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**Master of Science in Management, Economics and  
Industrial Engineering**

**SERVICE QUALITY AND CUSTOMER  
SATISFACTION IN THE TELECOM INDUSTRY**

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## **Abstract**

In this thesis, a discussion about service quality of telecom industry as well as customer satisfaction is carried out. A survey is conducted as part of analysis of the relationship between the two aspects. Therefore, an idea of improving future telecom industry service quality is proposed.

*Key words: service quality, customer satisfaction, telecom industry*

## SOMMARIO

In questa tesi, una discussione sulla qualità del servizio del settore delle telecomunicazioni così come la soddisfazione del cliente viene effettuato. Un sondaggio è condotto come parte di analisi del rapporto tra i due aspetti. Pertanto, l'idea di migliorare la qualità del futuro del settore delle telecomunicazioni servizio è proposto.

Parole chiave: *qualità del servizio, soddisfazione dei clienti, l'industria delle telecomunicazioni*

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## INTRODUCTION

It is currently a world fulfilled with information. As an important part of information exchange, telecom industry has an enormously important role in our daily life.

In addition to that, in fact, as the world economy only recovers slowly, the telecom industry has actually become an important driver for the recovery process. This is because of the development of this particular industry can lead to various developments in every technology related aspects of the industry.

However, it is not only important to see what the technology can do, but also necessary to find out what the service quality of this industry are like at present, then we can see which part of the service can we improve.

So in this thesis, we will emphasize on the service quality aspect of the industry. First we will find the aspects that service quality of the industry include, then we will conduct a survey to find out the current situation of the service quality and the importance of each aspect. Finally we will use a fish-bone diagram to figure out what we can do to improve these aspects.

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## **CHAPTER 1: OBJECTIVE OF THE THESIS AND INTRODUCTION TO TELECOM INDUSTRY**

This chapter outlines the concept of telecom industry. It presents the overview of telecom industry, its history and it also discusses about the current situation, future prospects of the telecom industry nowadays. These days, telecom industry is not only applying telegraph and telephone service but also other service such as internet, radio, television service etc. When telecom companies make their strategies to improve customer satisfaction, one of first steps is to find key performance factors that do effect on customer satisfaction. The objective of this thesis is to analyze the data from interviews of executive in different telecom companies and questionnaire for normal customers.

### **1.1 What is telecom industry?**

Telecommunication is the transmission of information over significant distances to communicate. In earlier times, telecommunications involved the use of visual signals, such as beacons, smoke signals, semaphore telegraphs, signal flags, and optical heliographs, or audio messages, to name a few, coded drumbeats, lung-blown horns, or sent by loud whistles. In the modern age of electricity and electronics,

telecommunications now also includes the use of electrical devices such as telegraphs, telephones, and tele-printers, the use of radio and microwave communications, as well as fiber optics and their associated electronics, plus the use of the orbiting satellites and the Internet.

## **1.2 History of telecommunications industry**

“Telecommunication” is a term coming from Greek and meaning “communication at distance” through signals of varied ways going from a transmitter to a receiver. In order to achieve effective communication, the choice of a proper mean of transport for the signal has played (and still plays) an important role.

In ancient times, the most common way of producing a signal would be through light (fires) and sound (drums and horns). However, those kinds of communications were insecure since the information could be easily stolen and certainly leaving room to improve, as they also did not permit a fast transmission of information on a large scale.

Then later, people also used mail service and trained pigeons to deliver messages. Though the security was improved, transmitting speed also increased, but still, due to the old fashioned transportation, the cases losing of messages are still fairly common.

The true 'jump' in terms of quality came with the advent of electricity. Electromagnetic energy, in fact, is able to transport information in an extremely fast way (ideally to the speed of light), in a way that previously had no equals in terms of costs reliability. Therefore, we may say that the starting point of all modern telecommunications was the invention of the electric cell by Alessandro Volta (1800).

It was shortly thereafter that the first experiments on more advanced communication system begun. In 1809, Thomas S.Sommering proposed a telegraphic system composed of a battery, 35 wires (one for each letter and number) and a group of sensors made of gold, which were submerged in a water tank: when a signal was passing from one of those wires, electrical current would split water molecules, and small oxygen bubbles would be visible near that sensor. Many other experiments were soon to follow: Wheatstone, Weber and Karl Friedrich Gauss tried to further develop Somme ring's idea in a product that could be mass-distributed, but their efforts were without success.

