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**Customer Satisfaction for the Lebanese Telecom Service Provider
Market**

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Customer Satisfaction for the Lebanese Telecom Service Provider Market

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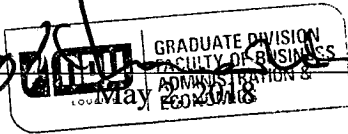
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DECLARATION

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ABSTRACT

Purpose – This research will attempt to investigate the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market.

Design/methodology/approach – The study is based on a positivism Epistemology, objectivist ontology, and deductive approach. A quantitative self-administered questionnaire is conducted by random people that use the Mobile Services from all ages all over Lebanon.

Findings – The quantitative findings of this study showed that there are four critical factors that mostly explain the concept of customer satisfaction for the Lebanese telecom service providers market. These factors are: Customer Care, Price, Mobile Services, and Communication. When studying the effect of these factors on customer satisfaction we found out that Communication and Mobile Services have the strongest coefficient, while Customer Care and Price have the least effect.

Research limitations – First of all the number of respondent from the two service providers was not equal. Secondly the number of respondent from certain geographical areas wasn't enough to draw definite conclusions. Moreover this research failed to address some important demographic aspects like the educational and Income level of a respondent.

Theoretical implications – The ministry of telecommunication should study the idea of employing a third and fourth operator in order to improve the mobile coverage level in the country. Additionally give the freedom for the operators to set their own pricing strategies based on the market demand so as to reduce the Price oligopoly and increase the level of competition between the service providers.

Practical implications – ALFA and TOUCH should starts by deploying more sites in order to improve their faded coverage in certain geographical areas in Lebanon. Secondly improve in the overall quality of services offered by ALFA, and present more diversified services. Finally introduce the mobile phone bundle service, were a consumer can benefit from the latest mobile phones available at a

reduced Prices, on the condition of subscribing to a specific number of services for a limited amount of time.

Originality/value – This thesis is one of few researches exploring customer satisfaction for the telecom service providers market, and the first of its kind in Lebanon.

Keywords – Customer satisfaction, Critical Factors, Customer Care, Price, Mobile Services, Communication, service providers, telecom, Lebanon.

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LIST OF ACRONYMS

CS	Customer Satisfaction
FA	Factor Analysis
IRB	Institutional Review Board
KMO	Kaiser-Meyer-Olkin
MOT	Ministry Of Telecommunication
MSA	Measure of Sampling Adequacy
ROI	Return On Investment
SEM	Structural Equations Modeling
USSD	Unstructured Supplementary Service Data

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1. INTRODUCTION

1.1 General background

Customer satisfaction is a global concept that measures how different products or services provided by an organization have met, surpassed or underachieved customer's expectation. As a definition it is the "evaluation of the perceived discrepancy between prior expectations, and the actual performance of the product" (Tse & Wilton, 1988). It should be noted that satisfaction is a "person's feeling of pleasure or disappointment resulting from comparing a product's perceived performance or outcome in relation to his or her expectations" (Kotler, 2003, p. 36). Therefore, we can deduct that satisfaction is directly related to customer's expectations.

Customer satisfaction can either be measured by a one-item scale, like Cronin & Taylor (1992) measured customer satisfaction by a single variable that asks for the customers' overall feeling towards the organization, or by combining multiple variables or criteria that are correlated and rooted under primary factors, that will help define and measure the customer satisfaction in an organization.

The telecom industry in Lebanon is an important sector since it is one of the few sectors that generate positive revenues each year; it contributes to the technological and social growth of the country. Keeping the telecom operators running smoothly with loyal and satisfied customers is very crucial, in order to have a financial and economic stability.

Nowadays, the Lebanese telecom market consists of two operators ALFA and TOUCH. Based on an article published by Blominvestbank entitled "The Lebanese Mobile Market: Strident Steps in 2014 to revitalize the Sector" ALFA claims approximately 47% of the market share, and TOUCH the remaining 53% of the market, and are managed and monitored by the ministry of telecommunication.

Lebanese people are not entirely satisfied by services provided, the quality of network and relatively high fees (comparing to other countries), and they've

voiced their concerns in many occasions in public or on social media; one article published by the daily star newspaper entitle “Lebanon's mobile phone users boycott telecoms companies” revealed that the majority of Lebanese people decided to switch off their mobile phones for one day as a protestation for the high Mobile Services fees. This is due to several reasons: like bad management, unstable situation of the country in recent years, and corruption. As a result, there is a need to research the critical factors that affect customer satisfaction and ways to improve the current situation.

1.2 Need for the study

The telecom industry overall and mobile phone services operators precisely operate in a highly competitive market, so effective strategies must be carefully developed and adequately applied in order to cope with the competition, and meet the market demands. Several factors would affect the performance of these firms, and customer satisfaction is a major factor contributing to the success of an operator. The importance of customer satisfaction is manifested by customer retention and loyalty, which in turn will greatly impact the sales level and overall business performance of the operator.

1.3 Purpose of the study

This research attempts to investigate the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market. The data is collected using a questionnaire, where respondents answered several questions related to the overall customer satisfaction, and different variables like Price, Communication, Call services, Facility, Customer Care and service providers. At the end of the research, we will present a model that illustrates the top variables that correlates with the customer satisfaction, and the level of impact each one of the variables have on it.

The Lebanese government (mainly the ministry of telecommunication), and the two Operators (ALFA and TOUCH) will benefit greatly from this research, as they will be able to predict the top factors impacting the satisfaction of the Lebanese consumer, and work accordingly to improve and enhance these factors,

in order to have better customer retention, and a good overall business performance.

1.4 Brief Overview of all the Chapters

Our thesis is composed of five main chapters. Chapter one the introduction; we kicked off this chapter by presenting a general background on the concept of Customer satisfaction, and an overview of the current situation of Lebanese telecom service providers market afterwards we highlighted the need and purpose of our research. Chapter two the literature review; in this chapter we will analyze and present several major studies and literatures that were previously published, in relation to our study. This chapter is subdivided into eight sections: the first section is a general overview of Customer satisfaction concept, section two will provide an overview of Customer satisfaction in mobile operators, and will highlight the different factors affecting it. The following sections are a detailed research of each of success factors that were introduced in section two. Chapter three the methodology; in this chapter we will describe the proposed methodology and design used for this research, including the philosophical dimensions, and the different hypotheses that will be later validated with the sample collected. We will define also the dependent and independent variables, as well as the research instruments used for this study. Chapter four the findings; in this chapter we will study and examine the data collected, which will ultimately lead us to reject or retain the introduced hypotheses in chapter three. Concerning the data analysis we will test the reliability and validity of the questionnaire used. A Principal Component Factor Analysis along with a regression will help us conclude the critical success factors and their effect on our dependent variable, where will summarize the findings in a comparison table. Adding to that a Mann-Whitney U and Kruskal-Wallis H non parametric tests will be explored. The last and final chapter of our study is the conclusion; in this chapter we will recap the findings and analysis of chapter 4, and compare them with the literature. We will also present the limitation and theoretical/practical

implications of our study, as well as the future recommendation for further research related to our topic.

2. LITERATURE REVIEW

2.1 Literature Review Introduction

In this chapter we will analyze and present several major studies and literatures in relation to customer satisfaction for the telecom service providers market. First of all, we will start with a general overview of Customer satisfaction concept. Secondly we will research different studies about Customer satisfaction in mobile operators, and the different factors affecting it worldwide. Finally we will study deeply each of the success factors extracted, and pinpoint the different researches already done in that regards.

2.2 Customer satisfaction

A customer is one of the key stakeholders for an organization, who will make a decision to purchase a certain product/service based on different factors. Therefore the company providing this product/service must do whatever it takes in order to satisfy the needs and expectations of the concerned customer. Customer satisfaction is one of the most important topics to go through, since a positively or negatively satisfied consumer can have a huge impact on the level of success or failure of a company, service or product. According to the literature many definitions and theories can be attributed to satisfaction and specifically customer satisfaction. Satisfaction can be directly associated to the customers own expectations , as already mentioned before satisfaction is a "person's feeling of pleasure or disappointment resulting from comparing a product's perceived performance or outcome in relation to his or her expectations" (Kotler, 2003, p. 36). Bitner & Zeithaml (2003) stated that satisfaction is the customers' evaluation of a product or service in terms of whether that product or service has met their needs and expectations. Customer satisfaction can be "the consumer's response to the evaluation of the perceived discrepancy between prior expectations and the actual performance of the product or service as perceived after its consumption" (Tse & Wilton, 1988, p. 204). So the closer the gap between the product/service performance and the consumer's expectations, the

higher the customer's satisfaction is (Hutcheson & Moutinho, 1998). According to Boselie et al. (2002) satisfaction is a positive, affective state resulting from the appraisal of all aspects of a party's working relationship with another. And customer satisfaction can be highlighted as "the feeling or attitude of customers toward a product/service after it has been used" (Solomon, 1996; Wells & Prensky, 1996; Hansemark & Albinsson, 2004). Others explain that "Customer satisfaction is identified by a response (cognitive or affective) that pertains to a particular focus (i.e. a purchase experience and/or the associated product) and occurs at a certain time (i.e. post-purchase, post-consumption)". (Giese & Cote, 2000, p. 15).

2.3 Customer satisfaction in mobile operators

Nowadays, communication has become an integral part of the modern society, mobile technology (in the form of cell phones, tablets ...) is making our lives easier and better than ever before. Through mobiles we can connect with anyone anytime anywhere in the world. Today mobile operators are the sole companies capable of providing Mobile Services, and huge revenues have been generated through diverse services like voice, data, sms So keeping a high level of satisfied customers is very essential to the continuity and progress of these firms. In the literature many have studied customer satisfaction in mobile operators; Hongcham & Leelakulthanit (2011) examined the different factors affecting customer satisfaction for mobile operators in Thailand. 400 respondents have been interrogated and the results concluded that Corporate image of the company, Promotional value, Quality of customer service at shops, are the top determinants that influence customer satisfaction. Uddin et al. (2010) interviewed 60 university students that use Mobile Services in Bangladesh, in order to find the factors that are in play in the selection of mobile operators. The Results of the study revealed that, perceived Call rate and Brand image, play the biggest role on the customers' selection decision of a mobile operator. Buunk et al. (2010) examined customer loyalty to mobile telecom providers, in The Netherlands. The study concluded that customer satisfaction has a great impact

role in affecting customer commitment for mobile service operators and there is a positive correlation between enhancing customer satisfaction and gaining customer loyalty. Sadia et al. (2011) examined customer satisfaction and loyalty in mobile service provider in Pakistan, using 146 mobile users. The study found that Service quality, Switching cost, Staff loyalty, and Trust are the most important factors. Hafeez & Hasnu (2010) explored customer satisfaction in Pakistan they found that Service quality and Price are critical in determining customer satisfaction. Similar results were found by Balaji (2009) who studied the effect of customer satisfaction on Indian telecom operators in India, 199 postpaid users were surveyed in top Indian cities. Balaji concluded that “Perceived quality is an important predictor of customer satisfaction, which ultimately results in Trust, Price tolerance and Customer loyalty”. A study in Nigeria conducted by Omotayo & Joachim (2011) on 148 subscribers confirmed the positive impact that Service quality has on customer satisfaction and loyalty. How customers judge service quality in mobile service providers? The answer to that question can be found in a study by Agyapong & Boohene (2011) who stated that “due to the fact that telecom firms do not provide tangible products, their service quality is usually assessed by measure of the service provider’s relationship with customers. Thus, telecom service management should pay attention to staff skill profession and offering fast and efficient services”. Eshghi et al. (2008) interviewed 238 mobile users in major cities in India to identify the different factors affecting customer satisfaction. They found that “the most significant predictors of customer satisfaction are: Competitiveness, Relational quality, Reliability, Reputation, Support features, and Transmission quality”. Other studies found that voice Call quality, Wireless coverage, and the Customer complaint process are the top factors affecting the satisfaction of telecom service providers’ customers (Kim et al. 2004). Gerpott et al. (2001) considered customer satisfaction as an important goal for network operators in the German market. They considered Price, Network quality, Customer Care and personal benefits as catalyst of customer satisfaction. Lee et al. (2001) conducted a research to explore the factors affecting customer satisfaction of mobile

operators in France. They looked into pricing strategy, core services (coverage areas, clarity of sound), and value added services (billing service and easy access with mobile service provider). They found out that there is a positive and significant relation between the independent variables and customer satisfaction. Zohaib & Junaid (2014) in their study found that the dominant factors affecting customer satisfaction are Quality, Price, Promotions, and Social factors. They concluded that social factor is the most dominating factor. Jegan & Sudalaiyandi (2012) in their research on the consumer satisfaction and preference toward the mobile service providers found that the Call tariffs, Network coverage and Brand image have a positive correlation with the customer's preference and satisfaction.

2.4 Mobile Services

Mobile Services are all the other facilities that telecom operators add to the mobile network (other than voice and data services), which are either self-produced or provided through strategic agreement with the telecom service provider (Kuo et al. 2009).

According to Turel & Serenko, (2006), the improved customer services are indispensable for the telecom operators from a social and economic aspect. First of all from a social point of view, services should be offered to customers on practical terms and reasonable fees. Secondly from an economic standpoint, services should always satisfy and target the needs and desires of the customers. Kim et al. (2004) proposed that mobile service providers should deliver customer focused services in order to improve customer satisfaction. It was also found that the customers get attached more to a brand if they get all the desired and needed services available in that very brand (Ahn et al. 2006).

Zafar (2013) observed the impact of Mobile Services like Promotion, Brand image, Call rates and Service quality and Service availability on males and females consumers. The study discovered that males and females have different preference in purchasing an offered mobile service. They also found that females are hard to satisfy than the male consumers.

2.5 Price

Price is a very important factor to study, since setting a fair pricing strategy will definitely increase customer satisfaction and acquire customer loyalty. According to Kotler & Armstrong (2010) Price is the sum of money needed in order to acquire a product or a service, or the amount of the values that consumers exchange for the privilege of using the product or service. Michael et al. (1994) defined Price as “the amount of money or goods needed to acquire some combination of other goods and its accompanying services.” Zeithaml (1988) in his research concluded that, Price is a vital factor for customer satisfaction as consumers evaluate the value of a purchased service or product.

Concerning the relation with customer satisfaction researchers’ showed that Price fairness play a major role (Kukar-Kinney et al. 2007). Price fairness refers to the consumers’ personal assessments of whether a certain product or service Price is acceptable, reasonable, or justifiable (Kukar-Kinney et al. 2007). In another study by Herrmann et al. (2007), mentioned that Price perceptions have a direct influence at customer satisfaction while Price fairness indirectly impacts the level of satisfaction. Ali et al. (2010) found out also that Price fairness and customer satisfaction are significantly correlated as the consumer can switch to any other operator who offers better and fair Prices. On the other hand, customers are not always Price sensitive and in certain cases loyalty play a big role in brand preferences (Lommeruda & Sørgard, 2003), while a customer’s decision to accept specific Price has a direct influence at the level of satisfaction and loyalty towards the related seller (Martin-Consuegra et al. 2007).

2.6 Service Quality

In the last few years, service quality has drawn the attention of several researchers due to its significant impact on customer satisfaction, customer loyalty, business performance and profitability (Henderson, 2013). Service quality is generally known as the degree of how well the delivered services meet the customer’s expectations (Santos, 2003). Gronroos (1984) defined the perceived service quality, when the consumer parallels his expectations with the

service he perceives he has received. Furthermore, Parasuraman et al. (1988) defined service quality as “the overall evaluation of a specific service firm that results from comparing that firm’s performance with the customers’ general expectations of how firms in that industry should perform”. Based on this concept, they established the SERVQUAL model to measure service quality. This model consists of five dimensions: reliability, responsiveness, assurance, empathy, and tangibles. Van der Wal et al. (2002) used SERVQUAL model to assess the service quality in mobile operators in South Africa. Johnson & Sirikit (2002) also employed SERVQUAL to measure the service quality in telecommunication companies in Thailand. As of late, the importance of measuring service quality in the Mobile Services providers sector has increased, due to the fast technological advances and the large growth of penetration rates in most countries worldwide. In measuring the quality of mobile communication services, Chae et al. (2002) used “connection quality, content quality, interaction quality, and contextual quality” to measure the quality of mobile networking services. Kim et al. (2004) studied the call quality, value-added services, and customer support as variables the measure the service quality of mobile communication services in South Korea. Choi et al. (2007) identified several categories to measure the service quality in the mobile telephony industry which are: network coverage, value-added services, billing system, and Price structure. Research in the mobile telephony sector has confirmed the important correlation between service quality and customer satisfaction. Various studies have also confirmed the positive effect of service quality on customer satisfaction (Lee et al. 2001; Lim et al. 2006). According to Uddin & Akhter (2012) customer satisfaction is directly influenced by service quality, and when consumers get the expected service quality, it leads to better and higher satisfaction (Hutchinson et al. 2009).

2.7 Communication

Network coverage and signal quality have always been critical for selecting a mobile service provider. During the earlier days, mobile technology was not as advanced as today and Company networks were limited to only few locations. Today with the technological advancement, the network coverage and signal quality has been improved and operator's networks have grown to a great extent. Surveys have shown that both network coverage and signal quality correlate positively with customer satisfaction (Woo & Fock 1999).

Network connectivity and coverage have exhibit a positive relationship with customer satisfaction. This has to do with the power and strength of network signal as well as availability in most parts of the country. In this regards many customers complaint about the network's inability to cover certain local areas or not having a strong signal level at all places within the country. Additionally, customers expect a low level of delay between placing a call and the live connection with the received party. (Loo, 2004; shin & kim, 2008). Sometimes, telecom operators take considerably longer time to respond the problems like network coverage outages or degradation in call quality; which may affect the customer satisfaction with that particular brand (Ahn et al. 2006). According to Gerpott et al. (2001) the network quality refers to the excellent outdoor and indoor coverage and good voice clarity without any connection breakdowns.

2.8 Customer Care

Customer Care in the mobile telecommunication industry is the list of activities that includes: customer support system, complaints processing system, speed of processing complaints, ease of reporting complaint and friendliness when reporting complaint (Kim et al. 2004). A study done by Ahn et al. (2006) showed that when the customers do not get their complaints redressed properly, they start considering other brands. This is due to the fact that either the customer service centers do not handle complaints or the customers complaints are not addressed properly. Furthermore, the sociable, friendly, polite and well-mannered attitude of the service centers' employees, leave a positive impression on the customer.

That leads to higher customer satisfaction (Soderlund & Rosengren, 2008). According to Gerpott et al. (2001) Customer Care refers to the quality level of the exchanged information between the mobile service provider and the client in response to consumer enquiries and in the course of the interactive activities initiated by the service operator. Customer support refers to the speed of complaint processing, ease of complaint reporting and friendliness when the customer reporting a complaint (Kim et al. 2004). The importance of Customer Care was studied by Fornell & Westbrook (1984). They showed that by encouraging customer complaints, a company might be able to anticipate and reduce future complaints. It is also very important for the consumer to know where and how he can report his complaints and that it will be taken care of as soon as possible (Vranakis et al. 2012).

