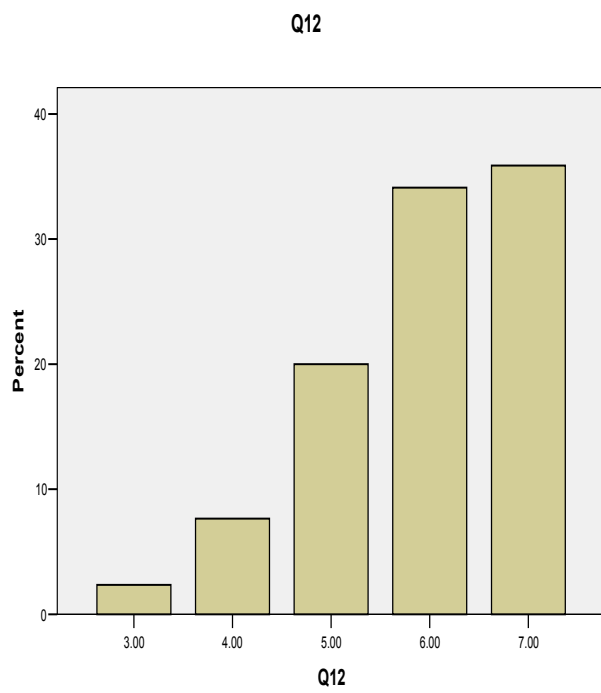
Graph 4 Q5*



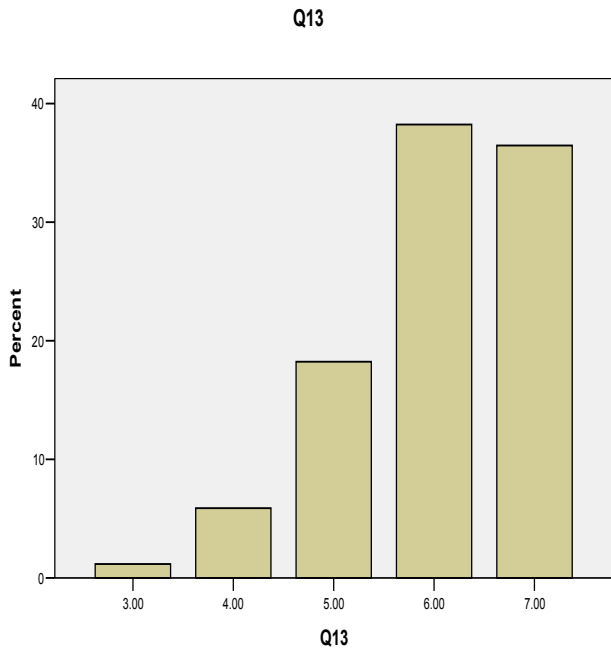
Graph 5 Q10*



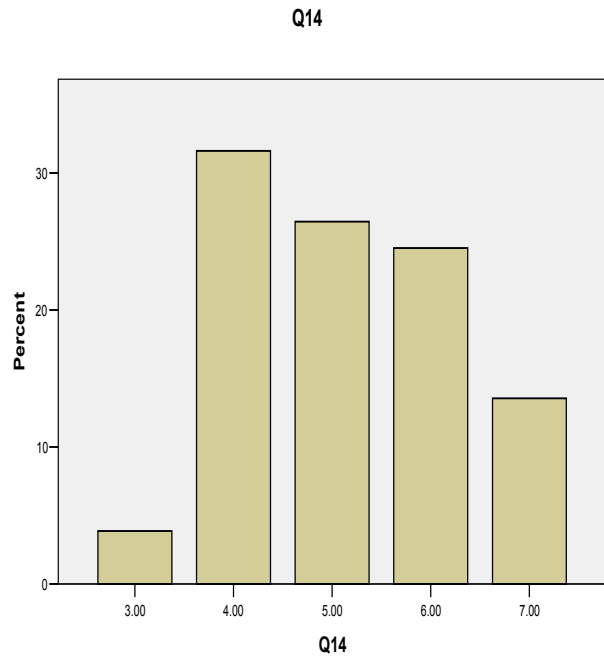
Graph 6 Q12*



Graph 7 Q13*

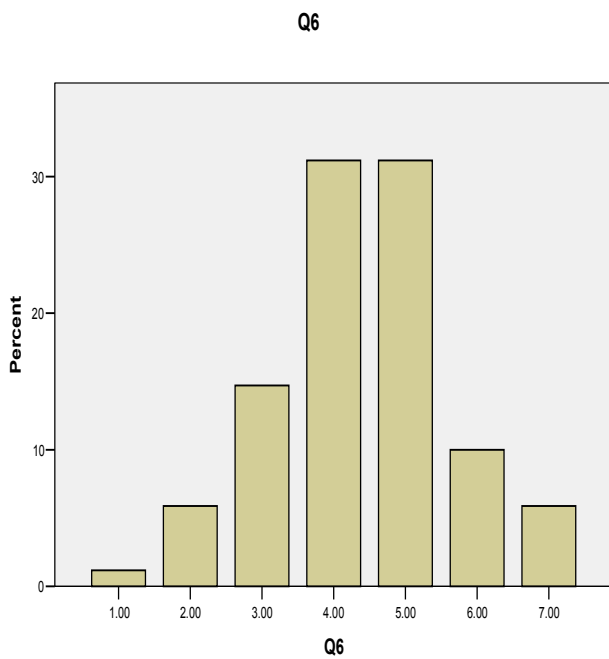


Graph 8 Q14*

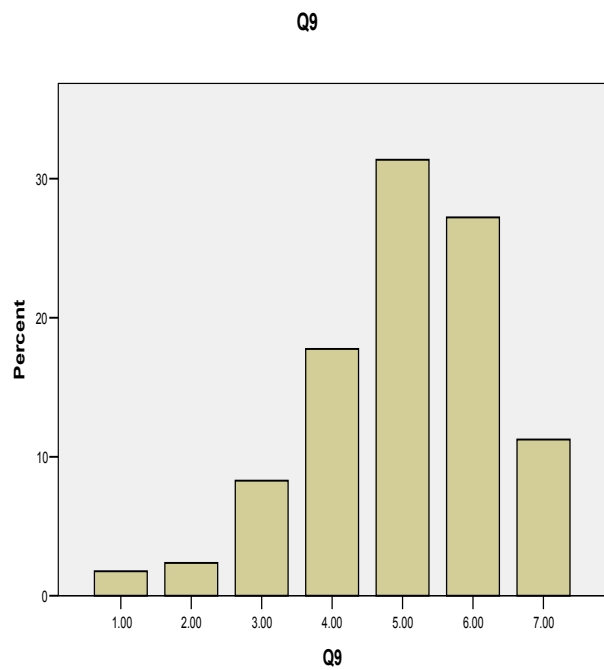


Website Characteristics

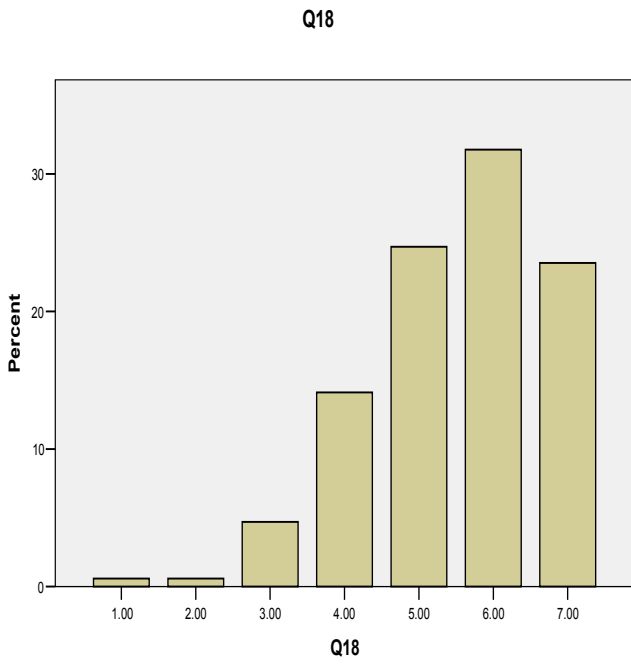
Graph 9 Q6*



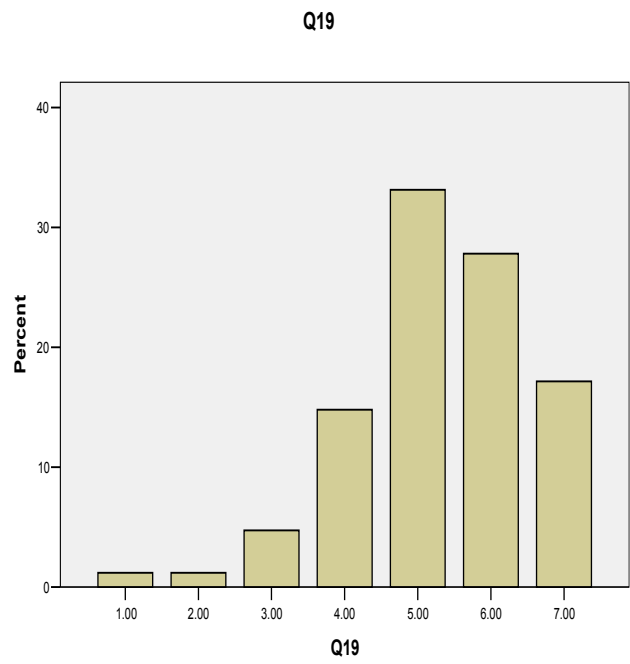
Graph 10 Q9*



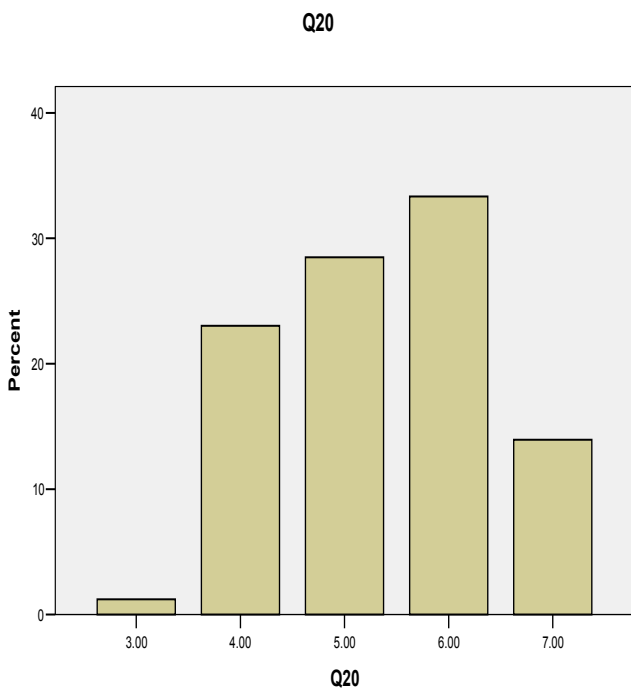
Graph 11 Q18*



Graph 12 Q19*

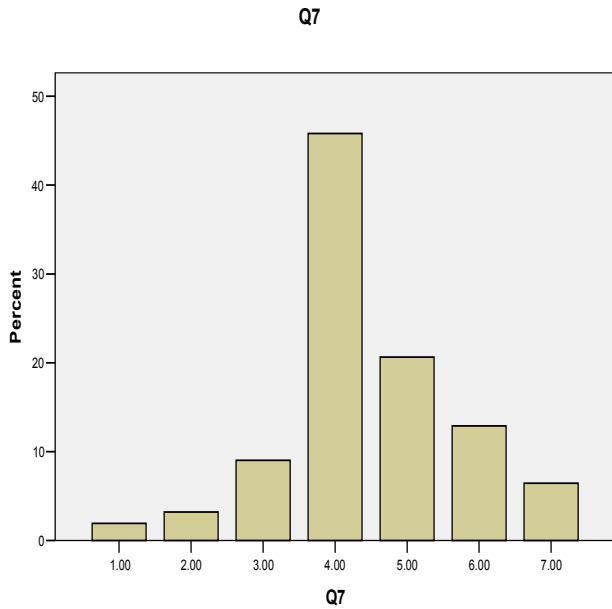


Graph 13 Q20*

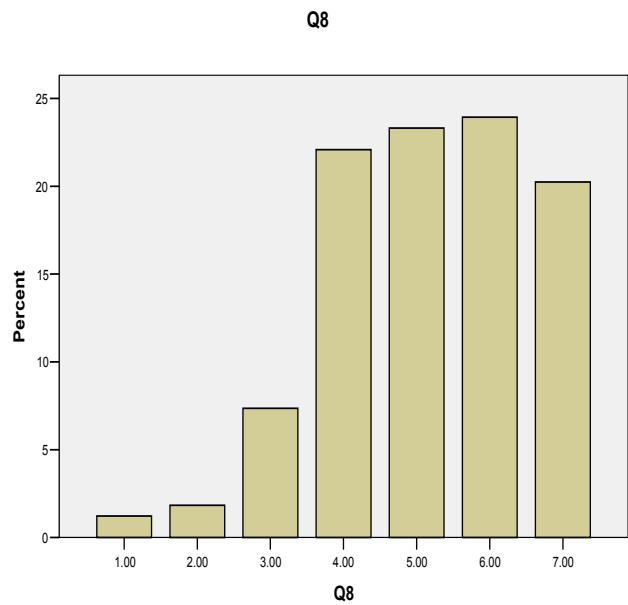


Communication

Graph 14 Q7*

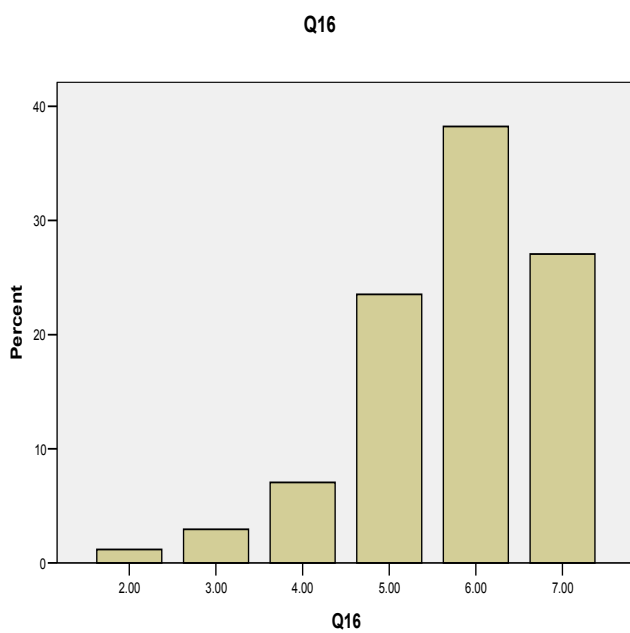


Graph 15 Q8*

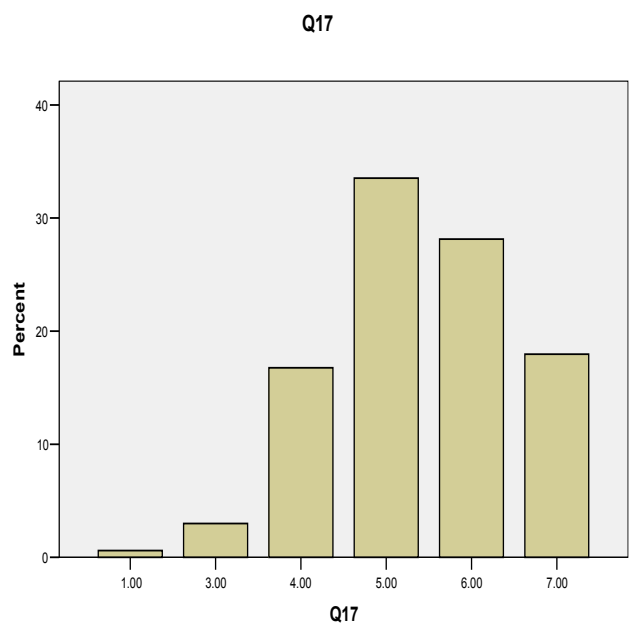