For the next step we would have to wait until 1843, the year in which Samuel Morse proposed a way to assign each letter and number to a ternary code (point, line, and space). This way turned out to be extremely convenient and more affordable than Sommering' s idea; especially in terms of reduced circuitry (you wouldn't need a wire for each symbol anymore). Meanwhile, technology became advanced

enough to find a way to convert those signals in audible (or sometimes graphic) signals. The combination of these two factors quickly determined the success of Morse's symbol code, which we can still find used today.

The system was further developed and improved in the following years by Hughes, Baudot, and Gray (1879), who theorized other possible codes (Gray's code has still applications today in the ICT industry and in barcodes technology).

However, the telegraph could still be used just by trained personal and in certain buildings like offices, so it could only be used by a limited amount of people. Research of the time therefore took another direction and aimed at producing a machine that could transmit sounds, rather than just signals. The first big step in this direction was the invention of transducers that could transform an acoustic signal into an electric one and vice versa (microphone and receiver) with acceptable information loss, in 1850.

Seven years later, Antonio Meucci and Graham Bell independently managed to build a prototype of an early telephone ('sound at distance') machine. Since Meucci didn't have the money to patent his invention (the cost was \$250 at the time), Bell managed to register it first.

Both with telegraphs and telephones, the need for a distributed and reliable communication network soon became evident. Routing issues

were first solved by means of human operators and circuit commutation: the PSTN (Public Switched Telephone Network) was born. However, this system didn't guarantee the privacy and secrecy of conversations, and efforts towards the development of an automatic circuit commutation were made.

In 1899, Almon Strowger invented an electro-mechanic device simply known as 'selector', which was directed by the electrical signals coming from the calling telephone device, achieved through selection based on geographical prefixes.

Many other innovations were soon to come:

In 1895, Guglielmo Marconi invented the 'wireless telegraph' (radio);

In 1920, valve amplifiers made their first appearance;

In 1923, the television was invented;

In 1947, the invention of transistors gave birth to the field of electronics;

In 1958, the first integrated circuit was built;

In 1969, the first microprocessor was invented.

With the last step, electronics becomes more than ever a fundamental part in the telecommunication world, at first in the transmission, and soon also in the field of circuit commutation.

All these amazing devices cannot bring us to our modern life, without the work of the likes of Michael Faraday (Faraday's Law), James Clerk Maxwell (Maxwell Equations on Electromagnetic field), as they found the

way of transmitting telecom signals using electromagnetic waves.

Moreover, in 1946 the invention of ENIAC (Electronic Numerical Integrator and Computer) starts the era of informatics. Informatics and telecommunications inevitably began to interact, as it was to be expected: the first made fast data processing possible, while thanks to second the data could then be sent to a distant location.

The development of microelectronics and informatics radically revolutionized techniques both in telecommunication networks and performance requirements for the networks. Starting from 1938, an innovative technology called PCM (Pulse Code Modulation) started to grow more and more popular. This technology could achieve the digital transmission of a voice signal by digitally encoding and decoding, rather than by means of transducers: however, PCM was first used on a large scale only in 1962 in the United States (the so-called "T1").

During the mid-Sixties Paul Baran, a RAND Corporation employee working on communication problems concerning the US Air Force, first gave birth to the concept of 'packet switching network' rather than the conventional idea of circuit commutation network. According to this model, there should be no hierarchy in the nodes of a network, but each node should rather be connected to many others and be able to decide (and, in case of need, modify) the packet routing. Each packet is a bulk of data that consist of two main parts, a 'header' containing routing

information and a 'body' containing the actual data.

In this context Vincent Cerf, Bob Kahn and others developed, starting from the 70s, the TCP/IP protocol suite, which made possible communication of computers and heterogeneous machines through a series of physical and logical layers. Packet switching network and TCP/IP were later chosen by the military project ARPANET. The rest of the story is widely known: in 1983, ARPANET became available to universities and research centers, between which NSFNET (National Science Foundation + NET), which finally gave birth to the Internet.

In the latest years, the importance of the Internet has been constantly growing. The high flexibility given by the TCP/IP suite and the ISO/OSI protocols provide a strong foundation on which communication among devices of different kind — be it a laptop or a cell phone, an iPod or a GPS navigator — has finally been made simple and easy to achieve.

### **1.3 Type of telecom industry in modern telecommunication**

In modern times, there are mainly four types of telecom services, based on different implementation methods, as the following:



### **1.3.1 Telephone (fixed-line phones and mobile phones)**

The fixed-line telephones in most residential homes are analog — in other words, the signal's voltage at the receiver end is totally the analogues of the speaker's voice at the other end. Although short-distance calls may be handled from end-to-end as analog signals, increasingly telephone service providers are transparently converting the signals to digital for transmission before converting them back to analog for reception. The advantage of this is that digitized voice data can travel along with data from the Internet in a single data bandwidth and can be perfectly reproduced in long distance communication (as opposed to analog signals that are inevitably impacted by noise).