2.9 The Service provider

The company brand image is a valuable asset that is hard to imitate and it can help an organization to achieve a sustainable competitive advantage (Roberts & Dowling 2002).

The company image is defined “as the total impression that the public has for a company. From the companies’ perspective, being reliable, professional and innovative, having social contribution and valuing the customers are key elements that form the company’s image” (Vranakis et al. 2012). Martensen et al. (2000) indicate that company image is a significant factor for customer satisfaction. Gupta (2002) found that there is a strong relation between the corporate image and reputation and competitive advantage for firm. Among the components of competitive advantage are: willingness to purchase, willingness to pay a premium Price, customer satisfaction and customer loyalty. The fast changes in technology impose challenges for the companies to satisfy their customers and obtain their loyalty through presenting innovative products. Innovation is used for strategic orientation toward customer loyalty, satisfaction, and to gain and increase the market shares. Innovativeness is defined as a process of converting an idea into a product that customer purchase which generates

financial returns to its providers. So the idea must have the quality to address specific needs and can be implemented at an acceptable cost in order to be labeled as innovation. Service innovativeness has become an essential organizational capability (Dotzel et al. 2013).

2.10 Literature Review Conclusion

As mentioned earlier Customer satisfaction is an important topics to go through that can leave a huge impact on the level of success or failure of a company, as Kotler defined satisfaction can be directly correlated to the consumers own expectations.

Concerning the telecom service providers market customer satisfaction play an integral role in the continuity and progress of these firms financially and strategically. Several factors are in-play that affects the satisfaction of a customer:

First of all the Mobile Services: according to Kuo et al. (2009) are all the other facilities that telecom operators add to the mobile network (other than voice and data services), which the consumer can benefit from.

Secondly Price: Ali et al. (2010) discovered that there is significant correlation between Price and customer satisfaction as the consumer can easily switch between operators which offer better and fair Prices.

Thirdly Service Quality: according to Hutchinson et al. (2009) when consumers get the expected service quality, it leads to better and higher satisfaction.

Fourthly Communication: based on a study done by Loo, (2004) a good network connectivity and a deep signal coverage displayed a positive relationship with customer satisfaction.

And finally Customer Care where Soderlund & Rosengren (2008) concluded that the sociable, friendly, polite, well-mannered attitude and the positive interaction between the service centers' employees and the customer will lead to higher customer satisfaction.

In the next chapter, we will discuss the methodology and instruments used in order to find the relationship between the customer satisfaction and critical success factors already explored.

3. PROCEDURES AND METHODOLOGY

3.1 Introduction

In this chapter we will explore the different procedures and methodologies used, in order to answer our main research question. We will start by stating the research aim and question. We will continue by defining the different hypothesis gathered from the literature. Afterwards we will present the different dependent and independent variables that will be the basis of our analysis in the following chapters. Finally we will describe the proposed methodology and design, which includes the philosophical dimensions, the Research approach as well as the research instruments used in this study.

3.2 Research Aims and Questions

This research attempts to investigate the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market. In order to fulfill the aim of this study, the below question will be answered:

What are the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market?

The outcome of our research will assist, policy makers, represented by the ministry of telecommunication and the two Operators (ALFA and TOUCH) in identifying the important factors that influence the Lebanese consumer satisfaction and consequently adjust their business strategies in order to develop and remedy issues and problems which will result in a better customer retention and overall business growth.

3.3 Hypotheses

The outcome of our study will attempt to either reject or retain several hypotheses that are related to customer satisfaction in the Lebanese telecom service providers market. Based on the literature and our personal experience in this domain, we've formulated eight hypotheses that will be presented in the table below:

#	Hypotheses
H1	Overall Customer Satisfaction differs between ALFA and TOUCH.
H2	Overall Customer Satisfaction differs between male and female customers.
H3	People from different ages have similar opinions.
H4	People in different regions have different needs and preferences.
H5	Communication has a positive influence on Customer satisfaction.
H6	Price has the biggest influence on Customer satisfaction.
H7	Mobile Services have an important positive influence on Customer satisfaction.
H8	Customer service/care has an important positive influence on Customer satisfaction.

Table 1: Formulated hypotheses

3.4 Selected Variables

As mentioned before the aim of our research is to explore the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market. Therefore, the dependent variable is Customer Satisfaction and the independent variables are the critical factors affecting customer satisfaction.

3.4.1 Dependent Variable

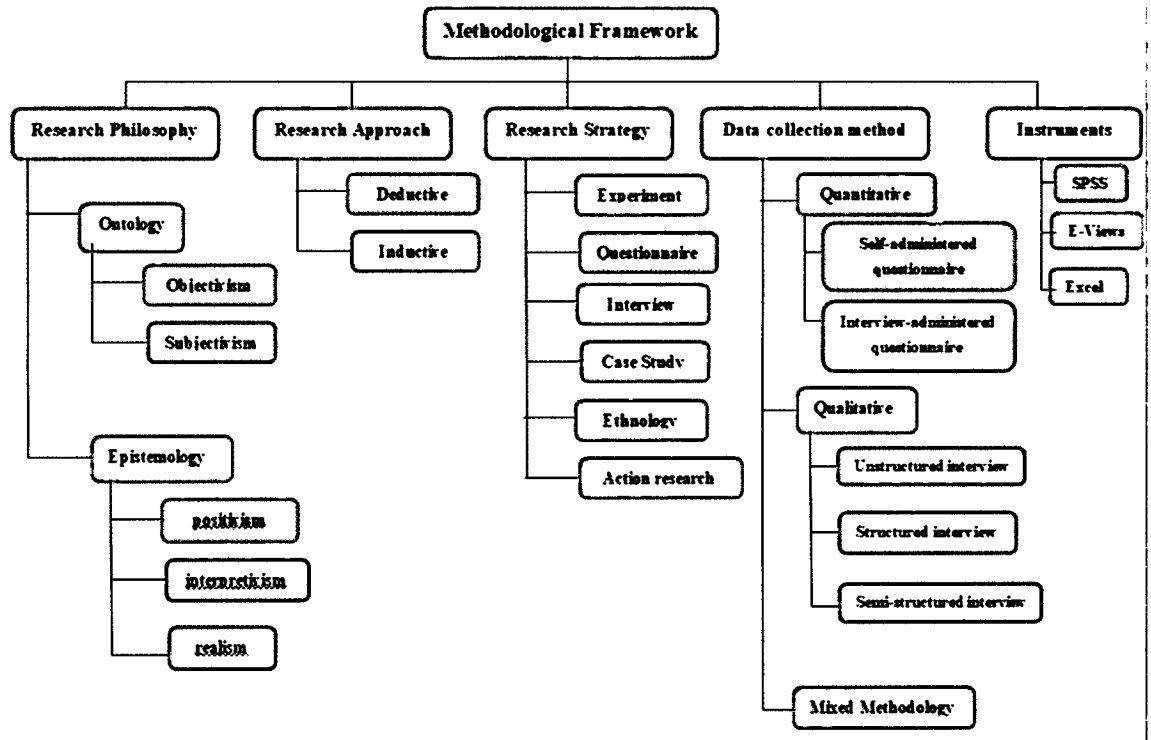
As stated in the literature the customer is the most important stakeholder for any organization which can have a huge impact on the level of success or failure of a company, service or product. Since we are studying the level of satisfaction of the Lebanese customer in the telecom service providers, the dependent variable is Customer satisfaction.

3.4.2 Independent variables

The independent variables are the factors affecting the customer satisfaction for the Lebanese telecom service providers market which are four. These four factors will be studied in a 25-item questionnaire that asks approximately four to five questions per factor. The purpose of having more than one question per Factor is to ensure that each factor is well defined and completely covered. The four Critical factors (which were already stated in the literature) are: Customer Care, Price, Mobile Services, and Communication.

3.5 Methodology used

3.5.1 Proposed Methodology and Design



The methodology used in this research

Figure 1: Methodology used

3.5.2 Research philosophy

The research philosophy is related to the development of knowledge, which is defined by what the researcher is going to do and how, when initiating a research in a specific field. It contains major beliefs and expectations, about the way in which the researcher views the world. These assumptions, will establish the foundation for the research strategy, and the methods chosen as part of that strategy. There are two major ways to approach the research philosophy: ontology and epistemology. (Saunders et al. 2016)

3.5.2.1 Ontology

Blaikie (1993) defines ontology as “the science or study of being”. So as a science, it answers the question whether the social entities are identified as objective or subjective. There are two types of ontology: objectivism and subjectivism.

Objectivism “is an ontological position that asserts that social phenomena and their meanings have an existence that is independent of social actors”.

Subjectivism “is an ontological position which asserts that social phenomena and their meanings are continually being accomplished by social actors”.

For the sake of our research objectivism was adopted. This study relied on an objective data collection and analysis, that are independent from skepticism and mysticism, and are not influenced by the researchers own views and perceptions.

3.5.2.2 Epistemology

Three types of epistemology can be adopted: positivism, interpretivism and realism.

Positivism is a philosophical approach that relies significantly on scientific evidence, like experiments and statistical analysis. Positivist researcher depend on proofs and validated experiments, and often distant themselves from the subjective biases of the research they study. Positivism is characterized by hypothesis generation and testing, and generally quantitative methods are used. Typically positivism position is adopted by objectivists.

In contrast Interpretivism involves the integration of human interest into the study, where researchers tend to interpret different situation and other humans, which will likely impact their actions and interaction in the society.

Accordingly Interpretivism is “associated with the philosophical position of idealism, and is used to group together diverse approaches, including social constructivism, phenomenology and hermeneutics; approaches that reject the objectivist view that meaning resides within the world independently of consciousness” (Collins, 2017). Moreover Interpretivist approach is directly associated to a more naturalistic methods of data collection, such as interviews

and observations. Additionally Secondary data research can be also related with interpretivism philosophy.

Realism can be described as a mixture of positivism and Interpretivism, where the development of knowledge is based on the assumption of a scientific approach.

Our research is based on a positivism philosophy, since our study seeks to deduct results through empirical measurements and objectivity, which are close to reality.

3.6 Research approach

There are two types of research approaches: inductive and deductive.

Inductive reasoning uses a bottom up approach that goes from specific to general. Deductive reasoning uses a top down approach, which goes from general to specific.

Inductive approach is often used in exploratory projects, where researchers start with data collection and then analyses it to see what theories could emerge. While deductive approach is when researchers use the literature to help identify hypothesis and theories which will be tested using the data collected from interviews surveys questionnaire etc ... (Saunders et al. 2016)

In studying the critical factors affecting the customer satisfaction of the Lebanese mobile telecom operators, we used the deductive reasoning where we started with a review of literature, and a deep discussion of the research variables which guided the study into formulating several hypothesis, that are later tested using the data collected and analysis, until reaching the final conclusion and deducing the major factors affecting the satisfaction of the Lebanese mobile operators customers.

3.6.1 Reliability and Validity

3.6.1.1 Reliability

“Reliability is the extent to which a measurement instrument or procedure yields the same results on repeated trials” (Carmines & Zeller, 2008)

According to Saunders et al. (2016) there are four threats to reliability:

Subject or participant error: this error occurs if a certain time interval (different times of the week) can affect the participant answer. For example if the respondent answers are different from Monday to Friday.

Subject or participant bias: this error occurs when the respondent doesn't give their honest opinion for example if we are studying employee satisfaction the employees will answer what their boss implies them to say.

Observer error: this is when the interviewer asks a certain question in a specific way that can affect the answer of the interviewee.

Observer bias: this is when the interviewer analyses the responses in a biased way.

3.6.1.2 Validity

Validity refers to what level the research conducted reflects exactly the specific theory that the researcher is attempting to test. Two types of validity can be identified internal and external validity.

External validity is explained as to which degree the end results of a study can be generalizable. Internal validity refers to what extent the variable explored (dependent and independent) have a causal relationship.

There are several threats that can affect internal validity: (Saunders et al. 2016)

History: is the first internal threat that might be encountered. This is when if the research is conducted before or after an event and might affect the respondent answers.

The testing threat occurs if the respondent knows that the outcome of the study might affect them negatively; this will influence the results.

The instrumentation threat happens when the measurement scales are modified during the research.

Mortality: if a respondent abandoned the research

Maturation: if a certain external event takes place during the study.

3.6.2 Ethics of the Research Design

Research ethics is defined as the “appropriateness of your behavior in relation to the rights of those who become the subject of your work or are affected by your work” (Saunders et al. 2009). This indicates that the research respondents need to know they are being studied, are aware of the implications of participating in this research, and the results will not affect them in anyway, or cause any disadvantages.

To ensure the ethicality of our research, the below steps have been applied:

In the literature review:

The references were properly cited.

In the quantitative research:

The introduction in the questionnaire described how and where the data will be used.

The introduction also mentioned the privacy of the data collected.

The Responses to the questionnaire were strictly confidential and completely anonymous.

3.6.3 Research Strategy and Data Collection Methods

The research strategy is the overall plan that guides the researcher in order to answer the research question. For the purpose of our study a quantitative research was conducted. Concerning the gathering of quantitative data a self-prepared and administered questionnaire was carried out, where a high number of respondents filled the survey at their own comfort and, without having any sort of interview biased effect or time constraints.

3.6.4 Quantitative Research

When developing the questionnaire we referred to a pre-prepared survey about customer satisfaction for the mobile service providers in Canada. (Turel & Serenko, 2006) A similar format was used and the questions were reformulated in order to suit our research.

Our questionnaire is composed from three parts. The first part is an abstract introducing the initiator of the research, the aim of the study, a confidentiality assurance of the respondents' answers, and guidelines for a successful completion of the questionnaire. The second part is a list of demographic variables like age, gender, locationThe final part is a list of questions covering all the variables that are in correlation with our research, where the answers of the respondents are based on a ordinal scale of 0 to 10 where "0" being "very low" and "10" being "very high".

3.6.5 Pilot Studies

Before proceeding with the data collection our quantitative questionnaire was piloted. The piloted sample consisted of 15 anonymous respondents from all ages, different locations in Lebanon, and from both operators. The piloted group completed the survey and reflected back on the questionnaire design and objectives and commented on few questions which were not very well understood. For example one respondent didn't understand question N14 in the questionnaire related to the value added services, another didn't know what network latency means etc.... Thus based on our observation and respondents comments the questionnaire was amended.

3.7 Methodology Conclusion

In this chapter, we have examined the methodology used in this research. From an ontological point of view objectivism was adopted, since our study relied on an objective data collection that is independent from skepticism and mysticism and is not influenced by the researchers own views and perceptions. Furthermore, a positivism philosophy was adopted as an epistemology, since our

study seeks to deduct results through empirical measurements and objectivity which are close to reality. A deductive reasoning was employed, since our research is going from the wide theory to a specific data collection.

Speaking of data collection, a self-administered questionnaire was adopted. Furthermore this chapter outlined eight hypotheses that were deducted from the literature and our personal experience, and identified the dependent and independent variables.

In the next chapter, the data collected from the quantitative questionnaire will be analyzed and presented so to reject or retain the hypotheses already mentioned, and deduct the major findings of this research.

4. FINDINGS

4.1 Introduction

This chapter we will presents the findings of this study. We will start by explaining the framework of the quantitative research. Afterwards, we will conduct an analysis of the data collected and we will unfold the findings of the survey. The quantitative analysis will include: a principal factor analysis followed by a linear regression using IBM SPSS software. The conclusions extracted from the quantitative analysis will eventually lead to either reject or retain the proposed hypotheses in the previous chapter.

4.2 Analysis Framework

4.2.1 Quantitative Analysis Framework

After receiving the IRB approval of the questionnaire, hard copies of the survey were printed and distributed to random people from all over the country in order to be filled where we received 41 respondents from Akkar and the North, 209 from Mount Lebanon, 31 from Beirut, 16 from Beqaa and Baalbek-Hermel and finally 9 respondents from the South and Nabatieh region , adding to it a similar version was created and uploaded on the website eSurvey Creator where an electronic link of the questionnaire was generated and shared with the concerning respondent through different social media platforms (WhatsApp, Facebook, telegram...) and emails. A total of 350 Survey were filled (100 hard copies and 250 online), out of which 44 were partially completed and thus discarded (12.6 % incompleteness rate) leaving a total of 306 completed surveys. The data collected from the 306 respondent was used in Structural Equations Modeling (SEM) that combines the principal factor analysis and regression methods using a confirmatory with a deductive reasoning. The different factors that were generated from the study were thoroughly tested and analyzed thus leading to either a retention or rejection of the formulated hypothesis. Mann-Whitney and Kruskal-Wallis tests were also used in order to check the relation between the dependent variable and different demographic variables. Moreover, multiple regressions of the independent variables against the dependent one is also done.

The results of this research were achieved using IBM SPSS and Microsoft Excel software.

Please note that before proceeding to the regression we tested our dependent variable for normality, the results were illustrated in the following descriptive statistics section.

4.2.2 Descriptive statistics of Level of satisfaction

The level of satisfaction was the first question asked after the demographic section has ended. This variable is the dependent variable in our research and each participant was asked to rate his overall level of satisfaction with his service provider/operator on a scale of 0 to 10 where 0 indicates a very low level of satisfaction and 10 indicates a very high level of satisfaction.

The level of satisfaction variable had a mean 6.14, a standard deviation of 2.087, a skewness of -0.8 and kurtosis of 0.928. We can conclude that since the skewness and kurtosis values are close to 0 this variable can be considered as normally distributed.

Descriptives				
		Statistic	Std. Error	
level of satisfaction	Mean	6.14	.119	
	90% Confidence Interval for Mean	Lower Bound	5.94	
		Upper Bound	6.33	
	5% Trimmed Mean	6.24		
	Median	6.00		
	Variance	4.355		
	Std. Deviation	2.087		
	Minimum	0		
	Maximum	10		
	Range	10		
	Interquartile Range	3		
	Skewness	-.800	.139	
	Kurtosis	.928	.278	

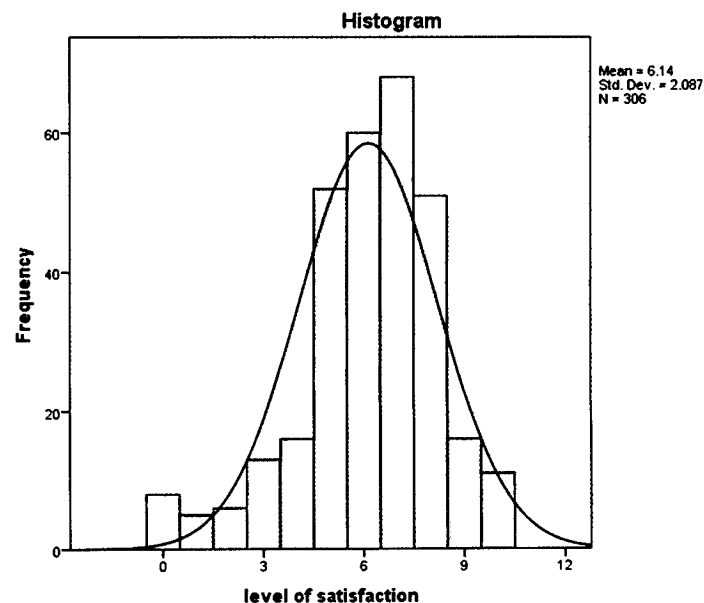


Figure 2: Descriptive statistics + Histogram of Level of satisfaction variable

We tested also the normality of all the remaining variables and confirmed that they were normally distributed since their kurtosis is close to 0, and we made sure also that all have a pseudo bell shaped curve in their histogram. Please refer to the appendix for the values of skewness and kurtosis of all the variables.