Efficiency

Graph 16 Q16*



Graph 17 Q17*



Appendix VIII Tables showing the percentage of the total number of respondents that have stated 4 or below; 3 or below and 6 or 7 on the Likert Scale

Table 1 Percentage of the total number of respondents that have stated 4 or below; 3 or below and 6 or 7 on the Likert Scale for each item (question) in ascending order

People that have stated 4 or below on the Likert Scale (in ascending order)		People that have stated 3 or below on the Likert Scale (in ascending order)		People that have stated 6 or 7 on the Likert Scale (in ascending order)	
Q13*	7.1	Q13*	1.2	Q6*	15.9
Q10*	9.5	Q20*	1.2	Q7*	19.4
Q12*	10	Q10*	1.8	Q14*	38.1
Q5*	10.7	Q12*	2.4	Q9*	38.5
Q16*	11.2	Q4*	3	Q8*	44.2
Q1*	12.4	Q5*	3	Q19*	45
Q4*	16.9	Q1*	3.5	Q17*	46.1
Q18*	20	Q17*	3.6	Q20*	47.3
Q17*	20.4	Q14*	3.9	Q1*	52.9
Q19*	21.9	Q16*	4.1	Q3*	54.5
Q3*	24	Q18*	5.9	Q18*	55.3
Q20*	24.2	Q19*	7.1	Q5*	63.1
Q9*	30.2	Q3*	7.8	Q16*	65.3
Q8*	32.5	Q8*	10.4	Q4*	67.5
Q14*	35.5	Q9*	12.4	Q12*	70
Q6*	52.9	Q7*	14.2	Q10*	71
Q7*	60	Q6*	21.8	Q13*	74.7

Table 2 Percentage of the total number of respondents, customers of FSB and those customers of other banks, that have stated 4 or below; 3 or below and 6 or 7 on the Likert Scale for the all items pertaining to the different quality dimensions (in ascending order)

	People that have stated 4 or below on the Likert Scale (in ascending order)		People that have stated 3 or below on the Likert Scale (in ascending order)		People that have stated 6 or 7 on the Likert Scale (in ascending order)	
Non-FSB customers	Service Performance	11.26	Service Performance	2.15	Communication	32.45
	Efficiency	15.5	Efficiency	3.1	Website Characteristics	40.36
	Website Characteristics	27.22	Website Characteristics	8.08	Efficiency	51.15
	Communication	43.85	Communication	12.3	Service Performance	59.78
FSB customers	Service Performance	15.775	Service Performance	4.375	Communication	31.15
	Efficiency	16.05	Efficiency	4.55	Website Characteristics	40.38
	Website Characteristics	32.28	Website Characteristics	11.18	Efficiency	59.95
	Communication	48.55	Communication	12.35	Service Performance	63.03