Mobile phones have had a significant impact on telephone networks. Mobile phone subscriptions now outnumber fixed-line subscriptions in many markets. Sales of mobile phones in 2005 totaled 816.6 million with that figure being almost equally shared amongst the markets of Asia/Pacific (204 m), Western Europe (164 m), CEMEA (Central Europe, the Middle East and Africa) (153.5 m), North America (148 m) and Latin America (102 m). In terms of new subscriptions over the five years from 1999, Africa has outpaced other markets with 58.2% growth. Increasingly these phones are being serviced by systems where the voice content is transmitted digitally such as GSM or W-CDMA with many markets choosing to depreciate analog systems such as AMPS.

More recently, the market of smart phones and 3G or even 4G networks are merging into the market, which continues to expand the mobile phones market.

### **1.3.2 Radio and television and broadcasting**

The broadcast media industry is at a critical turning point in its development, with many countries moving from analog to digital broadcasts. This move is made possible by the production of cheaper, faster and more capable integrated circuits. The chief advantage of digital broadcasts is that they prevent a number of complaints common to traditional analog broadcasts. For television, this includes the elimination of problems such as snowy pictures, ghosting and other distortion. These occur because of the nature of analog transmission, which means that perturbations due to noise will be evident in the final output. Digital transmission overcomes this problem because digital signals are reduced to discrete values upon reception and hence small perturbations do not affect the final output. However, despite the pending switch to digital, analog television remains being transmitted in most countries. An exception is the United States that ended analog television transmission (by all but the very low-power TV stations) on 12 June 2009 after twice delaying the switchover deadline.

### **1.3.3 The Internet**

The Internet is a worldwide network of computers, computer networks and even smart phones and portable devices (3Gnetwork, WiFi) that can communicate with each other using the Internet Protocol. Any computer on the Internet has a unique IP address that can be used by other computers to route information to it. Hence, any computer on the Internet can send a message to any other computer using its IP address. These messages carry with them the originating computer's IP address allowing for two-way communication. The Internet is thus an exchange of messages between computers.

As of 2008, an estimated 21.9% of the world population has access to the Internet with the highest access rates (measured as a percentage of the population) in North America (73.6%), Oceania/Australia (59.5%) and Europe (48.1%). In terms of broadband access, Iceland (26.7%), South Korea (25.4%) and the Netherlands (25.3%) led the world.

### **1.3.4 Area Networks and Wide Area Networks (WAN)**

Despite the growth of the Internet, the characteristics of local area networks ("LANs" – computer networks that do not extend beyond a few kilometers in size) remain distinct. This is because networks on this scale do not require all the features associated with larger networks and are

often more cost-effective and efficient without them. When they are not connected with the Internet, they also have the advantages of privacy and security. However, purposefully lacking a direct connection to the Internet will not provide 100% protection of the LAN from hackers, military forces, or economic powers. These threats exist if there are any methods for connecting remotely to the LAN.

There are also independent wide area networks ("WANs" – private computer networks that can and do extend for thousands of kilometers.) Once again, some of their advantages include their privacy, security, and complete ignoring of any potential hackers – who cannot "touch" them. Of course, prime users of private LANs and WANs include armed forces and intelligence agencies that must keep their information completely secure and secret.

#### **1.4 Current situation of telecom industry worldwide**

Telecommunications play an important role in the world economy nowadays; the worldwide telecommunication industry's revenue was estimated to be \$3.85 trillion in 2008. The service revenue of the global telecommunications industry was estimated to be \$1.7 trillion in 2008, and is expected to touch \$2.7 trillion by 2013. (refer to appendix 1) However, due to different economic development of countries and

different population, the current situation in different countries also varies. Following we will see the current telecom industry situations of three interesting countries: Italy, China, and USA.