4.3 Quantitative Analysis

4.3.1 Exploratory Factor Analysis for the combined sample

4.3.1.1 Reliability Analysis - Cronbach Alpha

Cronbach Alpha measure the reliability and internal consistency of our questionnaire the result are found below:

Cronbach's Alpha	N of Items
.941	24

Figure 3: Cronbach Alpha for the combined sample

In our case we can see that cronbach alpha is 0.941, which represents a good reliability since it is above the minimum required of 0.7 cronbach alpha for the final 24 variables used. Therefore we can conclude that the questionnaire conducted was reliable and valid.

4.3.1.2 Pearson Correlation

After inspecting the Pearson Correlation matrix, we found out that there were enough correlations which are significant (p value under 0.05) so we don't have to omit any variable. Below is an excerpt from the Pearson Correlation matrix highlighting the correlations between each variable and their significance.

													Correlations	
		level of satisfaction	Call quality	drop call	coverage level	network latency	Call forwarding/waiting	SMS service	V.A.S	AIR/USSD service	new technology	Fixed Fee	Calling Fee	Data
level of satisfaction	Pearson Correlation	1	.699	.423	.558	.471	.510	.456	.499	.519	.576	.352	.341	
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
Call quality	Pearson Correlation	.699	1	.456	.619	.404	.461	.475	.433	.442	.529	.314	.324	
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
drop call	Pearson Correlation	.423	.456	1	.459	.261	.278	.292	.307	.325	.285	.191	.209	
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000	.001	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
coverage level	Pearson Correlation	.558	.619	.459	1	.396	.372	.359	.298	.352	.422	.238	.250	
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
network latency	Pearson Correlation	.471	.404	.261	.396	1	.456	.410	.392	.373	.538	.240	.251	
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
Call forwarding/waiting	Pearson Correlation	.510	.461	.278	.372	.456	1	.507	.501	.428	.478	.189	.239	
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.001	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
SMS service	Pearson Correlation	.456	.475	.292	.359	.410	.507	1	.479	.507	.450	.259	.227	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
V.A.S	Pearson Correlation	.499	.433	.307	.298	.392	.501	.479	1	.485	.465	.305	.305	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
AIR/USSD service	Pearson Correlation	.519	.442	.325	.352	.373	.428	.507	.485	1	.434	.303	.259	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	
new technology	Pearson Correlation	.576	.529	.285	.422	.538	.478	.450	.465	.434	1	.357	.310	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	
	N	306	306	306	306	306	306	306	306	306	306	306	306	

Figure 4: Pearson Correlation matrix for the combined sample

4.3.1.3 KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin or KMO is a measure of sampling adequacy, it predicts if the data is likely to factor well based on correlation and partial correlation. KMO can be used to identify which variables were to drop from the factor analysis because they lack multicollinearity. Overall KMO should be 0.50 or higher to proceed with factor analysis. The Bartlett's test of Sphericity is a Statistical test for the overall significance of all correlations within the correlation matrix; the value should be lower than 0.05 in order to proceed with our analysis.

Below we can find the results of the KMO and Bartlet test of sphericity conducted for our study.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.937
Bartlett's Test of Sphericity	Approx. Chi-Square	4477.576
	df	276
	Sig.	.000

Figure 5: KMO and bartlet test of sphericity for the combined sample

We can see that the KMO scored 0.937 and the Bartlet's test of sphericity showed a significant p value of .000.

4.3.1.4 Anti-Image Correlation

Anti-image correlation Matrix is a Matrix of the Partial correlations among variables; it represents the degree to which the factors explain each other in the results. The diagonal contains the MSA for each variable, and the off diagonal values are the partial correlations among variables. the MSA should be over 0.5 in order to retain the variables, if under 0.5 we should remove the concerning variable from our analysis.

	level of satisfaction	Call quality	drop call	coverage level	network latency	Call forwarding/waiting	SMS service	V.A.S	AIR/USSD service	new technology	Fixed Fee	Calling Fee
responsiveness	-.044	.007	.005	-.013	-.010	-.032	-.013	-.008	.057	-.064	-.008	.007
product range	-.036	.023	-.065	.006	.008	.002	.010	-.020	-.053	.002	.042	-.029
Anti-image Correlation	.942^a	-.360	-.043	-.143	-.086	-.088	.067	-.091	-.161	-.113	-.036	.056
level of satisfaction	-.360	.932 ^a	-.128	-.296	.069	-.011	-.120	-.056	.000	-.083	.060	-.041
Call quality	-.043	-.128	.949 ^a	-.210	.003	.018	-.026	-.065	-.041	.038	-.006	-.010
drop call	-.143	-.296	-.210	.939 ^a	-.108	-.018	-.016	.088	-.001	-.023	-.015	-.042
coverage level	-.086	.069	.003	-.108	.951 ^a	-.096	-.068	-.076	-.015	-.266	-.006	-.072
network latency	-.088	-.011	.018	-.018	-.096	.958 ^a	-.159	-.198	-.043	-.043	.088	-.105
Call forwarding/waiting	.067	-.120	-.026	-.016	-.068	-.159	.961 ^a	-.148	-.193	-.038	-.077	.061
SMS service	-.091	-.056	-.065	.088	-.076	-.198	-.148	.957 ^a	-.115	-.067	-.003	.016
V.A.S	-.161	.000	-.041	-.001	-.015	-.043	-.193	-.115	.950 ^a	-.036	-.124	.082
AIR/USSD service	-.113	-.083	.038	-.023	-.266	-.043	-.038	-.067	-.036	.959 ^a	-.080	.107
new technology	-.036	.060	-.006	-.015	-.006	.088	-.077	-.003	-.124	-.080	.861 ^a	-.590
Fixed Fee	.056	-.041	-.010	-.042	-.072	-.105	.061	.016	.082	.107	-.590	.880 ^a
Calling Fee	-.053	-.101	.052	.076	.049	.100	.014	-.001	.094	-.061	-.317	-.257
Data Fee	.088	-.014	-.028	-.042	.113	.048	.061	-.121	-.012	-.081	-.076	-.033
validity period	.118	-.159	-.018	-.023	-.120	-.186	.013	.061	.005	-.097	.048	-.054
social involvement	-.129	.108	.029	.073	.042	.009	.032	-.086	.024	-.001	-.090	-.079
line recharge	.142	-.046	.085	.001	-.050	.013	-.079	-.037	-.112	-.037	-.095	-.009
customer complaint	-.148	.007	-.097	-.036	-.015	-.016	-.011	.116	.071	.080	.081	.019
complaint resolution	-.083	-.035	.049	.110	.033	-.053	-.120	.039	.044	.003	.009	-.064
waiting time before connecting to a call center	.004	-.046	.040	-.040	.029	-.090	.013	.018	.021	-.154	-.127	.105
in house customer relation	-.024	.112	-.005	-.049	.030	-.005	-.060	-.126	-.079	.015	.147	-.112
innovation/creativity	.027	-.085	-.039	.017	-.044	.057	.014	.018	-.176	.068	-.018	-.004
reliability/credibility	-.121	.019	.009	-.029	-.020	-.072	-.028	-.017	.125	-.150	-.026	.022
responsiveness	-.104	.064	-.131	.014	.018	.006	.024	-.046	-.122	.005	.138	-.096
product range												

a. Measures of Sampling Adequacy(MSA)

	Data Fee	validity period	social involvement	line recharge	customer complaint	complaint resolution	waiting time before connecting to a call center	in house customer relation	innovation/creativity	reliability/credibility
responsiveness	-.021	.033	.029	.007	-.004	-.060	-.005	-.035	-.060	-.128
product range	-.052	-.027	-.093	-.126	-.052	.024	.033	-.073	.001	-.026
Anti-image Correlation	-.053	.088	.118	-.129	.142	-.148	-.083	.004	-.024	-.027
level of satisfaction	-.101	-.014	-.159	.108	-.046	.007	-.035	-.046	.112	-.085
Call quality	.052	-.028	-.018	.029	.085	-.097	.049	.040	-.005	-.039
drop call	.076	-.042	-.023	.073	.001	-.036	.110	-.040	-.049	.017
coverage level	.049	.113	-.120	.042	-.050	-.015	.033	.029	.030	-.044
network latency	.100	.048	-.186	.009	.013	-.016	-.053	-.090	-.005	.057
Call forwarding/waiting	.014	.061	.013	.032	-.079	-.011	-.120	.013	-.060	.014
SMS service	-.001	-.121	.061	-.086	-.037	.116	.039	.018	-.126	.018
V.A.S	.094	-.012	.005	.024	-.112	.071	.044	.021	-.079	-.176
AIR/USSD service	-.061	-.081	-.097	-.001	-.037	.080	.003	-.154	.015	.068
new technology	-.317	-.076	.048	-.090	-.095	.081	.009	-.127	.147	-.018
Fixed Fee	-.257	-.033	-.054	-.079	-.009	.019	-.064	.105	-.112	-.004
Calling Fee	.900 ^a	-.233	.006	.023	.177	-.121	.079	.025	-.082	.020
Data Fee	-.233	.951 ^a	-.023	-.067	-.024	.004	-.059	-.018	-.018	-.161
validity period	.006	-.023	.961 ^a	-.088	-.047	-.047	-.061	-.029	-.095	-.002
social involvement	.023	-.067	-.088	.943 ^a	-.146	-.055	.010	.102	-.149	.079
line recharge	.177	-.024	-.047	-.146	.913 ^a	-.602	-.059	.025	-.011	-.070
customer complaint	-.121	.004	-.047	-.055	-.602	.911 ^a	-.098	-.100	.049	-.059
complaint resolution	.079	-.059	-.061	.010	-.059	-.098	.950 ^a	-.324	-.012	-.090
waiting time before connecting to a call center	.025	-.018	-.029	.102	.025	-.100	-.324	.942 ^a	-.274	.069
in house customer relation	-.082	-.018	-.095	-.149	-.011	.049	-.012	-.274	.950 ^a	-.258
innovation/creativity	.020	-.161	-.002	.079	-.070	-.059	-.090	.069	-.258	.947 ^a
reliability/credibility	-.057	.071	.068	.017	-.014	-.181	-.010	-.090	-.157	-.327
responsiveness	-.151	-.061	-.229	-.312	-.168	.075	.076	-.200	.002	-.069
product range										

a. Measures of Sampling Adequacy(MSA)

	validity period	social involvement	line recharge	customer complaint	complaint resolution	waiting time before connecting to a call center	in house customer relation	innovation/creativity	reliability/credibility	responsiveness	product range
responsiveness	.033	.029	.007	-.004	-.060	-.005	-.035	-.060	-.128	.393	.027
product range	-.027	-.093	-.126	-.052	.024	.033	-.073	.001	-.026	.027	.356
Anti-image Correlation	.088	.118	-.129	.142	-.148	-.083	.004	-.024	.027	-.121	-.104
level of satisfaction	-.014	-.159	.108	-.046	.007	-.035	-.046	.112	-.085	.019	.064
Call quality	-.028	-.018	.029	.085	-.097	.049	.040	-.005	-.039	.009	-.131
drop call	-.042	-.023	.073	.001	-.036	.110	-.040	-.049	.017	-.029	.014
coverage level	.113	-.120	.042	-.050	-.015	.033	.029	.030	-.044	-.020	.018
network latency	.048	-.186	.009	.013	-.016	-.053	-.090	-.005	.057	-.072	.006
Call forwarding/waiting	.061	.013	.032	-.079	-.011	-.120	.013	-.060	.014	-.028	.024
SMS service	-.121	.061	-.086	-.037	.116	.039	.018	-.126	.018	-.017	-.046
V.A.S	-.012	.005	.024	-.112	.071	.044	.021	-.079	-.176	.125	-.122
AIR/USSD service	-.081	-.097	-.001	-.037	.080	.003	-.154	.015	.068	-.150	.005
new technology	-.076	.048	-.090	-.095	.081	.009	-.127	.147	-.018	-.026	.138
Fixed Fee	-.033	-.054	-.079	-.009	.019	-.064	.105	-.112	-.004	.022	-.096
Calling Fee	-.233	.006	.023	.177	-.121	.079	.025	-.082	.020	-.057	-.151
Data Fee	.951 ^a	-.023	-.067	-.024	.004	-.059	-.018	-.018	-.161	.071	-.061
validity period	.006	-.023	-.088	-.047	-.047	-.061	-.029	-.095	-.002	.068	-.229
social involvement	-.067	-.088	.943 ^a	-.146	-.055	.010	.102	-.149	.079	.017	-.312
line recharge	-.024	-.047	-.146	.913 ^a	-.602	-.059	.025	-.011	-.070	-.014	-.168
customer complaint	.004	-.047	-.055	-.602	.911 ^a	-.098	-.100	.049	-.059	-.181	.075
complaint resolution	-.059	-.061	.010	-.059	-.098	.950 ^a	-.324	-.012	-.090	-.010	.076
waiting time before connecting to a call center	-.018	-.029	.102	.025	-.100	-.324	.942 ^a	-.274	.069	-.090	-.200
in house customer relation	-.018	-.095	-.149	-.011	.049	-.012	-.274	.950 ^a	-.258	-.157	.002
innovation/creativity	-.161	-.002	.079	-.070	-.059	-.090	.069	-.258	.947 ^a	-.327	-.069
reliability/credibility	.071	.068	.017	-.014	-.181	-.010	-.090	-.157	-.327	.951 ^a	.073
responsiveness	-.061	-.229	-.312	-.168	.075	.076	-.200	.002	-.069	.073	.939 ^a
product range											

a. Measures of Sampling Adequacy(MSA)

Figure 6: Anti-Image Correlation for the combined sample

In our case all the variables scored over 0.9 so we didn't remove any of them.

4.3.1.5 Communalities

Communalities are the Total amount of Variance an original Variable shares with all other variables included in the analysis. A significant value is over 0.5.

Communalities		
	Initial	Extraction
level of satisfaction	1.000	.685
Call quality	1.000	.722
drop call	1.000	.497
coverage level	1.000	.709
network latency	1.000	.475
Call forwarding/waiting	1.000	.601
SMS service	1.000	.533
V.A.S	1.000	.637
AIR/USSD service	1.000	.526
new technology	1.000	.547
Fixed Fee	1.000	.780
Calling Fee	1.000	.792
Data Fee	1.000	.784
validity period	1.000	.551
social involvement	1.000	.527
line recharge	1.000	.583
customer complaint	1.000	.706
complaint resolution	1.000	.743
waiting time before connecting to a call center	1.000	.567
in house customer relation	1.000	.630
innovation/creativity	1.000	.628
reliability/credibility	1.000	.616
responsiveness	1.000	.633
product range	1.000	.618

Extraction Method: Principal Component Analysis.

Figure 7: Communalities for the combined sample

Overall we can notice that most of the variable are above 0.5 except for the "drop call" and "network latency" variables which had a score 0.497 and 0.475, in this case these variables will be retained and since their value is very close to 0.5 we will keep them under control and take a decision after further analysis.

4.3.1.6 Scree plot Test

Scree plot is a visual interpretation of the maximum number of factors to extract. We take the Latent root criterion into account, which means no eigenvalues lower than 1.

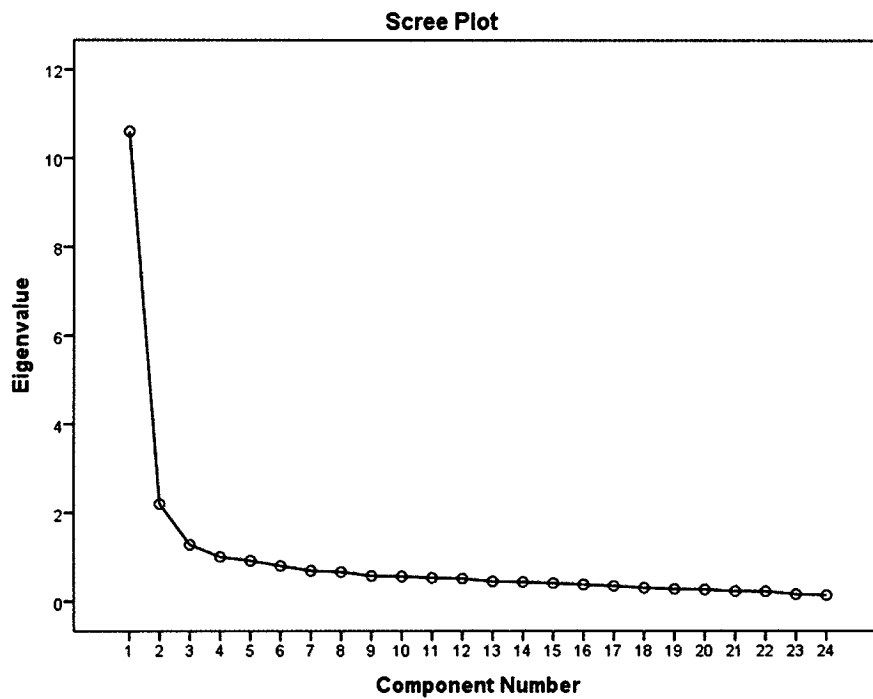


Figure 8: Scree plot for the combined sample

After the visual observation we can predict that we have around 4 important factors, but this observation is not conclusive, the next step in our analysis which is "Total Variance Explained" will confirm the exact number of significant factors.

4.3.1.7 Total Variance Explained

Like we mentioned briefly, the Total Variance Explained indicates how many significant factors we have, and the contribution of each factor to the total variance. Factors that do not explain much variance might not be worth including in the final model.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.574	44.515	44.515	11.574	44.515	44.515
2	2.202	8.469	52.984	2.202	8.469	52.984
3	1.300	4.999	57.983	1.300	4.999	57.983
4	1.010	3.885	61.869	1.010	3.885	61.869
5	.932	3.584	65.453			
6	.850	3.270	68.723			
7	.759	2.918	71.641			
8	.681	2.618	74.260			
9	.635	2.444	76.703			
10	.566	2.177	78.880			
11	.560	2.156	81.036			
12	.516	1.985	83.021			
13	.502	1.929	84.950			
14	.470	1.809	86.759			
15	.418	1.607	88.367			
16	.404	1.553	89.920			
17	.381	1.464	91.384			
18	.355	1.364	92.748			
19	.310	1.194	93.942			
20	.307	1.181	95.123			
21	.281	1.082	96.205			
22	.252	.969	97.175			
23	.226	.871	98.046			
24	.207	.796	98.842			
25	.163	.627	99.469			
26	.138	.531	100.000			

Figure 9: Total Variance Explained for the combined sample

We can confirm that we have 4 significant factors which explained 61.869 % of the total Variance, where the contribution of the first factor is 44.515%, the second factor is 8.469%, the third factor is 4.999% and the Fourth factor is 3.885%. From the contributions we can notice that the first factor has the biggest weight.