### 1.4.1 Telecommunications in Italy

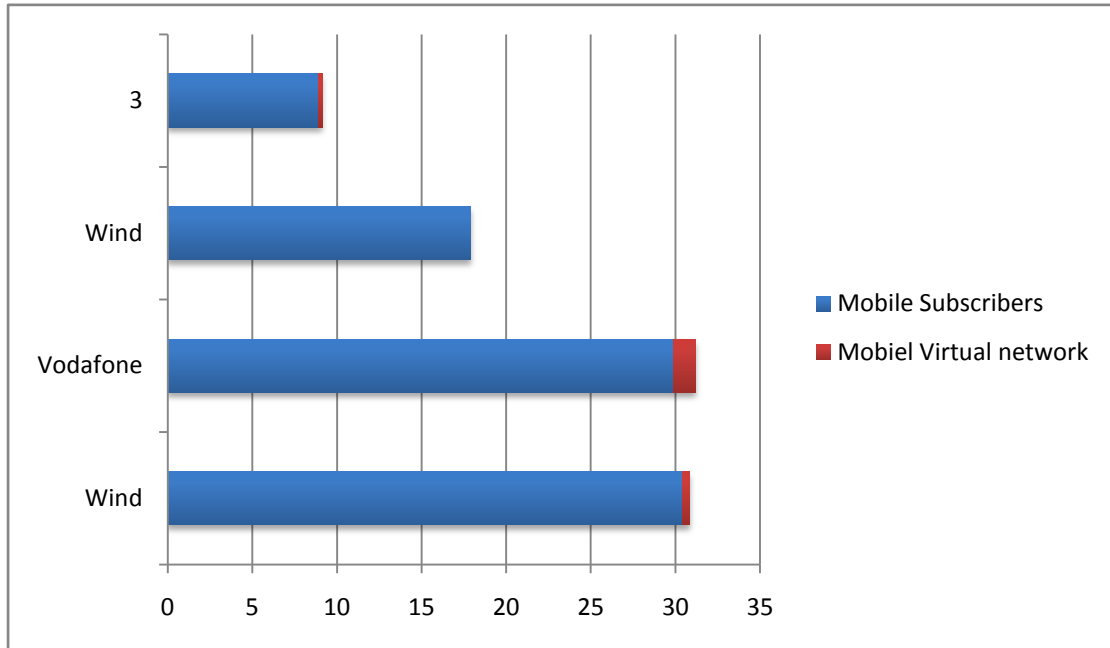
➤ **Telephones - main lines in use:** 21.3 million (2009), 12<sup>th</sup> in the world

➤ **Telephones - mobile cellular subscribers:** 90.613 million (2009), 12<sup>th</sup> in the world

● Operators - Fixed and mobile operators in Italy as follows:

● Acantho	● EcsNet	● <b>Telecom Italia</b>
● Axis	● Elemedia	● Infostrada
● Alcotek	● Elitel	● <b>Wind (Italy)</b>
● Amtel	● Energit	● Albacom
● ASCO	● Eurotime Communication	● <b>FASTWEB</b>
● Atlant	● Eutelia	● Nodalis
● Bergamocom	● FreeLine	● OlimonTel
● Brennercom	● Leadercom	● Plugit
● Budget Telecom	● LTS (coverage in Sicily)	● Kataweb
● Cdc 1085	● Millecom	● SeletTelecomunicazioni
● ClickTel	● Mobaila	● Tag Comunicazioni
● Colt Telecom	● Momax	● <b>TIM</b>
● Digital	● Noicom	● <b>Vodafone</b>
● EasyTel	● Orobiacom	● Tibis Communication
● <b>3</b>	● Tiscali	● Ultrantel

**Table 1 Telecom operators in Italy**



**Fig. 1 Main Mobile Subscribers in Italy (Data from 2009)**

➤ **Radio**

- Radio broadcast stations: AM about 100, FM about 4,600, shortwave 9 (1998)
- Radios: 50.5 million (1997)

➤ **Television**

- Television broadcast stations: 358 (plus 4,728 repeaters) (1995)
- Televisions: 30.5 million (1997)

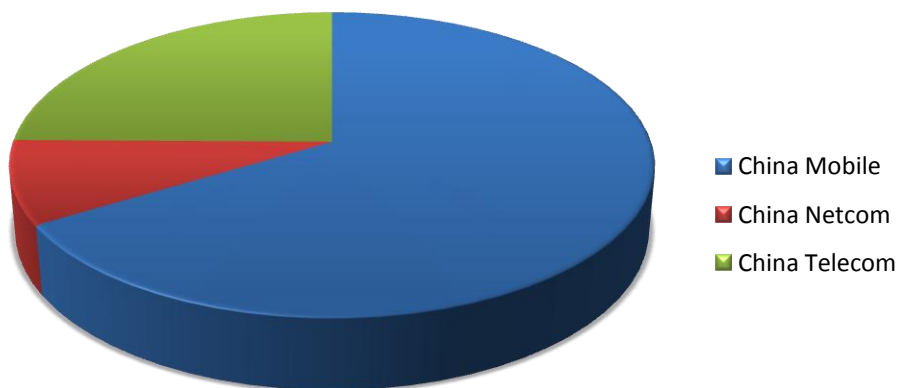
➤ **Internet**

- Internet Hosts: 22.152 million (2009)
- Internet users: 24.992 million (2008)
- Country code (Top-level domain): .it