4.3.1.8 Unrotated Component Matrix

The Component Matrix contains the component factor loadings, which are the correlations between the variable and the factors extracted. Since some variables are found in two or more Factors (in our case a total of 6 cross-loading variables) a rotation is required to solve this anomaly.

Component Matrix^a

	Component			
	1	2	3	4
level of satisfaction	.765			
Call quality	.710			
drop call	.481			
coverage level	.579		.476	
network latency	.578			
Call forwarding/waiting	.639			
SMS service	.631			
V.A.S	.638			.460
AIR/USSD service	.643			
new technology	.703			
Fixed Fee	.577	.646		
Calling Fee	.590	.651		
Data Fee	.535	.680		
validity period	.552	.496		
social involvement	.712			
line recharge	.635			
customer complaint	.759			
complaint resolution	.743			
waiting time before connecting to a call center	.632			
in house customer relation	.751			
innovation/creativity	.764			
reliability/credibility	.739			
responsiveness	.729			
product range	.750			

Figure 10: Unrotated Component Matrix for the combined sample

4.3.1.9 Rotated Matrix

There are two types of rotations; orthogonal and oblique rotations. Orthogonal rotations consist of Quartimax, Varimax, and Equamax and the Oblique rotations include Promax and Direct oblimin.

In the beginning of our analysis we had 26 total variables, after performing the five methods of rotation two variables remained cross loaded between different factors these variables were: "Website/mobile app" and "number of retailed stores" so we were obliged to remove them, and restart our analysis. Since we had a total of 306 respondents the minimum cross loading factor used was 0.442. Our final model was solved using the Equamax with Kaiser Normalization method after 9 iterations. Below is the final model solved.

Rotated Component Matrix^a

	Component			
	1	2	3	4
level of satisfaction				.610
Call quality				.736
drop call				.675
coverage level				.807
network latency			.558	
Call forwarding/waiting			.666	
SMS service			.607	
V.A.S			.726	
AIR/USSD service			.615	
new technology			.511	
Fixed Fee		.854		
Calling Fee		.860		
Data Fee		.862		
validity period		.686		
social involvement			.464	
line recharge		.539		
customer complaint	.719			
complaint resolution	.765			
waiting time before connecting to a call center	.692			
in house customer relation	.630			
innovation/creativity	.575			
reliability/credibility	.622			
responsiveness	.639			
product range		.475		

Figure 11: Rotated Component Matrix for the combined sample

Below is the total variance explained after removing the two variables mentioned before:

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	10.606	44.193	44.193	10.606	44.193	44.193	4.233	17.636	17.636	
2	2.201	9.170	53.363	2.201	9.170	53.363	3.901	16.255	33.891	
3	1.279	5.328	58.691	1.279	5.328	58.691	3.710	15.459	49.350	
4	1.006	4.191	62.882	1.006	4.191	62.882	3.248	13.532	62.882	
5	.920	3.831	66.713							
6	.801	3.337	70.050							
7	.691	2.878	72.928							
8	.664	2.765	75.693							
9	.574	2.394	78.087							
10	.562	2.344	80.430							
11	.531	2.213	82.643							
12	.514	2.140	84.784							
13	.451	1.879	86.662							
14	.437	1.823	88.485							
15	.412	1.718	90.203							
16	.381	1.589	91.792							
17	.350	1.456	93.249							
18	.307	1.280	94.528							
19	.282	1.175	95.704							
20	.269	1.121	96.825							
21	.232	.966	97.791							
22	.227	.944	98.735							
23	.163	.680	99.415							
24	.140	.585	100.000							

Extraction Method: Principal Component Analysis.

Figure 12: Total variance explained after removing the variables for the combined sample

We can see that Factor 1 explains 17.636 % of the total variance, factor 2 explains 16.255 % of the total variance, factor 3 explains 15.459% of the total variance and factor 4 explains 13.532 % which sums up for a total of 62.882% of total variance explained. We can notice that after discarding the cross-loading variables the percentage of the total variance explained increased, and the weights of the four factors are now balanced.

4.3.2 Multiple Regression Analysis

Linear regression is the next step after correlation. It is applied when we want to predict the value of an independent variable based on the value of a dependent variable.

To further advance our analysis we will use the linear regression in two cases:

Case 1: we will filter and retain the significant variables for each of the four factors obtained with factor analysis.

Case 2: we will rank the four factors already extracted in order of influence on our dependent variable which will be "level of customer satisfaction" where the factor with the highest coefficient will have the most influence on the satisfaction of the customer etc...

4.3.2.1 Factor 1

In the model summary below we can see that the value of the Durbin-Watson is 1.941 which means that there is no autocorrelation in the sample; Durban Watson value should be between 1.8 and 2.2, then there are no autocorrelations.

R squared is 0.735 that means that the variables selected explain 73.5% of the dependent variable, which is our case Factor 1. R Squared and Adjusted R Squared are close to one another, which mean there are no insignificant variables in the equation.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.857 ^a	.735	.729	.52102535	.735	117.932	7	298	.000	1.941

a. Predictors: (Constant), responsiveness, waiting time before connecting to a call center, customer complaint, innovation/creativity, reliability/credibility, in house customer relation, complaint resolution

b. Dependent Variable: REGR factor score 1 for analysis 1

Figure 13: Model summary Factor 1 for the combined sample

In the coefficients test below we can observe that the P Value of two variables scored more than 0.05, these variables are “in house customer relation” and “innovation/creativity” (0.224 and 0.773 respectively) these two variable will be discarded and we will repeat the analysis.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.985	.119		-25.140	.000
	customer complaint	.069	.023	.156	2.988	.003
	complaint resolution	.144	.024	.319	5.908	.000
	waiting time before connecting to a call center	.139	.018	.302	7.529	.000
	in house customer relation	.030	.025	.055	1.217	.224
	innovation/creativity	.006	.022	.013	.289	.773
	reliability/credibility	.044	.021	.093	2.064	.040
	responsiveness	.051	.021	.109	2.425	.016

a. Dependent Variable: REGR factor score 1 for analysis 1

Figure 14: Coefficients test Factor 1 for the combined sample

Below is the repeated analysis after removing the two variables. We can see that the Durban-Watson remained in the comfort range with a value of 1.949 and R square is 0.733.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig F Change	
1	.856 ^a	.733	.729	52104320	.733	164.689	5	300	.000	1.949

a. Predictors: (Constant), responsiveness, waiting time before connecting to a call center, customer complaint, reliability/credibility, complaint resolution

b. Dependent Variable: REGR factor score 1 for analysis 1

Figure 15: Model summary Factor 1 after removing the variables for the combined sample

We can see also notice that with the new coefficient test, all the variables scored a significant value of less than 0.05 so these variables are significant independent variables for factor 1 (see below).

		Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.926	.111		-26.363	.000
	customer complaint	.072	.023	.164	3.175	.002
	complaint resolution	.146	.024	.324	6.044	.000
	waiting time before connecting to a call center	.149	.017	.324	8.731	.000
	reliability/credibility	.048	.020	.102	2.390	.017
	responsiveness	.059	.020	.125	2.881	.004

a. Dependent Variable: REGR factor score 1 for analysis 1

Figure 16: Coefficients test Factor 1 after removing the variables for the combined sample

4.3.2.2 Factor 2

Concerning Factor 2 the Durban-Watson is 1.853 and R square 0.913 which translates that the variables found explains 91.3 % of Factor 2. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.955 ^a	.913	.911	.29871051	.913	519.868	6	299	.000	1.853

a. Predictors: (Constant), product range, Fixed Fee, validity period, line recharge, Data Fee, Calling Fee

b. Dependent Variable: REGR factor score 2 for analysis 1

Figure 17: Model summary Factor 2 for the combined sample

In the coefficient test we can see that all the variables scored a significant value of less than 0.05 so all these variables will be retained (see below).

		Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0 Low
		B	Std. Error	Beta			
1	(Constant)	-1.866	.051		-36.679	.000	
	Fixed Fee	.093	.013	.234	7.290	.000	
	Calling Fee	.121	.013	.292	9.000	.000	
	Data Fee	.129	.010	.358	12.877	.000	
	validity period	.076	.008	.201	9.084	.000	
	line recharge	.041	.009	.104	4.432	.000	
	product range	-.038	.011	-.085	-3.595	.000	

a. Dependent Variable: REGR factor score 2 for analysis 1

Figure 18: Coefficients test Factor 2 for the combined sample

4.3.2.3 Factor 3

Concerning Factor 3 the Durban-Watson is 2.021 and R square 0.735 which translates that the variables found explains 73.5 % of Factor 3. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.857 ^a	.735	.729	.52054584	.735	118.228	7	298	.000	2.021

a. Predictors: (Constant), social involvement, V.A.S, network latency, AIR/USSD service, SMS service, new technology, Call forwarding/waiting
 b. Dependent Variable: REGR factor score 3 for analysis 1

Figure 19: Model summary Factor 3 for the combined sample

In the coefficient we can see that two variables had a significant level over 0.05 which are "social involvement" and " new technology" so they will be discarded.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.371	.133		-25.381	.000
	network latency	.080	.017	.183	4.862	.000
	Call forwarding/waiting	.127	.019	.262	6.563	.000
	SMS service	.066	.019	.136	3.509	.001
	V.A.S	.162	.016	.382	9.998	.000
	AIR/USSD service	.097	.018	.203	5.392	.000
	social involvement	-.012	.017	-.026	-7.01	.484
	new technology	-.011	.017	-.026	-6.54	.514

a. Dependent Variable: REGR factor score 3 for analysis 1

Figure 20: Coefficients test Factor 3 for the combined sample

The Final result after discarding the two variables is found below, we can see that the Durban-Watson remained in the comfort range with a value of 2.014 and R square is 0.734.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.857 ^a	.734	.730	.51980748	.734	165.759	5	300	.000	2.014

a. Predictors: (Constant), AIR/USSD service, network latency, Call forwarding/waiting, V.A.S, SMS service
 b. Dependent Variable: REGR factor score 3 for analysis 1

Figure 21: Model summary Factor 3 after removing the variables for the combined sample

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.382	.132		-25.596	.000
	network latency	.074	.015	.169	4.826	.000
	Call forwarding/waiting	.121	.019	.250	6.553	.000
	SMS service	.064	.019	.131	3.414	.001
	V.A.S	.159	.016	.376	9.992	.000
	AIR/USSD service	.093	.018	.196	5.294	.000

a. Dependent Variable: REGR factor score 3 for analysis 1

Figure 22: Coefficients test Factor 3 after removing the variables for the combined sample

4.3.2.4 Factor 4

Factor 4 had a Durban-Watson is 2.058 and of R square value of 0.819 where the variable found explains 81.9 % of Factor 4. R Squared and Adjusted R Squared are close to one another so there are no insignificant variables in the equation.

Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.905 ^a	.819	.817	.42804761	.819	340.906	4	301	.000	2.058

a. Predictors: (Constant), coverage level, drop call, level of satisfaction, Call quality

b. Dependent Variable: REGR factor score 4 for analysis 1

Figure 23: Model summary Factor 4 for the combined sample

In the coefficient we can see that one variable had a significant level over 0.05 which is "level of satisfaction and it will be discarded.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.878	.087		-33.014	.000
	level of satisfaction	.003	.017	.005	.153	.879
	Call quality	.144	.019	.290	7.717	.000
	drop call	.128	.011	.322	11.226	.000
	coverage level	.192	.013	.477	14.524	.000

a. Dependent Variable: REGR factor score 4 for analysis 1

Figure 24: Coefficients test Factor 4 for the combined sample

The Final result after discarding the “level of Satisfaction” variable is found below, we can see that the Durban-Watson has a value of 2.056 and R square remained 0.819.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.905 ^a	.819	.817	.42735485	.819	456.008	3	302	.000	2.056

a. Predictors: (Constant), coverage level, drop call, Call quality

b. Dependent Variable: REGR factor score 4 for analysis 1

Figure 25: Model summary Factor 4 after removing the variables for the combined sample

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.875	.085		-33.988	.000
	Call quality	.146	.016	.293	9.113	.000
	drop call	.128	.011	.322	11.336	.000
	coverage level	.193	.013	.478	14.848	.000

a. Dependent Variable: REGR factor score 4 for analysis 1

Figure 26: Coefficients test Factor 4 after removing the variables for the combined sample

4.3.3 Final Factors

The table below highlights the four factors ranked from the highest to the lowest loading:

Factor Number	Factor Name
Factor 1	Customer Care
Factor 2	Price
Factor 3	Mobile Services
Factor 4	Cummmunication

Table 2: Final four Factors

Factor 1 - Customer Care: loaded on 5 variables that are associated to everything has to do with the relation between the operator and his customer base from customer complaint redressal system, complaint resolution response time, the waiting time it takes for the call center personnel to respond to a customer, the

reliability and credibility of the operator in the eye of their customers, and the level of responsiveness to major breakdowns and incidents.

Factor 2 - Price: loaded on 6 variables that related everything has to do with the charges and fees a customer has to pay in order to obtain the services provided by the concerning operator, from the fixed, calling and data fee rates, the validity period is the period during which the Subscriber can use his/her recharged account or to pay his or her bill, and the different product ranges and line recharge options offered by the operator.

Factor 3 - Mobile Services : loaded on 5 variables that cover all the services offered by the operator to their consumers, like the call forwarding/waiting service (Call forwarding: forward or redirect incoming calls to any alternate number, Call waiting: service whereby someone making a telephone call is notified of another incoming call), the SMS service which give the user the ability to send short messages, the value added services like the ANGHAMI service for playing and downloading music, the university offer service which is allocated to university student, AL KHAT AL ASKARY which is a special services related to the military forces ..., the AIR/USSD service which gives the user the privilege to check his remaining balance and recharge his account using short codes numbers (*11#, *111# or *220#,*210#) and network latency which defines the delay or amount of time it takes to use a certain service for example how fast can a user play a song on ANGHAMI or watch a video on YOUTUBE.

Factor 4 - Communication: loaded on 3 variables which define the Call quality of Mobile Services, the number of dropped calls that a user suffers while using a services and the coverage level of the service provider in the area a certain customer live in.

4.3.4 Regression of the 4 factors with the dependent variable

The next step in our analysis is a regression of the 4 factors extracted as independent variables with the "level of customer satisfaction" as a dependent variable, and ranking them from the most to the least influential.

In the model summary we can see that the four factors extracted explain 68.5 % of the dependent variable, which is highlighted by R square value of 0.685. The Value of Durbin-Watson is 1.742 which is acceptable. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.827 ^a	.685	.680	1.180	.685	163.363	4	301	.000	1.742

a. Predictors: (Constant), REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

b. Dependent Variable: level of satisfaction

Figure 27: Model Summary of Regression of the 4 factors with Customer Satisfaction for the combined sample

In the Coefficient test we can see that Factor 4 which is "Communication" affect mostly the satisfaction of customer with a coefficient value of 1.274. That can be explained with the significant difference between the two operators from the coverage level (which the call quality and drop call rate relates too) since the mobile coverage of the two operator is not well spread all over the country as each operator has a good level of coverage in a certain area and bad coverage in another area (for example ALFA has a good coverage in the North area while TOUCH is not well covered). This is due to the difference in strategies each operator applies in allocating mobile sites in a certain geographical area. Factor 3 " Mobile Services" is next followed by Factor 1 which is " Customer Care" and finally the least Factor that affect Customer satisfaction is Factor 2 " Price". This can be interpreted as the oligopoly between the two operators, since the pricing policies are approved and set by the Ministry of telecommunication, and each operator must abide by these policies.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.137	.067		91.007	.000
	REGR factor score 1 for analysis 1	.667	.068	.320	9.881	.000
	REGR factor score 2 for analysis 1	.447	.068	.214	6.617	.000
	REGR factor score 3 for analysis 1	.845	.068	.405	12.509	.000
	REGR factor score 4 for analysis 1	1.274	.068	.610	18.856	.000

a. Dependent Variable: level of satisfaction

Figure 28: Coefficients test of Regression of the 4 factors with Customer Satisfaction for the combined sample

4.3.5 Exploratory Factor Analysis for ALFA operator

In this part we will use the Factor analysis method to extract the top factors that contribute the most when studying the ALFA operator's customer satisfaction level.

4.3.5.1 Reliability Analysis - Cronbach Alpha

As we can see below that Cronbach Alpha is 0.931 which represents a good reliability since it is above the minimum required of 0.7 Cronbach Alpha for the final 22 variables used. Therefore we can conclude that questionnaire conducted on ALFA's customers was reliable and valid.

Reliability Statistics

Cronbach's Alpha	N of Items
.931	22

Figure 29: Cronbach Alpha for ALFA sample

4.3.5.2 Pearson Correlation

After inspecting the Pearson Correlation matrix, we found out that there were enough correlations which are significant in order to continue with the analysis.

Below is an extract from the Pearson Correlation matrix.

		overall level of satisfaction	Call quality	drop call	coverage level	network latency	Call forwarding/waiting	SMS	V.A.S	AIR/USSD	new mobile technology	Fixed Fee	Calling Fee	Data Fee
overall level of satisfaction	Pearson Correlation	1	.658	.447	.492	.526	.556	.531	.481	.542	.636	.321	.314	.273
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
Call quality	Pearson Correlation	.658	1	.493	.595	.430	.492	.470	.416	.481	.552	.332	.327	.267
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
drop call	Pearson Correlation	.447	.493	1	.460	.303	.332	.263	.323	.351	.306	.215	.199	.143
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000	.003	.006	.048
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
coverage level	Pearson Correlation	.492	.595	.460	1	.402	.414	.323	.277	.414	.419	.238	.237	.153
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.001	.001	.035
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
network latency	Pearson Correlation	.526	.430	.303	.402	1	.501	.472	.403	.437	.556	.224	.206	.196
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000	.002	.004	.007
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
Call forwarding/waiting	Pearson Correlation	.556	.492	.332	.414	.501	1	.559	.464	.465	.480	.177	.239	.112
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.014	.001	.124
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
SMS	Pearson Correlation	.531	.470	.263	.323	.472	.559	1	.516	.546	.468	.266	.259	.167
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.021
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
V.A.S	Pearson Correlation	.481	.416	.323	.277	.403	.464	.516	1	.501	.456	.238	.243	.221
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000	.001	.001	.002
	N	191	191	191	191	191	191	191	191	191	191	191	191	191
AIR/USSD	Pearson Correlation	.542	.481	.351	.414	.437	.465	.546	.501	1	.401	.260	.218	.174
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.002	.016
	N	191	191	191	191	191	191	191	191	191	191	191	191	191

Figure 30: Pearson Correlation matrix for ALFA sample

4.3.5.3 KMO and Bartlett's Test of Sphericity

The KMO scored 0.922 which is above 0.7 and the Bartlett's test of Sphericity showed a significant p value of .000.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.922
Bartlett's Test of Sphericity	Approx. Chi-Square	2403.160
	df	231
	Sig.	.000

Figure 31: KMO and Bartlett test of Sphericity ALFA sample

4.3.5.4 Anti-Image Correlation

Below is a sample from the anti-image test. We can confirm that the MSA value of all the variables on the diagonal were over 0.5 so no variable has been dropped.

Anti-image A											
	Call quality	drop call	coverage level	network latency	Call forwarding/waiting	SMS	V.A.S	AIR/USSD	new mobile technology	Fixed Fee	
Anti-image Correlation	Call quality	.944 ^a	-.215	-.320	.056	-.062	-.089	-.027	-.051	-.188	-.017
	drop call	-.215	.915 ^a	-.169	.003	-.025	.097	-.112	-.021	.049	-.087
	coverage level	-.320	-.169	.910 ^a	-.107	-.103	.078	.106	-.113	-.060	-.025
	network latency	.056	.003	-.107	.950 ^a	-.118	-.099	-.054	-.055	-.270	-.020
	Call forwarding/waiting	-.062	-.025	-.103	-.118	.915 ^a	-.271	-.126	-.081	-.020	.084
	SMS	-.089	.097	.078	-.099	-.271	.930 ^a	-.186	-.167	-.068	-.070
	V.A.S	-.027	-.112	.106	-.054	-.126	-.186	.942 ^a	-.209	-.103	.046
	AIR/USSD	-.051	-.021	-.113	-.055	-.081	-.167	-.209	.945 ^a	.037	-.116
	new mobile technology	-.188	.049	-.060	-.270	-.020	-.068	-.103	.037	.941 ^a	-.066
	Fixed Fee	-.017	-.087	-.025	-.020	.084	-.070	.046	-.116	-.066	.867 ^a
	Calling Fee	.004	.009	-.069	.077	-.092	-.042	-.004	.113	.061	-.507
	Data Fee	-.023	.079	.125	-.064	.050	.083	-.013	.025	-.031	-.349
	validity period	-.073	.092	-.073	.076	.108	.100	-.129	.005	-.070	-.041
	social involvement	-.110	.002	.061	-.125	-.326	.160	.066	.007	-.118	.018
	product range	.027	-.125	.013	-.016	.038	.019	-.045	-.127	-.022	.158
	different recharge options	.102	-.012	.024	.033	-.028	-.077	-.013	.012	-.041	-.078
	complaint redressal system	-.037	.087	-.060	-.023	.102	-.107	.018	-.116	.022	-.013
	complaint resolution response time	.016	-.129	-.020	-.042	-.065	-.011	.050	.074	.027	.018
	waiting time before connecting to a call center personnel	-.104	.144	.160	.061	-.084	-.022	.001	-.037	-.054	-.047
	reliability/credibility	-.094	-.108	-.005	-.093	.169	-.182	.047	-.172	.113	.019
	responsiveness	.019	.002	-.041	.052	-.043	.002	-.108	.107	-.270	-.022
	number of retail stores	-.016	-.089	-.152	-.028	-.116	-.003	-.076	.006	.000	.004

Figure 32: Anti-Image Correlation for ALFA sample

4.3.5.5 Communalities

Overall we can notice that most of the variables are above 0.5 except for the "number of retail stores" variables which had a score of 0.455 so we'll keep this variable under control for future analysis.

Communalities		
	Initial	Extraction
Call quality	1.000	.678
drop call	1.000	.664
coverage level	1.000	.700
network latency	1.000	.516
Call forwarding/waiting	1.000	.623
SMS	1.000	.654
V.A.S	1.000	.581
AIR/USSD	1.000	.517
new mobile technology	1.000	.555
Fixed Fee	1.000	.797
Calling Fee	1.000	.789
Data Fee	1.000	.828
validity period	1.000	.539
social involvement	1.000	.548
product range	1.000	.675
different recharge options	1.000	.546
complaint redressal system	1.000	.793
complaint resolution response time	1.000	.797
waiting time before connecting to a call center personnel	1.000	.527
reliability/credibility	1.000	.535
responsiveness	1.000	.503
number of retail stores	1.000	.455

Extraction Method: Principal Component Analysis.

Figure 33: Communalities for ALFA sample

4.3.5.6 Scree plot Test

The Visual inspection of the scree plot showed that we have around 4 important factors to extract

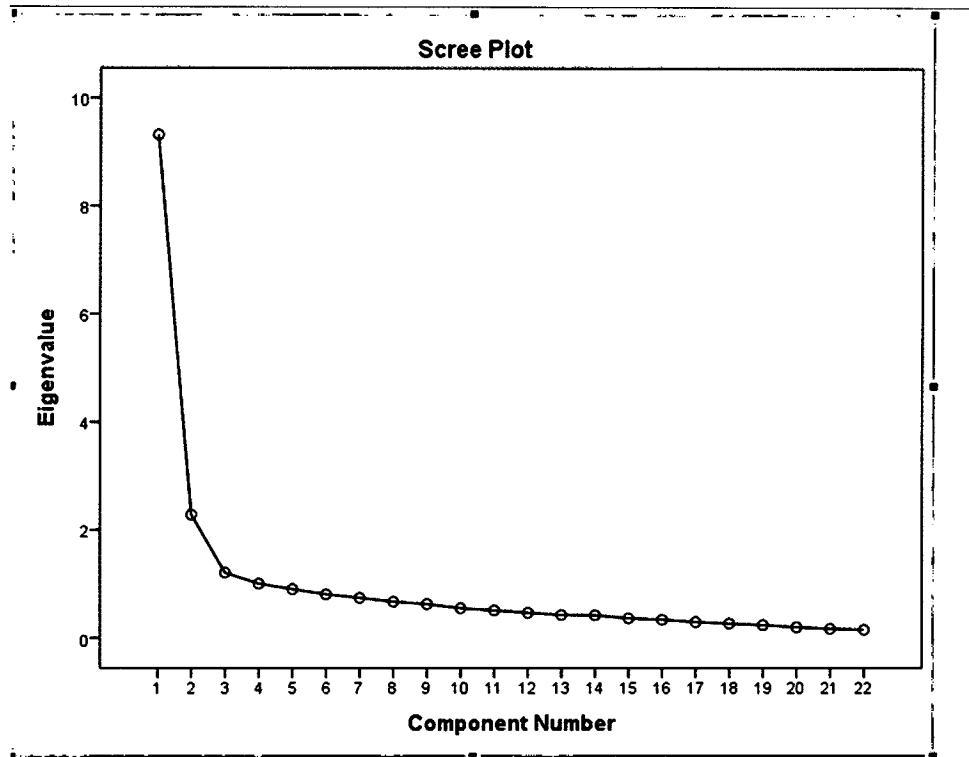


Figure 34: Scree plot for ALFA sample

4.3.5.7 Total Variance Explained

The total variance explained test, confirmed our visual inspection and extracted 4 factors that explained 62.822 % of the total variance. The contribution of the first factor is 42.361% the second factor is 10.378% the third factor is 5.504% and the Fourth factor is 4.580%. From the contributions we note that the first factor has the biggest weight.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.319	42.361	42.361	9.319	42.361	42.361
2	2.283	10.378	52.739	2.283	10.378	52.739
3	1.211	5.504	58.243	1.211	5.504	58.243
4	1.008	4.580	62.822	1.008	4.580	62.822
5	.904	4.110	66.932			
6	.809	3.679	70.612			
7	.744	3.381	73.993			
8	.674	3.062	77.054			
9	.629	2.857	79.912			
10	.551	2.506	82.417			
11	.511	2.324	84.742			
12	.467	2.125	86.866			
13	.427	1.943	88.809			
14	.423	1.921	90.730			
15	.365	1.660	92.390			
16	.339	1.542	93.932			
17	.297	1.349	95.281			
18	.269	1.221	96.502			
19	.241	1.096	97.597			
20	.202	.918	98.515			
21	.172	.781	99.296			
22	.155	.704	100.000			

Extraction Method: Principal Component Analysis.

Figure 35: Total Variance Explained for ALFA sample

4.3.5.8 Unrotated Component Matrix

Below is the initial unrotated component matrix. As we can see there are five variables that are cross-loaded so we proceeded to the rotation to resolve the cross-loading.

	Component			
	1	2	3	4
overall level of satisfaction	.773			
Call quality	.716			
drop call	.510			
coverage level	.572		.455	
network latency	.621			
Call forwarding/waiting	.659			
SMS	.669			
V.A.S	.616			
AIR/USSD	.665			
new mobile technology	.709			
Fixed Fee	.522	.696		
Calling Fee	.541	.694		
Data Fee	.475	.768		
validity period	.470	.559		
social involvement	.714			
product range	.776			
different recharge options	.634			
complaint redressal system	.734			
complaint resolution response time	.740			
waiting time before connecting to a call center personnel	.662			
in house customer relation	.764			
innovation/creativity	.756			
reliability/credibility	.727			
responsiveness	.704			
website /mobile app	.808			
number of retail stores	.678			

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Figure 36: Unrotated Component Matrix for ALFA sample

4.3.5.9 Rotated Matrix

We tested the 5 methods of rotation and found out that several variables were still cross-loaded between two or more factors so we deleted these variables and redo the test. After several repetition four variables from the initial 26 were dropped these variables were:

- Overall level of satisfaction
- Website /mobile app
- Innovation/creativity
- In house customer relation

We solved our model using the Equamax rotation method with a minimum cross-loading factor of 0.4 since there were around 200 respondents. We rechecked the total variance explained after the rotation and we ended up with the conclusion below:

Factor 1 explained 17.417 % of the total variance, factor 2 explained 16.304 % of the total variance, factor 3 explained 15.840% of the total variance and factor 4 explained 13.261 % which sums for a total of 62.822% of total variance explained. We can notice also that the weights of the four factors are now balanced.

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	9.319	42.361	42.361	9.319	42.361	42.361	3.832	17.417	17.417
2	2.283	10.378	52.739	2.283	10.378	52.739	3.587	16.304	33.721
3	1.211	5.504	58.243	1.211	5.504	58.243	3.485	15.840	49.561
4	1.008	4.580	62.822	1.008	4.580	62.822	2.918	13.261	62.822
5	.904	4.110	66.932						
6	.809	3.679	70.612						
7	.744	3.381	73.993						
8	.674	3.062	77.054						
9	.629	2.857	79.912						
10	.551	2.506	82.417						
11	.511	2.324	84.742						
12	.467	2.125	86.866						
13	.427	1.943	88.809						
14	.423	1.921	90.730						
15	.365	1.660	92.390						
16	.339	1.542	93.932						
17	.297	1.349	95.281						
18	.269	1.221	96.502						
19	.241	1.096	97.597						
20	.202	.918	98.515						
21	.172	.781	99.296						
22	.155	.704	100.000						

Extraction Method: Principal Component Analysis.

Figure 37: Total variance explained after removing the variables for ALFA sample

Rotated Component Matrix^a

	Component			
	1	2	3	4
Call quality				.665
drop call				.795
coverage level				.799
network latency		.594		
Call forwarding/waiting		.683		
SMS		.728		
V.A.S		.710		
AIR/USSD		.561		
new mobile technology		.560		
Fixed Fee			.866	
Calling Fee			.858	
Data Fee			.901	
validity period			.684	
social involvement	.526			
product range	.648			
different recharge options	.620			
complaint redressal system	.813			
complaint resolution	.816			
response time				
waiting time before connecting to a call center personnel	.568			
reliability/credibility	.485			
responsiveness	.491			
number of retail stores		.416		

Extraction Method: Principal Component Analysis.

Rotation Method: Equamax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Figure 38: Rotated Component Matrix for ALFA sample

4.3.6 Multiple Regression Analysis

Like we did previously we proceeded with multiple regression analysis in order to retain the significant variables that are found in each of the 4 factors obtained with FA.

4.3.8.1 Factor 1

Concerning Factor 1 we ended up by dropping 4 variables that have a significant value over 0.05 these variables were: social involvement, product range, reliability/credibility and responsiveness. The final model test showed a Durbin-Watson of 1.9 and R squared of 0.772. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.688	.135		-19.921	.000
	social involvement	-.022	.021	-.050	-1.033	.303
	product range	.044	.026	.098	1.725	.086
	different recharge options	.075	.018	.193	4.132	.000
	complaint redressal system	.154	.030	.341	5.198	.000
	complaint resolution response time	.178	.031	.383	5.746	.000
	waiting time before connecting to a call center personnel	.053	.020	.118	2.638	.009
	reliability/credibility	-.022	.023	-.047	-.963	.337
	responsiveness	-.013	.023	-.028	-.569	.570

a. Dependent Variable: REGR factor score 1 for analysis 1

Figure 39: Coefficients test Factor 1 for ALFA sample

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.759	.120		-22.989	.000
	different recharge options	.085	.016	.218	5.200	.000
	complaint redressal system	.154	.029	.340	5.324	.000
	complaint resolution response time	.173	.030	.372	5.773	.000
	waiting time before connecting to a call center personnel	.046	.019	.101	2.342	.020

a. Dependent Variable: REGR factor score 1 for analysis 1

Figure 40: Coefficients test Factor 1 after removing the variables for ALFA sample

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.878 ^a	.772	.767	.48312045	.772	157.009	4	186	.000	1.900

a. Predictors: (Constant), waiting time before connecting to a call center personnel, different recharge options, complaint redressal system, complaint resolution response time

b. Dependent Variable: REGR factor score 1 for analysis 1

Figure 41: Model summary Factor 1 after removing the variables for ALFA sample

4.3.8.2 Factor 2

For Factor 2 we dropped 3 variables: AIR/USSD, New Mobile technology, number of retail stores

The final model test showed a Durbin-Watson of 2.042 and R squared of 0.762. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.527	.165		-21.375	.000
	network latency	.070	.021	.155	3.312	.001
	Call forwarding/waiting	.126	.024	.253	5.263	.000
	SMS	.159	.025	.311	6.325	.000
	V.A.S	.145	.019	.351	7.639	.000
	AIR/USSD	.014	.022	.029	.624	.533
	new mobile technology	.025	.020	.059	1.262	.209
	number of retail stores	-.026	.020	-.057	-1.326	.186

a. Dependent Variable: REGR factor score 2 for analysis 1

Figure 42: Coefficients test Factor 2 for ALFA sample

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.533	.156		-22.657	.000
	network latency	.078	.020	.172	3.966	.000
	Call forwarding/waiting	.125	.023	.252	5.416	.000
	SMS	.164	.024	.321	6.831	.000
	V.A.S	.148	.018	.358	8.221	.000

a. Dependent Variable: REGR factor score 2 for analysis 1

Figure 43: Coefficients test Factor 2 after removing the variables for ALFA sample

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.873 ^a	.762	.757	.49308187	.762	148.869	4	186	.000	2.042

a. Predictors: (Constant), V.A.S, network latency, Call forwarding/waiting, SMS
 b. Dependent Variable: REGR factor score 2 for analysis 1

Figure 44: Model summary Factor 2 after removing the variables for ALFA sample

4.3.8.3 Factor 3

Concerning Factor 3 all the variables included were significant and the Durbin-Watson scored a value of 1.849 and R squared score an excellent value of 0.939. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.969 ^a	.939	.938	.24915714	.939	718.651	4	186	.000	1.849

a. Predictors: (Constant), validity period, Fixed Fee, Data Fee, Calling Fee
 b. Dependent Variable: REGR factor score 3 for analysis 1

Figure 45: Model summary Factor 3 for ALFA sample

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.885	.045		-42.159	.000
	Fixed Fee	.107	.013	.274	8.353	.000
	Calling Fee	.097	.013	.236	7.235	.000
	Data Fee	.142	.011	.400	12.788	.000
	validity period	.078	.008	.203	9.160	.000

a. Dependent Variable: REGR factor score 3 for analysis 1

Figure 46: Coefficients test Factor 3 for ALFA sample

4.3.8.4 Factor 4

Similar to Factor 3 all the variables in factor 4 were significant and the R squared and Durbin-Watson scored 0.878 and 2.282 respectively. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.934	.092		-31.825	.000
	Call quality	.062	.017	.122	3.666	.000
	drop call	.200	.012	.508	16.819	.000
	coverage level	.207	.014	.492	15.053	.000

a. Dependent Variable: REGR factor score 4 for analysis 1

Figure 47: Coefficients test Factor 4 for ALFA sample

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.937 ^a	.878	.876	.35180961	.878	449.368	3	187	.000	2.282

a. Predictors: (Constant), coverage level, drop call, Call quality

b. Dependent Variable: REGR factor score 4 for analysis 1

Figure 48: Model summary Factor 4 for ALFA sample

4.3.7 Final Factors

As we conclude our factor analysis for the ALFA operator we found out that:

- Customer Care came as factor 1
- Mobile Services came as Factor 2
- Price came as Factor 3
- Communication was Factor 4

4.3.8 Regression of the 4 factors with the dependent variable

The next step in our analysis is a regression of the 4 factors extracted as independent variables with the "level of customer satisfaction" as a dependent variable, and ranking them from the most to the least influential.

In the model summary we can see that the four factor extracted explained 60.1 % of the dependent variable which is highlighted by R square value of .601. The Value of Durbin-Watson is 1.897 which is good.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.775 ^a	.601	.592	1.292	.601	69.925	4	186	.000	1.897

a. Predictors: (Constant), REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

b. Dependent Variable: overall level of satisfaction

Figure 49: Model Summary of Regression of the 4 factors with Customer Satisfaction for ALFA sample

In the Coefficient test we can see that Factor 2 which is "Mobile Services" affect mostly the satisfaction of customer with a Coefficient value of 1.010. Factor 4 " Communication " is next, followed by Factor 1 which is " Customer Care ", and finally the least Factor that affect Customer satisfaction is Factor 3 " Price " .

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
		1	(Constant)	6.246			.093		66.811	.000
	REGR factor score 1 for analysis 1	.695	.094	.344	7.417	.000	.540	.850	1.000	1.000
	REGR factor score 2 for analysis 1	1.010	.094	.499	10.770	.000	.855	1.165	1.000	1.000
	REGR factor score 3 for analysis 1	.390	.094	.193	4.158	.000	.235	.545	1.000	1.000
	REGR factor score 4 for analysis 1	.896	.094	.443	9.560	.000	.741	1.051	1.000	1.000

a. Dependent Variable: overall level of satisfaction

Figure 50: Coefficients test of Regression of the 4 factors with Customer Satisfaction for ALFA sample

4.3.9 Exploratory Factor Analysis for TOUCH operator

Similar to ALFA we did the same analysis for TOUCH Operator below are the results

4.3.9.1 Cronbach Alpha

Cronbach Alpha was 0.947 which represents a good reliability so the questionnaire conducted on TOUCH's customers was reliable and valid.