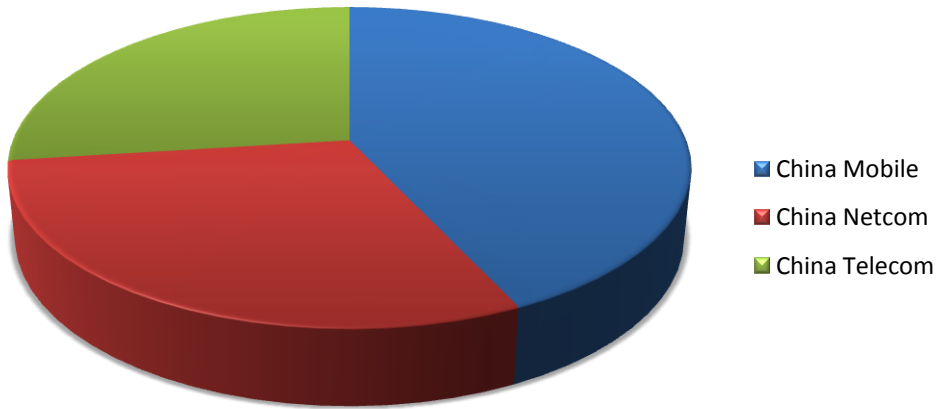
## 1.4.2 Telecommunication in China

- **Telephones - main lines in use:** 313.68 million (2009), 1<sup>st</sup> in the world
- **Telephones - mobile cellular subscribers** 747 million (2009), 1<sup>st</sup> in the world
- **Operators - Fixed and mobile operators in China include:** China Mobile, China Netcom, China Tietong, China Satcom, China Telecom and China Unicom.

**Figure 2: Mobile Cellular Subscribers**



**Figure 3: 3G Mobile Cellular Subscribers**





➤ **Radio**

- Radio broadcast stations: AM 369, FM 259, shortwave 45 (1998)
- Radios: 428 million [33 per 100 persons] (2000)

➤ **Television**

- Television companies: 358 (2008)
- Television broadcast stations: 3,240 (of which 209 are operated by China Central Television, 31 are provincial TV stations and nearly 3,000 are local city stations) (1997)
- Televisions: 493.90 million [38 per 100 persons] (2003)