Reliability Statistics

Cronbach's Alpha	N of Items
.947	26

Figure 51: Cronbach Alpha for TOUCH sample

4.3.9.2 Pearson Correlation

After inspecting the Pearson Correlation matrix, we found out that there were enough correlations which are significant in order to proceed with the analysis. Below is an excerpt from the Pearson Correlation matrix highlighting the correlations between each variable and their significance.

		overall level of satisfaction	Call quality	drop call	coverage level	network latency	Call forwarding/wa iting	SMS	V.A.S	AIR/USSD	new mobile technology	Fixed Fee	Calling Fee	Data Fee
overall level of satisfaction	Pearson Correlation	1	.757	.391	.644	.380	.435	.344	.524	.483	.472	.401	.382	.462
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
Call quality	Pearson Correlation	.757	1	.411	.638	.333	.393	.467	.445	.376	.471	.281	.318	.428
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000	.002	.001	.000
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
drop call	Pearson Correlation	.391	.411	1	.479	.208	.201	.347	.288	.283	.298	.150	.238	.237
	Sig. (2-tailed)	.000	.000		.000	.026	.031	.000	.002	.002	.005	.110	.014	.011
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
coverage level	Pearson Correlation	.644	.638	.479	1	.347	.283	.384	.308	.254	.403	.235	.268	.293
	Sig. (2-tailed)	.000	.000	.000		.000	.002	.000	.001	.006	.000	.012	.004	.001
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
network latency	Pearson Correlation	.380	.333	.208	.347	1	.362	.297	.348	.268	.484	.284	.324	.139
	Sig. (2-tailed)	.000	.000	.026	.000		.000	.001	.000	.004	.000	.004	.000	.140
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
Call forwarding/wa iting	Pearson Correlation	.435	.393	.201	.283	.362	1	.418	.551	.368	.455	.202	.234	.181
	Sig. (2-tailed)	.000	.000	.031	.002	.000		.000	.000	.000	.000	.030	.012	.052
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
SMS	Pearson Correlation	.344	.467	.347	.384	.297	.418	1	.409	.447	.408	.246	.175	.201
	Sig. (2-tailed)	.000	.000	.000	.000	.001	.000		.000	.000	.000	.008	.061	.032
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
V.A.S	Pearson Correlation	.524	.445	.288	.308	.348	.551	.409	1	.455	.462	.427	.418	.381
	Sig. (2-tailed)	.000	.000	.002	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
AIR/USSD	Pearson Correlation	.483	.376	.283	.254	.268	.368	.447	.455	1	.494	.378	.329	.263
	Sig. (2-tailed)	.000	.000	.002	.006	.004	.000	.000	.000	.000	.000	.000	.000	.005
	N	115	115	115	115	115	115	115	115	115	115	115	115	115
new mobile technology	Pearson Correlation	.472	.471	.258	.403	.484	.455	.408	.462	.494	1	.377	.288	.365
	Sig. (2-tailed)	.000	.000	.005	.000	.000	.000	.000	.000	.000	.000	.002	.000	.000

Figure 52: Pearson Correlation matrix for TOUCH sample

4.3.9.3 KMO and Bartlett's Test of Sphericity

The KMO scored 0.899 which is above 0.7 and the Bartlett's test of Sphericity showed a significant p value of .000.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.899
Bartlett's Test of Sphericity	Approx. Chi-Square	2015.297
	df	325
	Sig.	.000

Figure 53: KMO and Bartlett test of Sphericity for TOUCH sample

4.3.9.4 Anti-Image Correlation

All the variables on the diagonal of the anti-image test were over 0.5 so no variable has been dropped.

	overall level of satisfaction	Call quality	drop call	coverage level	network latency	Call forwarding/waiting	SMS	V.A.S	AIR/USSD	new mobile technology	Fixed Fee	Calling Fee	
number of retail stores	.008	.001	.047	-.024	.040	.041	.040	-.075	-.072	.077	.036	-.063	
Anti-image Correlation	.856 ^a	-.497	-.027	-.397	-.134	-.140	.285	-.165	-.312	.117	-.156	.185	
overall level of satisfaction		.883 ^a	-.061	-.105	.106	.053	-.203	-.102	.058	-.125	.241	-.204	
Call quality			.877 ^a	-.222	-.020	.115	-.150	-.051	-.074	.033	.181	-.131	
drop call				.873 ^a	-.013	.138	-.167	.068	.246	-.136	-.028	-.065	
coverage level					.856 ^a	-.006	-.015	-.132	.047	-.326	.095	-.321	
network latency						.906 ^a	-.151	-.323	.068	-.116	.188	-.155	
Call forwarding/waiting							.906 ^a	-.151	-.323	.068	-.116	.188	
SMS								.849 ^a	-.192	-.321	.059	-.143	
V.A.S									.908 ^a	.066	-.061	-.103	
AIR/USSD										.883 ^a	-.256	-.084	
new mobile technology											.913 ^a	-.168	
Fixed Fee												.824 ^a	
Calling Fee													.819 ^a
Data Fee													.193
validity period													.022
social involvement													.078
product range													.031
line recharge options													.181
complaint redressal system													.046
complaint resolution													.035
waiting time before connecting to a call center													.035
in house customer relation													.189
innovation/creativity													.230
reliability/credibility													.084
responsiveness													.229
website/mobile app													.081
number of retail stores													.238

a. Measures of Sampling Adequacy(MSA)

Figure 54: Anti-Image Correlation for TOUCH sample

4.3.9.5 Communalities

Only 2 variables scored below 0.5 which were “drop call” and “network latency”.

	Initial	Extraction
overall level of satisfaction	1.000	.705
Call quality	1.000	.753
drop call	1.000	.457
coverage level	1.000	.726
network latency	1.000	.331
Call forwarding/waiting	1.000	.606
SMS	1.000	.495
V.A.S	1.000	.681
AIR/USSD	1.000	.567
new mobile technology	1.000	.527
Fixed Fee	1.000	.753
Calling Fee	1.000	.777
Data Fee	1.000	.768
validity period	1.000	.597
social involvement	1.000	.505
product range	1.000	.682
line recharge options	1.000	.710
complaint redressal system	1.000	.701
complaint resolution	1.000	.685
waiting time before connecting to a call center	1.000	.531
in house customer relation	1.000	.628
innovation/creativity	1.000	.712
reliability/credibility	1.000	.732
responsiveness	1.000	.772
website /mobile app	1.000	.540
number of retail stores	1.000	.518

Figure 55: Communalities for TOUCH sample

4.3.9.6 Scree Test

The Visual inspection of the scree plot showed that we have around Four important factors to extract.

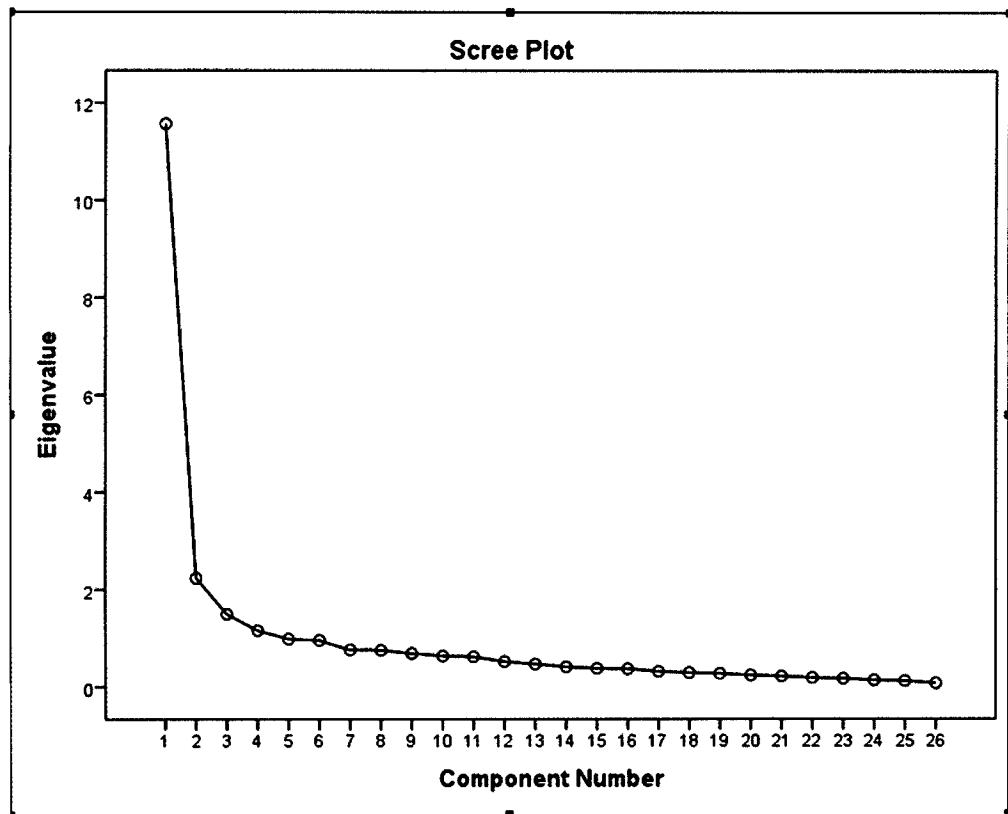


Figure 56: Scree plot for TOUCH sample

4.3.9.7 Total Variance Explained

The Total Variance Explained test confirmed our visual inspection and extracted four factors that explained 63.312 % of our model. The contribution of the first factor is 44.505%, the second factor is 8.598%, the third factor is 5.752%, and the Fourth factor is 4.457%. From the contributions we note that the first factor has the biggest weight.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.571	44.505	44.505	11.571	44.505	44.505
2	2.236	8.598	53.103	2.236	8.598	53.103
3	1.495	5.752	58.855	1.495	5.752	58.855
4	1.159	4.457	63.312	1.159	4.457	63.312
5	.984	3.786	67.098			
6	.956	3.679	70.777			
7	.760	2.922	73.699			
8	.752	2.894	76.593			
9	.686	2.639	79.232			
10	.635	2.442	81.674			
11	.618	2.376	84.050			
12	.518	1.993	86.044			
13	.466	1.791	87.835			
14	.409	1.574	89.409			
15	.376	1.446	90.854			
16	.367	1.412	92.266			
17	.314	1.207	93.473			
18	.287	1.106	94.579			
19	.273	1.049	95.627			
20	.237	.913	96.540			
21	.216	.830	97.370			
22	.184	.708	98.078			
23	.170	.653	98.731			
24	.136	.522	99.254			
25	.120	.460	99.714			
26	.074	.286	100.000			

Figure 57: Total Variance Explained for TOUCH sample

4.3.9.8 Unrotated Component Matrix

Below is the initial unrotated component matrix. As we can see three variables are cross-loaded so rotation is a must to resolve this anomaly.

	Component			
	1	2	3	4
overall level of satisfaction	.724			
Call quality	.668			
drop call				
coverage level	.565			
network latency				
Call forwarding/waiting	.610			
SMS	.540			
V.A.S	.680			
AIR/USSD	.616			
new mobile technology	.654			
Fixed Fee	.650	-.556		
Calling Fee	.664	-.558		
Data Fee	.625			
validity period	.685			
social involvement	.704			
product range	.705			
line recharge options	.659	-.502		
complaint redressal system	.794			
complaint resolution	.733			
waiting time before connecting to a call center	.593			
in house customer relation	.736			
innovation/creativity	.793			
reliability/credibility	.791			
responsiveness	.758			
website /mobile app	.660			
number of retail stores	.669			

Extraction Method: Principal Component Analysis.

Figure 58: Unrotated Component Matrix for TOUCH sample

4.3.9.9 Rotated Matrix

We used the Varimax rotation method and the matrix was solved after 7 iterations. We can notice that “network latency” and “social involvement” didn't feature in any of the four factors extracted, so in this case we won't include them in our final analysis. The minimum cross-loading factor used was 0.5 since there were around 120 respondents.

	Component			
	1	2	3	4
overall level of satisfaction				.674
Call quality				.767
drop call				.622
coverage level				.797
network latency				
Call forwarding/waiting			.621	
SMS			.517	
V.A.S			.677	
AIR/USSD			.650	
new mobile technology			.525	
Fixed Fee		.832		
Calling Fee		.839		
Data Fee		.794		
validity period		.662		
social involvement				
product range		.692		
line recharge options		.744		
complaint redressal system	.648			
complaint resolution	.713			
waiting time before connecting to a call center	.674			
in house customer relation	.655			
innovation/creativity	.692			
reliability/credibility	.720			
responsiveness	.796			
website /mobile app	.536			
number of retail stores	.558			

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Figure 59: Rotated Component Matrix for TOUCH sample

The Total Variance after the rotation showed that Factor 1 explained 19.972 % of the total variance, factor 2 explained 18.716 % of the total variance, factor 3 explained 12.451% of the total variance and factor 4 explained 12.173 % which sums for a total of 63.312% of Total Variance Explained. We can notice that the weights of the four factors are now balanced.

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	11.571	44.505	44.505	11.571	44.505	44.505	5.193	19.972	19.972
2	2.236	8.598	53.103	2.236	8.598	53.103	4.866	18.716	38.687
3	1.495	5.752	58.855	1.495	5.752	58.855	3.237	12.451	51.139
4	1.159	4.457	63.312	1.159	4.457	63.312	3.165	12.173	63.312
5	.984	3.786	67.098						
6	.956	3.679	70.777						
7	.760	2.922	73.699						
8	.752	2.894	76.593						
9	.686	2.639	79.232						
10	.635	2.442	81.674						
11	.618	2.376	84.050						
12	.518	1.993	86.044						
13	.466	1.791	87.835						
14	.409	1.574	89.409						
15	.376	1.446	90.854						
16	.367	1.412	92.266						
17	.314	1.207	93.473						
18	.287	1.106	94.579						
19	.273	1.049	95.627						
20	.237	.913	96.540						
21	.216	.830	97.370						
22	.184	.708	98.078						
23	.170	.653	98.731						
24	.136	.522	99.254						
25	.120	.460	99.714						
26	.074	.286	100.000						

Figure 60: Final total variance explained for TOUCH sample

4.3.10 Multiple Regression Analysis

Similar to ALFA we proceeded with multiple regression in order to retain the most significant variables that are found in each of the four factors obtained with FA.

4.3.9.1 Factor 1

Concerning Factor 1 we ended up by dropping five variables that have a significant value over 0.05 these variables were: “Complaint redressal system”, “in house customer relation”, “innovation/creativity”, “website/mobile app” and “number of retail stores”.

The final model test showed a Durbin-Watson of 1.598 and R squared of 0.770. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Model		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta				
1	(Constant)	-3.066	.205		-14.973	.000
	complaint redressal system	-.016	.035	-.037	-.460	.646
	complaint resolution	.089	.035	.208	2.548	.012
	waiting time before connecting to a call center	.133	.029	.282	4.534	.000
	in house customer relation	.023	.038	.043	.606	.546
	innovation/creativity	.024	.040	.048	.586	.559
	reliability/credibility	.055	.038	.114	1.419	.159
	responsiveness	.167	.039	.362	4.272	.000
	website /mobile app	-.015	.033	-.028	-.457	.649
	number of retail stores	.045	.032	.088	1.390	.167

a. Dependent Variable: REGR factor score 1 for analysis 1

Figure 61: Coefficients test Factor 1 for TOUCH sample

Model		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta				
1	(Constant)	-2.973	.167		-17.763	.000
	complaint resolution	.079	.029	.184	2.763	.007
	waiting time before connecting to a call center	.142	.026	.301	5.453	.000
	responsiveness	.186	.034	.402	5.404	.000
	reliability/credibility	.077	.034	.161	2.292	.024

a. Dependent Variable: REGR factor score 1 for analysis 1

Figure 62: Coefficients test Factor 1 after removing the variables for TOUCH sample

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.878 ^a	.770	.762	.48786797	.770	92.240	4	110	.000	1.598

a. Predictors: (Constant), reliability/credibility, waiting time before connecting to a call center, complaint resolution, responsiveness
 b. Dependent Variable: REGR factor score 1 for analysis 1

Figure 63: Model Summary of Factor 1 after removing the variables for TOUCH sample

4.3.9.2 Factor 2

For Factor 2 we ended up by dropping one variable that have a significant value over 0.05 which was “product range”. The final model test showed a Durbin-Watson of 1.777 and R squared of 0.859. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.040	.101		-20.208	.000
	Fixed Fee	.090	.029	.219	3.040	.003
	Calling Fee	.101	.031	.241	3.309	.001
	Data Fee	.095	.020	.259	4.741	.000
	validity period	.035	.019	.092	1.871	.064
	product range	.040	.024	.088	1.633	.105
	line recharge options	.078	.021	.202	3.778	.000

a. Dependent Variable: REGR factor score 2 for analysis 1

Figure 64: Coefficients test Factor 2 for TOUCH sample

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.972	.093		-21.302	.000
	Fixed Fee	.088	.030	.216	2.971	.004
	Calling Fee	.102	.031	.243	3.314	.001
	Data Fee	.102	.020	.280	5.229	.000
	validity period	.044	.018	.116	2.466	.015
	line recharge options	.092	.019	.236	4.794	.000

a. Dependent Variable: REGR factor score 2 for analysis 1

Figure 65: Coefficients test Factor 2 after removing the variables for TOUCH sample

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.927 ^a	.859	.853	.38376966	.859	133.008	5	109	.000	1.777

a. Predictors: (Constant), line recharge options, validity period, Data Fee, Fixed Fee, Calling Fee

b. Dependent Variable: REGR factor score 2 for analysis 1

Figure 66: Model Summary of Factor 2 after removing the variables for TOUCH sample

4.3.9.3 Factor 3

For Factor 3 we ended up by dropping two variables that have a significant value over 0.05 which were “SMS” and “new mobile technology”. The final model test showed a Durbin-Watson of 2.199 and R squared of 0.662. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.281	.238		-13.764	.000
	Call forwarding/waiting	.120	.033	.253	3.652	.000
	SMS	.051	.030	.111	1.693	.093
	V.A.S	.141	.032	.313	4.419	.000
	AIR/USSD	.163	.033	.339	4.982	.000
	new mobile technology	.024	.031	.052	.763	.447

a. Dependent Variable: REGR factor score 3 for analysis 1

Figure 67: Coefficients test Factor 3 for TOUCH sample

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.116	.224		-13.903	.000
	Call forwarding/waiting	.138	.032	.291	4.346	.000
	V.A.S	.152	.031	.340	4.862	.000
	AIR/USSD	.187	.030	.388	6.190	.000

a. Dependent Variable: REGR factor score 3 for analysis 1

Figure 68: Coefficients test Factor 3 after removing the variables for TOUCH sample

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.814 ^a	.662	.653	.58875459	.662	72.626	3	111	.000	2.199

a. Predictors: (Constant), AIR/USSD, Call forwarding/waiting, V.A.S

b. Dependent Variable: REGR factor score 3 for analysis 1

Figure 69: Model Summary of Factor 3 after removing the variables for TOUCH sample

4.3.9.4 Factor 4

For Factor 4 we dropped one variable that have a significant value over 0.05 which was “the overall level of satisfaction”. The final model test showed a Durbin-Watson of 1.829 and R squared of 0.799. R Squared and Adjusted R Squared are close to one another which means there are no insignificant variables in the equation.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.701	.145		-18.678	.000
	overall level of satisfaction	.005	.032	.011	.161	.872
	Call quality	.187	.034	.384	5.575	.000
	drop call	.104	.020	.258	5.223	.000
	coverage level	.162	.024	.421	6.893	.000

a. Dependent Variable: REGR factor score 4 for analysis 1

Figure 70: Coefficients test Factor 4 for TOUCH sample

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.696	.141		-19.081	.000
	Call quality	.191	.027	.391	6.984	.000
	drop call	.104	.020	.258	5.257	.000
	coverage level	.164	.022	.424	7.299	.000

a. Dependent Variable: REGR factor score 4 for analysis 1

Figure 71: Coefficients test Factor 4 after removing the variables for TOUCH sample

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.894 ^a	.799	.793	.45454050	.799	146.924	3	111	.000	1.829

a. Predictors: (Constant), coverage level, drop call, Call quality

b. Dependent Variable: REGR factor score 4 for analysis 1

Figure 72: Model Summary of Factor 4 after removing the variables for TOUCH sample

4.3.11 Final Factors

As we conclude our factor analysis for the TOUCH operator we found out that:

- Customer Care came as factor 1
- Price came as Factor 2
- Mobile Services came as Factor 3
- Communication was Factor 4

4.3.12 Regression of the 4 factors with the dependent variable

The next step in our analysis is a regression of the four factors extracted as independent variables with the "level of customer satisfaction" as a dependent variable and ranking them from the most to the least influential.

In the model summary we can see that the four factor extracted explain 70.5 % of the dependent variable which is highlighted by R square value of 0.705. The Value of Durbin-Watson is 2.145 which is good.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.840 ^a	.705	.694	1.208	.705	65.789	4	110	.000	2.145

a. Predictors: (Constant), REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

b. Dependent Variable: overall level of satisfaction

Figure 73: Model Summary of Regression of the 4 factors with Customer Satisfaction for TOUCH sample

In the Coefficient test we can see that Factor 4 which is "Communication" affect mostly the satisfaction of customer with a Coefficient value of 1.474. Factor 1 " Customer Care " is next, followed by Factor 2 which is " Price " and finally the least Factor that affect customer satisfaction is Factor 3 " Mobile Services " .

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	5.957	.113		52.866	.000	5.770	6.143		
	REGR factor score 1 for analysis 1	.665	.113	.304	5.873	.000	.477	.852	1.000	1.000
	REGR factor score 2 for analysis 1	.650	.113	.297	5.742	.000	.462	.838	1.000	1.000
	REGR factor score 3 for analysis 1	.577	.113	.264	5.102	.000	.390	.765	1.000	1.000
	REGR factor score 4 for analysis 1	1.474	.113	.674	13.026	.000	1.286	1.662	1.000	1.000

a. Dependent Variable: overall level of satisfaction

Figure 74: Coefficients test of Regression of the 4 factors with Customer Satisfaction for TOUCH sample

4.4 Non-Parametric Test - Mann-Whitney U test and Kruskal-Wallis H Test

Mann-Whitney and Kruskal-Wallis are two nonparametric tests that determine if the values of a variable for two or more independent samples are different.

Mann-Whitney and Kruskal-Wallis tests were used for testing the level of customer satisfaction with the demographic variables in the questionnaire, noting that Mann-Whitney is used for comparing two variables and Kruskal-Wallis is used for more than two variables.

The results of the two tests must have a significant value of 0.05 or less in order to reject the null hypothesis

4.4.1 Non-Parametric Test - Mann-Whitney U test

4.4.1.1 Gender

The gender of the respondents was the first question in the questionnaire. Out of the 306 respondents, 64.7% were males and 35.3% were females.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	198	64.7	64.7	64.7
	Female	108	35.3	35.3	100.0
	Total	306	100.0	100.0	

Figure 75: Statistical sample for Gender

Mann-Whitney's Test scored a significant value of 0.436. We can deduct that there is no difference between the Level of satisfaction and the Gender category. This means that level of satisfaction was assessed the same between males and females.

Mann-Whitney Test

		Gender	N	Mean Rank	Sum of Ranks
Level of satisfaction	Male		198	150.63	29825.50
	Female		108	158.75	17145.50
	Total		306		

	Level of satisfaction
Mann-Whitney U	10124.500
Wilcoxon W	29825.500
Z	-.778
Asymp. Sig. (2-tailed)	.436

a. Grouping Variable: Gender

Figure 76: Mann-Whitney U test for Gender

4.4.1.2 Operator

To which service provider the respondents refer too was collected in the third question of the questionnaire. Out of the 306 respondents, 62.4% were ALFA subscribers and 37.6% were TOUCH subscribers.

		Operator			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ALFA	191	62.4	62.4	62.4
	TOUCH	115	37.6	37.6	100.0
	Total	306	100.0	100.0	

Figure 77: Statistical sample for Operator

The Mann-Whitney's U Test scored a significant value of 0.286. Similar to the gender we can confirm that there is similarity in evaluating the level of satisfaction between TOUCH and ALFA customers.

Mann-Whitney Test

		Ranks			
		Operator	N	Mean Rank	Sum of Ranks
Level of satisfaction	ALFA		191	157.63	30107.00
	TOUCH		115	146.64	16864.00
	Total		306		

Test Statistics^a

	Level of satisfaction
Mann-Whitney U	10194.000
Wilcoxon W	16864.000
Z	-1.067
Asymp. Sig. (2-tailed)	.286

a. Grouping Variable: Operator

Figure 78: Mann-Whitney U test for Operator

4.4.2 Non-Parametric Test - Kruskal-Wallis H Test

4.4.2.1 Location

To which Governorate the respondents lived in was collected in the fourth question of the questionnaire. The table below showed the dispersion of our respondent all over the country. We can notice that the majority of our respondent lived in Mount Lebanon and Beirut, which is suspected since the Lebanese Population density is concentrated in these areas.

		Location			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Akkar	14	4.6	4.6	4.6
	North	27	8.8	8.8	13.4
	Mount Lebanon	209	68.3	68.3	81.7
	Beirut	31	10.1	10.1	91.8
	Beqaa	15	4.9	4.9	96.7
	Baalbek-Hermel	1	.3	.3	97.1
	South	8	2.6	2.6	99.7
	Nabatieh	1	.3	.3	100.0
	Total	306	100.0	100.0	

Figure 79: Statistical sample for Location

The Kruskal-Wallis H Test showed a p value of 0.298. It implies that there is no difference between the level of satisfaction and the Location variable. This means that level of satisfaction was perceived the same between all respondents from different location of Lebanon.

Kruskal-Wallis Test

Ranks

	Location	N	Mean Rank
Level of satisfaction	Akkar	14	136.39
	North	27	148.33
	Mount Lebanon	209	155.03
	Beirut	31	168.60
	Beqaa	15	120.30
	Baalbek-Hermel	1	26.00
	South	8	163.75
	Nabatieh	1	287.50
	Total	306	

Test Statistics^{a,b}

	Level of satisfaction
Chi-Square	8.410
df	7
Asymp. Sig.	.298

a. Kruskal Wallis Test

b. Grouping Variable:
Location

Figure 80: Kruskal-Wallis H test for Location

4.4.2.2 Age

The Age of the respondent was the second question of the questionnaire. Out of the 306 respondents, 2.6% are below 20 years of age, the majority of our respondent 69.6% are between 20 and 39, 24.5% are between 40 and 60 and 3.3% are over 60 years old.

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 20	8	2.6	2.6	2.6
	20 to 39	213	69.6	69.6	72.2
	40 to 60	75	24.5	24.5	96.7
	Over 60	10	3.3	3.3	100.0
	Total	306	100.0	100.0	

Figure 81: Statistical sample for Age

The Kruskal-Wallis H Test showed a p value of 0.125. It indicates that there is no difference between the level of satisfaction and the Age category, and the level of satisfaction was perceived the same between all respondents from different ages.

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Level of Satisfaction	Below 20	8	125.69
	20 to 39	213	161.04
	40 to 60	75	139.29
	Over 60	10	121.65
	Total	306	

Test Statistics^{a,b}

	Level of Satisfaction
Chi-Square	5.731
df	3
Asymp. Sig.	.125

a. Kruskal Wallis Test

b. Grouping Variable:
Age

Figure 82: Kruskal-Wallis H test for Age

4.5 Main Results

4.5.1 Comparison Table

Method	Total Sample	ALFA	TOUCH	Differences
Factor Analysis	Customer Care	Customer Care	Customer Care	No difference
	Price	Mobile Services	Price	Factor 2 for ALFA is "Mobile Services" while for TOUCH and Total sample is "Price"
	Mobile Services	Price	Mobile Services	Factor 3 for ALFA is "Price" while for TOUCH and Total sample is "Mobile Services"
	Communication	Communication	Communication	No difference
Regression With CS as Y	Communication	Mobile Services	Communication	"Communication" affects mostly the level of satisfaction for TOUCH customers and the Total sample while "Mobile Services" is N1 for ALFA's customers.
	Mobile Services	Communication	Customer Care	"Mobile Services" is the second Factor for the Total Sample "Communication" is for ALFA "Customer Care" is for TOUCH
	Customer Care	Customer Care	Price	"Customer Care" is the 3rd Factor for the Total Sample "Customer Care" is for ALFA "Price" is for TOUCH
	Price	Price	Mobile Services	"Price" has the least effect on customer satisfaction concerning the Total sample and ALFA's customers while "Mobile Services" is for TOUCH.

Table 3: Comparison Table

4.5.2 Quantitative Analysis Results

4.5.2.1 Factor analysis

Based on the outcome of the factor analysis we can see that the end results of the combined sample and TOUCH are similar, where the two most important factors are “Customer Care” and “Price” and the less important factors are “Mobile Services” and “Communication”. Concerning ALFA the two most important factors are “Customer Care” and “Mobile Services” followed by “Price” and “Communication”.

4.5.2.2 Regression Analysis

Concerning the regression analysis we can see that for the combined sample “Communication” and “Mobile Services” had the most influence on Customer satisfaction whereas “Customer Care” and “Price” had the least effect. As For ALFA “Mobile Services” and “Communication” had the most effect on the CS followed by “Customer Care” and “Price”. Finally for TOUCH “Communication” and “Customer Care” had the most effect on customer satisfaction while “Price” and “Mobile Services” had the least effect.

4.5.2.3 Deductions

1rst deduction: based on the literature and statistical analysis TOUCH has the largest market share that captures 53% of total overall subscribers, as a consequence the preferences of TOUCH customers affected the outcomes of the combined sample since the factor analysis results are similar.

Second deduction: In Factor Analysis “Customer Care” had the highest coefficient among the other factors. First of all we can deduct that there is a general consensus among all respondent concerning “Customer Care” variables. Secondly TOUCH should make sure that there is a positive interaction between the service centers’ employees and its customer, and ensure a high quality customer services in order to keep their subscribers satisfied since “Customer

Care” coefficient ranked second among the factors affecting customer satisfaction.

Third deduction: Price ranked second in FA and last as the factor influencing customer satisfaction. This can be interpreted as there is a general consensus among respondent concerning the pricing policies adopted by the two operators, due to the oligopoly and lack of competition in this domain.

Fourth Deduction: ALFA operator must ensure high quality Mobile Services and always work on improving and diversifying their product in order to meet their customers’ needs and desires. As based on the data analysis results, ALFA subscribers are very sensitive to “Mobile Services” (Mobile Services ranked second in FA and number one factor affecting customer satisfaction for ALFA).

Fifth deduction: there is a difference in opinions between TOUCH and ALFA respondent from the “Communication” point of view (Communication ranked last in FA). As already mentioned before, this due to the fact that the mobile coverage level of the two operators is not well spread all over the country, as each operator has a good coverage in a certain area and bad in another one. Therefore each operator must work on improving its communication sector, by adding more sites and enhancing the level of mobile coverage all over Lebanon, in order to reduce drop call rates (Communication factor ranked in the top two among variables affecting Customer satisfaction for ALFA and TOUCH).

4.6 Hypotheses Testing

4.6.1 Rejected Hypotheses

In this section we will present the hypotheses that were rejected after the data has been analyzed.

H1: Overall Customer Satisfaction differs between ALFA and TOUCH.

Based on the results of the Mann-Whitney’s U Test that scored a P value of 0.286 which is higher than 0.05. Therefore we do not reject the null hypothesis

that there is a Similarity in evaluating the level of satisfaction between TOUCH and ALFA customers.

Thus H1 has been rejected.

H2: Overall Customer Satisfaction differs between male and female customers.

Based on the results of the Mann-Whitney's U Test which scored a P value of 0.436 which is higher than 0.05. Therefore we do not reject the null hypothesis that there is a Similarity in evaluating the level of satisfaction between both genders.

Thus H2 has been rejected.

H4: People in different regions have different needs and preferences

Based on the results of the Kruskal-Wallis H Test which scored a P value of 0.298 which is higher than 0.05. Therefore we do not reject the null hypothesis that there are similarities in needs and preferences of people from different regions of Lebanon.

Thus H4 has been rejected.

H6: Price has the biggest influence on Customer satisfaction.

Based on the results of the regression analysis we can confirm that Price has a positive influence on customer Satisfaction, but is not the most influent factor.

Therefore H6 has been rejected.

H8: Customer service/care has an important positive influence on Customer satisfaction.

Based on the results of the regression we can confirm that Customer Care factor has a positive influence on customer Satisfaction, but not an important one since it ranked third among other factors.

Thus H8 has been rejected.

4.6.2 Retained Hypotheses

In this section we will present the hypotheses that were retained after the data has been analyzed.

H3: People from different ages have similar opinions.

Based on the results of the Kruskal-Wallis H Test which scored a P value of 0.125 which is higher than 0.05. Therefore we do not reject the null hypothesis that there are similarities in opinions of people from different ages.

Thus H3 has been retained.

H5: Communication has a positive influence on Customer satisfaction.

Based on the results of the regression analysis we can confirm that Communication factor has the strongest positive coefficient that affects customer Satisfaction.

Thus H5 has been retained.

H7: Mobile Services have an important positive influence on Customer satisfaction.

Based on the results of the regression analysis we can confirm that Mobile Services factor has an important positive influence on customer Satisfaction since it ranks second among the other variables.

Thus H7 has been retained.

4.7 Conclusion

In This chapter we concluded the final results of this research where we illustrated an overview of the analysis framework as well as the outcomes of the quantitative data analysis. This analysis was conducted using the principal component factor analysis, where we extracted the critical factors that represented our final model. Afterwards we expanded our investigation by performing two linear regressions that enabled us to conclude the most influential factors that affected the customer satisfaction. We ended this chapter, by testing the proposed hypotheses in chapter 3.

The findings showed that there are four main factors which are “Communication”, “Price”, “Mobile Services”, and “Customer Care”. “Communication” was the strongest coefficient that affected customer satisfaction for the combined sample and TOUCH operator, while “Mobile Services” was the strongest factor for ALFA. On the other hand “Price” was the lowest coefficient that affected customer satisfaction for the combined sample and ALFA as for TOUCH “mobiles services” factor was the lowest.

In the next and final chapter, we will summarize the findings that were already discussed. Furthermore, we will discuss the limitations of this research as well as the theoretical/practical implications, and the recommendations for future studies.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The final chapter of our thesis, we will conclude the analysis of our research that aims at finding the critical success factor that affect the customer satisfaction for the Lebanese telecom service providers market. In This chapter we will summarize the main findings of the quantitative data analysis, afterwards we will discuss some limitations that we faced will conducting this study, and finally we will present the theoretical and practical implications as well as the recommendations for future research.

5.2 Main Findings Summary

5.2.1 Quantitative Research Findings

The quantitative data analysis was based on a self-administrative questionnaire where 350 respondents filled the survey. Out of 350 responses 309 were considered for this study. Hard copies of the survey were printed and distributed to random people from all over the country, plus a similar version was created and uploaded on the website eSurvey Creator where an electronic link of the questionnaire was generated and shared with the concerning respondent through different social media platforms (WhatsApp, Facebook, Telegram...) and emails. The descriptive statistics showed that Out of the 306 respondents, 64.7% were males and 35.3% were females. While 62.4% of the respondent belonged to ALFA operator and 37.6% were TOUCH subscribers. The majority of our respondent lived in Mount Lebanon and Beirut since the Lebanese Population density is concentrated in these areas. Out of the 306 respondents, 2.6% were below 20 years of age, 69.6% were between 20 and 39, 24.5% were between 40 and 60, and 3.3% were over 60 years old.

5.2.1.1 The Factor Analysis

Three different principle factor analysis were conducted where the first one was for the combined sample while the other two were for ALFA and TOUCH operators respectively. The three samples scored a Cronbach Alpha value of over 0.7, which indicated that the questionnaire conducted was reliable and valid. The KMO and Bartlett's test of sphericity for the three samples were over 0.5 and 0.05 respectively. The Pearson correlation matrix for the three tests showed enough correlations with a significant p value under 0.05, so we didn't omit any variable. After the visual interpretation of the scree plot test of the three samples, we predicted that there are four important factors to extract. We confirmed this observation with the total variance explained test where for the combined sample the 4 significant factors explained 61.869 % of the total Variance, as for ALFA the 4 factors explained 62.822 % and 63.312 % for TOUCH. After extracting the total variance explained we performed several rotations methods in order to solve the cross-loadings variables that were available in the unrotated matrix. We used the Equamax rotation for the combined and ALFA sample and Varimax rotation for the TOUCH sample. The final four factors were presented in the table below:

Method	Total Sample	ALFA	TOUCH
Factor Analysis	Customer Care	Customer Care	Customer Care
	Price	Mobile Services	Price
	Mobile Services	Price	Mobile Services
	Communication	Communication	Communication

Table 4: The final four factors

5.2.1.2 Regression of New Factors with customer satisfaction

After concluding the Factor analysis we proceeded with the linear regression in order to:

First of all filter and retain the significant variables for each of the four factors obtained with factor analysis. Secondly rank the four factors already extracted in order of influence on our dependent variable which is "level of customer satisfaction" where the factor with the highest coefficient will have the most influence on the satisfaction of the customer. The conclusion of the regression analysis is illustrated in the table below:

Method	Total Sample	ALFA	TOUCH
Regression With CS as Y	Communication	Mobile Services	Communication
	Mobile Services	Communication	Customer Care
	Customer Care	Customer Care	Price
	Price	Price	Mobile Services

Table 5: The Regression factors

5.2.2 Summary of Findings

The table below illustrates a summary of our research findings.