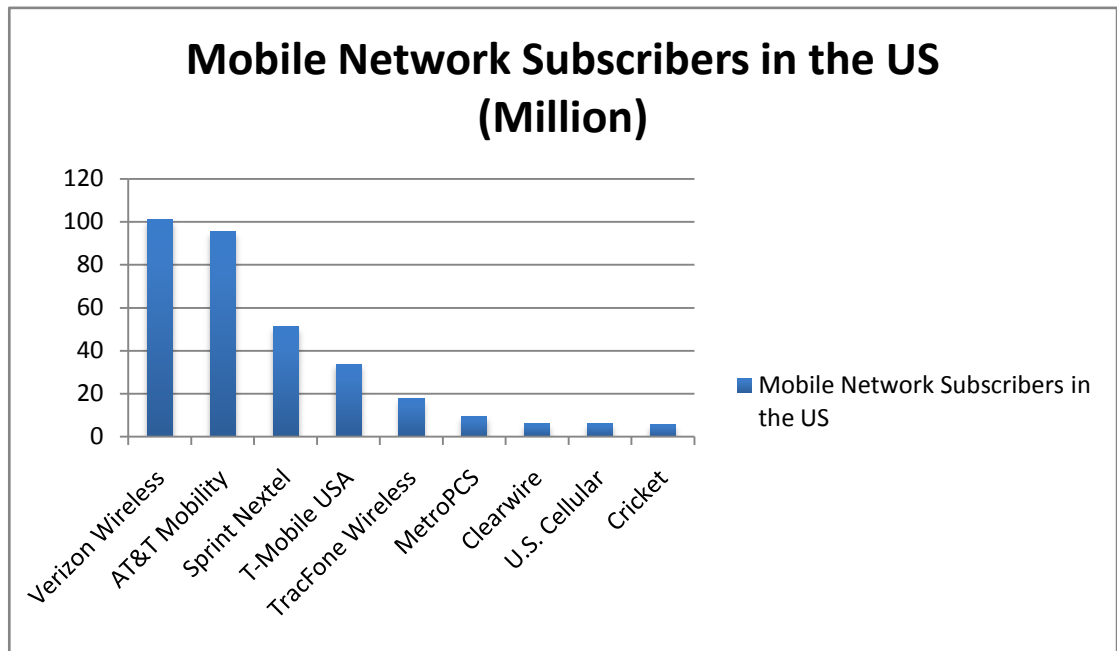
➤ **Internet**

- Internet country code: .cn
- Internet hosts: 13.57 million (2008)
- Internet service providers (ISP): 6 (2006)
- Internet users: 420 million (June 2010)
- Broadband Internet users: 363.81 million (June 2010)
- Personal computers: 130 million units [1 per 10 persons] (2007)

### **1.4.3 Telecommunication in U.S.**

- **Telephones - main lines in use:**141 million (2009), 2<sup>nd</sup> in the world

- **Telephones - mobile cellular subscribers:**286 million (2009), 2<sup>nd</sup> in the world
  - Operators – fixed lines are mostly operated by AT&T, while mobile telephone operators include: AT&T mobility, Verizon wireless, Sprint Nextel, T-Mobile.
  
- **Radio**
  - Radio broadcast stations: AM: 4,789; FM commercial stations: 6,231; FM educational stations: 2,672; FM translators & boosters: 3,995; low-power FM stations: 675 (as of December 31, 2005, according to the Federal Communications Commission)
  - Radios: 575 million (1997)



**Fig. 4 Mobile Network Subscribers in the US (Data collected from late 2010 and early 2011)**

➤ **Internet**

- Country code (Top level domain): US
- Internet Service Providers (ISPs): 7,600 (1999 est.)

### **1.5 Telecommunication industry outlook**

Although the world economy is currently going through a slow recovery phase, the telecommunication industry is actually identified as a major driver of economic recovery, since the industry encompasses a lot of technology-related business: the internet services, fiber optics networks, cable TV networks and commercial satellite communications. Several countries throughout the world unveiled economic stimulus plans as a

way out of the last recession. Huge government expenditures, including USA broadband infrastructure development program and similar structural subsidies in China and India, have become a boon for select telecom service providers and equipment manufacturers.

While China and India are on their way to establish their own 3G networks, several Central American, Latin American and Western European countries are quickly allotting spectrum for next-generation high-speed networks. For instance, the 4G Long-Term Evolution network has been launched in several Scandinavian countries; USA are also increasingly deploying 4G Wimax, both are super-fast 4G networks.

Smart phones, at the meanwhile, have also become the next-generation choice and are increasingly taking over market share from basic mobile handsets.

In summary, the future prospect of telecommunication industry is fairly bright. Therefore, improving the service quality is becoming more and more important in order to get this industry long term prosperity.

## **CHAPTER 2: SERVICE QUALITY AND CONSUMER SATISFACTION**

This chapter outlines the conceptual model of service quality and the methodology to evaluate consumer perceptions of service quality. The attainment of quality in products and services has become a pivotal concern since the 1980s. While quality in tangible goods has been described and measured by marketers, quality in services is largely undefined and not yet researched. Few academic researchers have attempted to define quality model because of the difficulties involved in delimiting and measuring the construct. However, while the service industry had a rapid growth in the last few decades, it is necessary to define a conceptual model of service quality and find the scale for measuring consumer perceptions of service quality.

### **2.1 Definition of service quality**

Service quality is a business administration's term and describes the degree of achievement of an ordered service. It is well acknowledged that service quality include 3 services characteristics—intangibility, heterogeneity, and inseparability.

GOODS	SERVICE
Tangible	Intangible
Producing—>Consuming	Producing + Consuming
Able to copy	Not able to copy

**Table 2 Differences between service quality and goods quality**

**First**, most services are intangible (Bateson 1977, Berry 1980, Lovelock 1981, Shostak 1977). Since they are performances rather than objects, it is difficult to set manufacturing specifications concerning uniform quality. For the same reason, most services cannot be counted, accurately measured, inventoried, physically tested, and verified in advance of sale to assure quality. Due to intangibility, the companies may find it difficult to quantize how consumers perceive their services and evaluate service quality.

**Second**, services, especially those with high labor content, are heterogeneous: their performance often varies from one member of staff to the other, from one customer to the other, and from one particular time to the other. Consistency of behavior from service personals (i.e., uniform quality) is a very tough achievement to assure considering what the firm intends to deliver may be entirely different from what the consumer receives.

**Third**, production and consumption of many services are inseparable (Carmen and Langeard 1980, Gronroos 1978, Regan 1963, Upah 1980). As

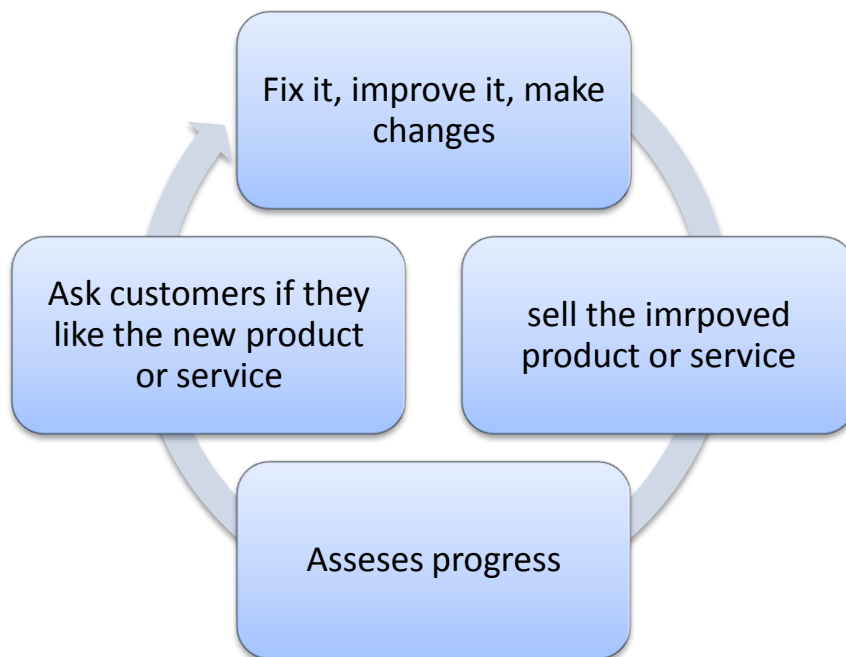
a consequence, quality in services is not engineered at the manufacturing plant, and then delivered intact to the consumer. One example is that, in labor-intensive services, quality change may occur during service delivery, usually in an interaction between the client and the contact person from the service body (Lehtinen 1982). The service firm may also have so much less managerial control over quality in services if consumer participation is intense (e.g., haircuts, doctor's visits), as the client affects the process to a large extent. In these special situations, the consumer's input (description of how the haircut should look, description of symptoms) becomes critical to the quality of service performance.

To summarize the three characteristics above, service quality is more difficult for the consumer or the service firm to evaluate even good quality is intended. Service quality perceptions result from a comparison of consumer expectations with actual service performance. Quality evaluations are not made solely on the outcome of a service; they must also involve evaluations of the process of service delivery.

## **2.2 What is customer satisfaction?**

As a term frequently used in marketing, customer satisfaction is a measure of how products and services supplied by a company meet or surpass customer expectation. Customer satisfaction is defined as "the

number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals." Most of marketing managers suggested that they found a customer satisfaction metric very useful in managing and monitoring their businesses. Increasing competition (whether for-profit or nonprofit) is forcing businesses to pay much more attention to satisfying customers, including by providing strong customer service, so a business ideally is continually seeking feedback to improve customer satisfaction.



**Fig.5 Seeking feedback to improve customer satisfaction**

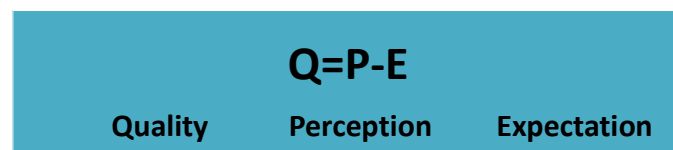
However, the importance of customer satisfaction decreased when a firm has increased bargaining power. For example, mobile cellular subscribers in China, such as China Mobile and China Netcom, holding



more than 80% market share of China, participate in an industry that is an oligopoly, where only a few suppliers of a certain product or service exist. As such, mobile cellular subscribers is not that encouraged to sell improved service such as more economic cell phone plan contracts or lower telephone fare, because it is not easy for customers have the option of leaving for a better contract offer when customer satisfaction would be too low.

### 2.3 Why measure service quality and customer satisfaction?

Service quality involves a comparison of expectations with performance. According to Lewis and Booms (1983), service quality is a measure of how well a delivered service matches the customers' expectations.



<b>Q=P-E</b>		
<b>Quality</b>	<b>Perception</b>	<b>Expectation</b>

**Fig. 6 Relationship between Quality, Perception and Expectation**

Generally the customer is requesting a service at the service interface where the service encounter is being realized, and then the service is being provided by the provider, while at the same time delivered to or consumed by the customer. Therefore, quality evaluations involve the end results and in-between processes.