Hypotheses	Research Methodology	Tests Used	Quantitative Research Findings
H1: Overall Customer Satisfaction differs between ALFA and TOUCH.	Quantitative Analysis, Self-Administrative questionnaire.	Factor Analysis Regression Analysis Mann-Whitney U Test Kruskal-Wallis H Test	There is a Similarity in evaluating the level of satisfaction between TOUCH and ALFA customers. The differences between the two operators are not statistically significant.
H2: Overall Customer Satisfaction differs between male and female customers.			There is a Similarity in evaluating the level of satisfaction between both genders. The differences among genders are not statistically significant.
H3: People from different ages have similar opinions.			there are similarities in opinions of people from different ages
H4: People in different regions have different needs and preferences			there are similarities in needs and preferences of people from different regions of Lebanon
H5: Communication has a positive influence on Customer satisfaction.			Communication factor has the strongest positive coefficient that affects customer Satisfaction.
H6: Price has the biggest influence on Customer satisfaction.			Price factor positively affects customer Satisfaction but it doesn't have the biggest coefficient. It ranks fourth among the other variables.
H7: Mobile Services have an important positive influence on Customer satisfaction.			Mobile Services factor positively affects customer Satisfaction by. It ranks second among the other variables.
H8: Customer service/care has an important positive influence on Customer satisfaction.			Customer Care factor positively affects customer Satisfaction by it ranks third among the other variables.

Table 6: Summary of Findings

5.2.3 Comparison with Literature

The results of our study showed that there are four factors that affected customer satisfaction for the telecom service providers market in Lebanon. These factors are “Communication”, “Mobile Services”, “Price”, and “Customer Care”. In our deep analysis of the literature in chapter 2 we found out some similar results to the case in Lebanon:

In a study conducted in Pakistan by Hafeez & Hasnu (2010) they found that Price was one of critical factors in determining customer satisfaction. Similar results were found by Balaji (2009), who studied the effect of customer satisfaction on Indian telecom operators, Price featured as one of the important predictor of Customer satisfaction. Gerpott (2001) studied the customer satisfaction for a German network operator, he concluded that Price along with Customer Care were two of the main catalyst of customer satisfaction. Finally Jegan & Sudalaiyandi (2012) in their research on the consumer satisfaction and preference toward the mobile service providers found that the call tariffs and network coverage have a positive correlation with the customer’s satisfaction.

5.3 Limitation of the Research

Even though the results of this research provided important insights on the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market, some limitations should be addressed.

First of all the number of respondent for ALFA exceeded the number of respondent for TOUCH. So in order to have more accurate results an equal sample should be taken into consideration.

Secondly the number of respondent from certain geographical areas wasn’t enough to draw definite conclusion about the current situation presented in that area. So having more respondent from certain locations would be more appropriate.

Moreover this research failed to address some important demographic aspects like the educational and Income level of a respondent. So it would be interesting to study the effect of these demographic on the consumer’s level of satisfaction.

5.4 Implications

5.4.1 Theoretical Implications

Since the Telecommunication industry is one of the fastest growing technologies worldwide (Carlson, 2006) and one of the most saturated market customer wise, the ability and capability to satisfy the majority of this large fan base become the number one challenge for the telecom companies and operators. In the Lebanese market the situation of the telecom operators is a little bit different in contrast to other countries globally, since the decision to undertake new projects and acquire new technologies in order to upgrade and improve the network and setting the most appropriate pricing strategy and modifying the services fees which will certainly impact the satisfaction of customer, is the scope of the ministry of telecommunication.

On the other hand the MOT should start by studying the idea of employing a third and fourth operator, as this will definitely improve the mobile coverage level all over the country, reduce the drop call rate and improve the overall level of satisfaction of the consumer. Furthermore a privatization of the sector should be implemented, this will give the freedom for the operators to set their own pricing strategies based on the market demand, which will reduce the Price oligopoly and increase the level of competition between the service providers.

5.4.2 Practical Implications

As for the practical implications since “Communication” is one of the important factors affecting customer satisfaction, we would suggest that ALFA and TOUCH starts by deploying more sites in order to improve their faded coverage in certain geographical areas in Lebanon. Secondly as the “Mobile Services” is the most affecting factor on customer satisfaction for ALFA and second most affecting factor overall, we would recommend an improvement in the quality of service offered and introduce more diversified offers so that would capture different subscribers from different age and gender. Finally I would propose the introduction of the mobile phone bundle service were a consumer can benefit from the latest mobile phones available at a reduced Prices, on the condition of

subscribing to a specific number of services for a limited amount of time. This strategy will increase the sales level, improve the ROI and reduce subscriber turnover for each service provider.

5.5 Recommendations for Further Research

To conclude this research will attempt to study the critical factors that affect customer satisfaction for the Lebanese telecom service providers market but focusing on satisfaction alone is not enough as there are other important subjects that have to be studied in order to reach the ultimate results.

One of the significant topics that can be exploited is identifying the different factors that affect the customer retention. The combination of customer satisfaction and customer retention can ensure a better understanding of Lebanese consumer telecom market behavior and based on the results acquired operators along with the ministry of telecommunication can set and develop new strategies that will help improve the overall performance of the industry and increase the return on investments. So further research on customer retention subject is highly recommended.

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7. ANNEXES

7.1 Quantitative Research Questions

Customer Satisfaction for the Lebanese telecom service provider market

Thank you for taking the time to complete this questionnaire, which is developed by an MBA student from NDU University, Lebanon. This research will be carried out by Mr Jad Wehbe (MBA student, phone #:70202536) and under the supervision of Mr. Ghassan Beyrouthy (Assistant professor, phone #:03447474) . The purpose of this survey is to investigate the critical factors that affect the customer satisfaction for the Lebanese telecom service providers market. This survey will be used in our research that would be published later on, any information provided in this questionnaire will not be used in any other context. Responses to this survey are strictly confidential and completely anonymous, no personally identifiable information is recorded. This survey takes around 10 minutes; we appreciate you taking the time to support this research.

1. Gender

Male Female

2. Age

Below 20 20 to 39 40 to 60 Over 60

3. Operator/Service Provider

ALFA TOUCH

4. In which Governorate (Mohafazah, محافظة) do you live?

Akkar Mount Lebanon Beqaa South
NorthBeirut Baalbek-Hermel Nabatieh

5. What is your overall level of satisfaction with your service provider/operator?
(ALFA/TOUCH)

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Level of satisfaction

6. What is your overall evaluation of the Call quality of Mobile Services? (Call quality:
جودة المكالمة)

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Level of satisfaction

7. Did you ever use International Roaming? (International roaming: التجوال الدولي)
If your answer is "No" please skip the next question

- Yes
 No

8. What is your overall evaluation of the quality of International roaming?

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Level of satisfaction

9. How do you rate your service provider/operator in terms of drop call? (Call Drop:
إنقطاع الإتصال)

If your answer is 0: the number of dropped calls is very high

If your answer is 10: the number of dropped calls is minimal to none

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Level of satisfaction

10. Please indicate the coverage level of your service provider in the area you live in?
(Coverage level: مستوى التغطية)

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Level of satisfaction

11. What is your overall satisfaction of the network latency?
Latency: Delay or amount of time it takes for example to play a video in "YouTube"

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Level of satisfaction

12. Please rate the quality of Call forwarding/waiting service
Call forwarding: forward or redirect incoming calls to any alternate number

Call waiting: service whereby someone making a telephone call is notified of another incoming call

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Quality

13. Please rate the quality of the SMS service

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10
Quality

14. Please indicate your level of satisfaction of the Value added Services available
(V.A.S)

Example of VAS: ALFA/TOUCH Anghami, 4x4, ALFA/TOUCH university offer

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

15. Please indicate your level of satisfaction of the AIR/USSD service
 Example of AIR/USSD (*11#, *111# or *220#,*210#: check balance, recharging ...)

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

16. Please indicate the level of satisfaction of the new mobile technology used (3G, 4G, and 4G+)

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

17. Please indicate the level of satisfaction of the Fixed Fee Rates/charges

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

18. Please indicate the level of satisfaction of the Calling Fee Rates

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

19. Please indicate the level of satisfaction of the Data Fee Rates (internet)

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

20. Please indicate your level of satisfaction of the validity period provided by your operator
 Validity period: period during which the Subscriber can use his/her recharged account or to pay his bill

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

21. Please indicate the level of satisfaction of the social involvement of your service provider/operator
 Example of social involvement: sponsorship or events

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

22. Please indicate the level of satisfaction of the product range offered by your operator
 Plans: prepaid, postpaid...

Very Low Very
 High
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

23. Please indicate the level of satisfaction of the different line recharge options
 Example: WhatsApp plan recharge, extra MB data recharge...

Very Low Very
 High

0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

24. Please indicate the level of satisfaction of the complaint redressal system (customer complaint)

Very Low High Very
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

25. Please indicate the level of satisfaction of the complaint resolution response time

Very Low High Very
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

26. Please indicate your level of satisfaction of the waiting time before connecting to a call center personnel

Very Low High Very
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

27. Please indicate your level of satisfaction of the in house customer relation (at the service provider retail store or at the company)

Very Low High Very
 0 1 2 3 4 5 6 7 8 9 10
 Level of satisfaction

28. In your opinion what is the level of innovation/creativity of your operator?

Very Low High Very
 0 1 2 3 4 5 6 7 8 9 10
 Level of creativity

29. What is the reliability/credibility level of your operator? (Reliability/credibility: مصداقية)

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10

Level of credibility

30. What is the level of responsiveness of your operator?
Responsiveness: How fast to recover from major failures, breakdowns, incidents ...

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10

Responsiveness

31. How satisfied are you when using the website or the mobile application of your operator? (user-friendly)

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10

Level of satisfaction

32. How satisfied are you from the number of retail stores related to your operator all over the country?

Very Low Very
High
0 1 2 3 4 5 6 7 8 9 10

Level of satisfaction

Thank You

7.2 Values of skewness and kurtosis of all the variables

Descriptives				
			Statistic	Std. Error
drop call	Mean		5.81	.143
	90% Confidence Interval for Mean	Lower Bound	5.58	
		Upper Bound	6.05	
	5% Trimmed Mean		5.90	
	Median		6.00	
	Variance		6.296	
	Std. Deviation		2.509	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		4	
	Skewness		-.475	.139
	Kurtosis		-.320	.278
	coverage level	Mean		6.34
90% Confidence Interval for Mean		Lower Bound	6.11	
		Upper Bound	6.58	
5% Trimmed Mean		6.47		
Median		7.00		
Variance		6.167		
Std. Deviation		2.483		
Minimum		0		
Maximum		10		
Range		10		
Interquartile Range		3		
Skewness		-.693	.139	
Kurtosis		-.139	.278	
network latency		Mean		5.70
	90% Confidence Interval for Mean	Lower Bound	5.48	
		Upper Bound	5.91	
	5% Trimmed Mean		5.76	
	Median		6.00	
	Variance		5.176	

	Std. Deviation	2.275		
	Minimum	0		
	Maximum	10		
	Range	10		
	Interquartile Range	4		
	Skewness	-.353	.139	
	Kurtosis	-.542	.278	
Call forwarding/waiting	Mean	6.40	.118	
	90% Confidence Interval for Mean	Lower Bound	6.20	
		Upper Bound	6.59	
	5% Trimmed Mean	6.48		
	Median	7.00		
	Variance	4.253		
	Std. Deviation	2.062		
	Minimum	0		
	Maximum	10		
	Range	10		
	Interquartile Range	3		
	Skewness	-.620	.139	
	Kurtosis	.777	.278	
SMS service	Mean	7.67	.117	
	90% Confidence Interval for Mean	Lower Bound	7.47	
		Upper Bound	7.86	
	5% Trimmed Mean	7.86		
	Median	8.00		
	Variance	4.190		
	Std. Deviation	2.047		
	Minimum	0		
	Maximum	10		
	Range	10		
	Interquartile Range	2		
	Skewness	-1.277	.139	
	Kurtosis	1.862	.278	
V.A.S	Mean	6.30	.135	
	90% Confidence Interval for Mean	Lower Bound	6.07	
		Upper Bound	6.52	
5% Trimmed Mean	6.41			

	Median	7.00	
	Variance	5.580	
	Std. Deviation	2.362	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-.615	.139
	Kurtosis	.112	.278
AIR/USSD service	Mean	7.38	.120
	90% Confidence Interval for Mean	Lower Bound	7.18
		Upper Bound	7.58
	5% Trimmed Mean	7.56	
	Median	8.00	
	Variance	4.407	
	Std. Deviation	2.099	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-1.094	.139
	Kurtosis	1.207	.278
new technology	Mean	6.23	.132
	90% Confidence Interval for Mean	Lower Bound	6.01
		Upper Bound	6.45
	5% Trimmed Mean	6.33	
	Median	7.00	
	Variance	5.370	
	Std. Deviation	2.317	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-.659	.139
	Kurtosis	.187	.278
Fixed Fee	Mean	4.39	.144
	90% Confidence Interval for Mean	Lower Bound	4.16

	Interval for Mean	Upper Bound	4.63	
	5% Trimmed Mean		4.37	
	Median		5.00	
	Variance		6.318	
	Std. Deviation		2.514	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		3	
	Skewness		-.093	.139
	Kurtosis		-.619	.278
Calling Fee	Mean		4.47	.138
	90% Confidence Interval for Mean	Lower Bound	4.25	
		Upper Bound	4.70	
	5% Trimmed Mean		4.47	
	Median		5.00	
	Variance		5.811	
	Std. Deviation		2.411	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		3	
	Skewness		-.109	.139
	Kurtosis		-.510	.278
Data Fee	Mean		4.04	.159
	90% Confidence Interval for Mean	Lower Bound	3.77	
		Upper Bound	4.30	
	5% Trimmed Mean		3.97	
	Median		4.00	
	Variance		7.707	
	Std. Deviation		2.776	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		4	
	Skewness		.093	.139
	Kurtosis		-.988	.278

validity period	Mean		5.14	.150
	90% Confidence Interval for Mean	Lower Bound	4.89	
		Upper Bound	5.38	
	5% Trimmed Mean		5.15	
	Median		5.00	
	Variance		6.886	
	Std. Deviation		2.624	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		4	
	Skewness		-.267	.139
	Kurtosis		-.638	.278
social involvement	Mean		5.73	.125
	90% Confidence Interval for Mean	Lower Bound	5.52	
		Upper Bound	5.93	
	5% Trimmed Mean		5.78	
	Median		6.00	
	Variance		4.783	
	Std. Deviation		2.187	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		2	
	Skewness		-.393	.139
	Kurtosis		.213	.278
product range	Mean		5.70	.127
	90% Confidence Interval for Mean	Lower Bound	5.49	
		Upper Bound	5.91	
	5% Trimmed Mean		5.78	
	Median		6.00	
	Variance		4.944	
	Std. Deviation		2.224	
	Minimum		0	
	Maximum		10	
	Range		10	
Interquartile Range		2		

	Skewness		-.493	.139
	Kurtosis		.214	.278
line recharge	Mean		5.44	.147
	90% Confidence Interval for Mean	Lower Bound	5.20	
		Upper Bound	5.68	
	5% Trimmed Mean		5.49	
	Median		5.50	
	Variance		6.594	
	Std. Deviation		2.568	
	Minimum		0	
	Maximum		10	
	Range		10	
	Interquartile Range		3	
	Skewness		-.364	.139
	Kurtosis		-.477	.278
	customer complaint	Mean		6.09
90% Confidence Interval for Mean		Lower Bound	5.88	
		Upper Bound	6.30	
5% Trimmed Mean			6.18	
Median			6.00	
Variance			5.097	
Std. Deviation			2.258	
Minimum			0	
Maximum			10	
Range			10	
Interquartile Range			3	
Skewness			-.597	.139
Kurtosis			.248	.278
complaint resolution		Mean		6.12
	90% Confidence Interval for Mean	Lower Bound	5.91	
		Upper Bound	6.33	
	5% Trimmed Mean		6.20	
	Median		6.00	
	Variance		4.930	
	Std. Deviation		2.220	
	Minimum		0	
	Maximum		10	

	Range	10		
	Interquartile Range	3		
	Skewness	-.549	.139	
	Kurtosis	.271	.278	
waiting time before connecting to a call center	Mean	6.07	.124	
	90% Confidence Interval for Mean	Lower Bound	5.86	
		Upper Bound	6.27	
	5% Trimmed Mean	6.16		
	Median	6.00		
	Variance	4.733		
	Std. Deviation	2.176		
	Minimum	0		
	Maximum	10		
	Range	10		
	Interquartile Range	3		
	Skewness	-.612	.139	
	Kurtosis	.285	.278	
	in house customer relation	Mean	6.37	.104
90% Confidence Interval for Mean		Lower Bound	6.20	
		Upper Bound	6.54	
5% Trimmed Mean		6.43		
Median		6.00		
Variance		3.336		
Std. Deviation		1.827		
Minimum		0		
Maximum		10		
Range		10		
Interquartile Range		3		
Skewness		-.488	.139	
Kurtosis	.670	.278		
innovation/creativity	Mean	5.86	.117	
	90% Confidence Interval for Mean	Lower Bound	5.66	
		Upper Bound	6.05	
	5% Trimmed Mean	5.91		
	Median	6.00		
	Variance	4.209		
Std. Deviation	2.052			

	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	2	
	Skewness	-.371	.139
	Kurtosis	.093	.278
reliability/credibility	Mean	6.48	.120
	90% Confidence Interval for Mean	Lower Bound	6.29
		Upper Bound	6.68
	5% Trimmed Mean	6.57	
	Median	7.00	
	Variance	4.434	
	Std. Deviation	2.106	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-.581	.139
	Kurtosis	.277	.278
responsiveness	Mean	6.36	.121
	90% Confidence Interval for Mean	Lower Bound	6.16
		Upper Bound	6.56
	5% Trimmed Mean	6.45	
	Median	6.00	
	Variance	4.506	
	Std. Deviation	2.123	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-.623	.139
	Kurtosis	.636	.278
website /mobile app	Mean	6.44	.114
	90% Confidence Interval for Mean	Lower Bound	6.25
		Upper Bound	6.63
	5% Trimmed Mean	6.53	
	Median	7.00	

	Variance	3.972	
	Std. Deviation	1.993	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-.663	.139
	Kurtosis	.712	.278
number of retail stores	Mean	6.13	.119
	90% Confidence Interval for Mean	Lower Bound	5.94
		Upper Bound	6.33
	5% Trimmed Mean	6.22	
	Median	6.00	
	Variance	4.326	
	Std. Deviation	2.080	
	Minimum	0	
	Maximum	10	
	Range	10	
	Interquartile Range	3	
	Skewness	-.629	.139
	Kurtosis	.690	.278