The main reason to focus on quality is to meet customer needs while not

losing economically competitiveness at the same time. Quote one sentence from Gronroos 1982, "When a service provider knows how the service will be evaluated by the consumer, we will be able to suggest how to influence these evaluations in a desired direction". This clearly demonstrates satisfying the customer needs is very important for the enterprises to survive.

Customer satisfaction is a key performance indicator within business and is part of a Balanced Scorecard. In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy.

Within organizations, customer satisfaction can have powerful effects on focusing employees on the importance of fulfilling customers' expectations, improving customer perception. Furthermore, low customer satisfaction leads to problems that can affect sales and profitability. These metrics quantify an important dynamic. When a brand has loyal customers, it gains positive word-of-mouth marketing, which is both free and highly effective. Therefore, it is essential for businesses to effectively manage customer satisfaction. To be able to do this, firms need reliable and representative measures of satisfaction.

In researching satisfaction, firms generally ask customers whether their product or service has met or exceeded expectations. Thus, expectations

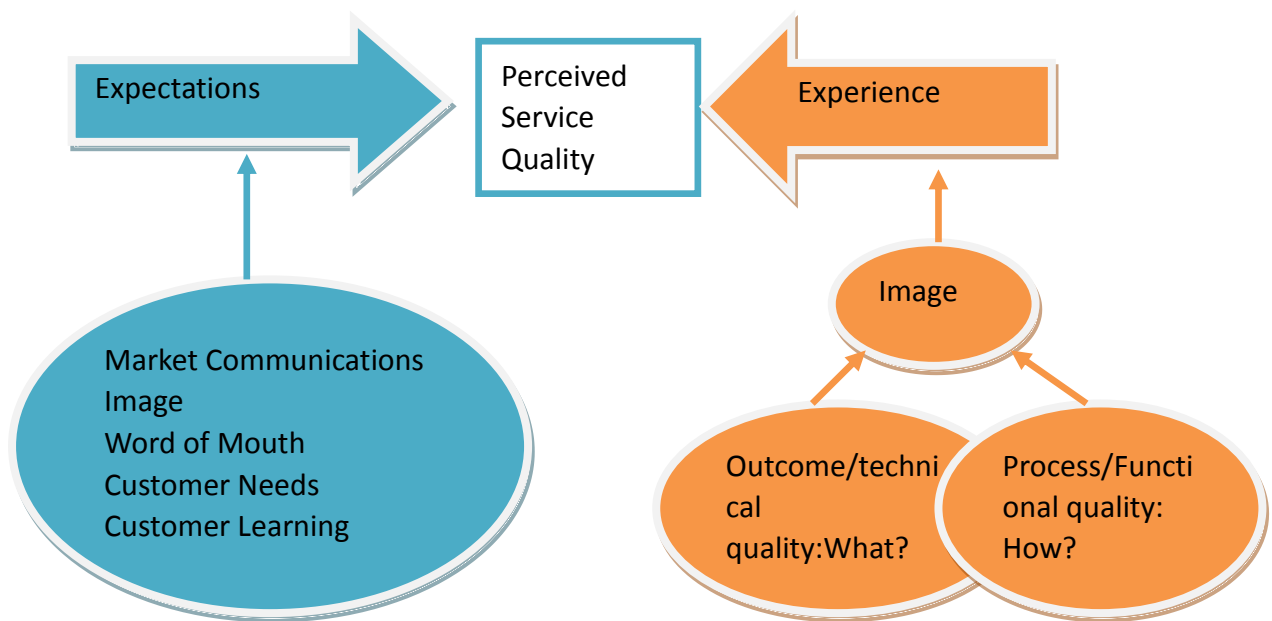
are a key factor behind satisfaction. When customers have high expectations and the reality falls short, they will be disappointed and will likely rate their experience as less than satisfying. For this reason, a luxury resort, for example, might receive a lower satisfaction rating than a budget motel—even though its facilities and service would be deemed superior in “absolute” terms.

## **2.4 Conceptual model of service quality**

There are two main models to analyze service quality:

### **2.4.1 Service Quality Model of Grönroos.**

Grönroos writes in his paper that the expectations of the customer depend on the 5 determinants: “market communication, image, word of mouth, customer needs and customer learning”. Experiences depend on the technical quality (what/outcome) and the functional quality (how/process), which is filtered through the image (who). Both expectations and experiences can create a perception gap. As shown in the figure below.

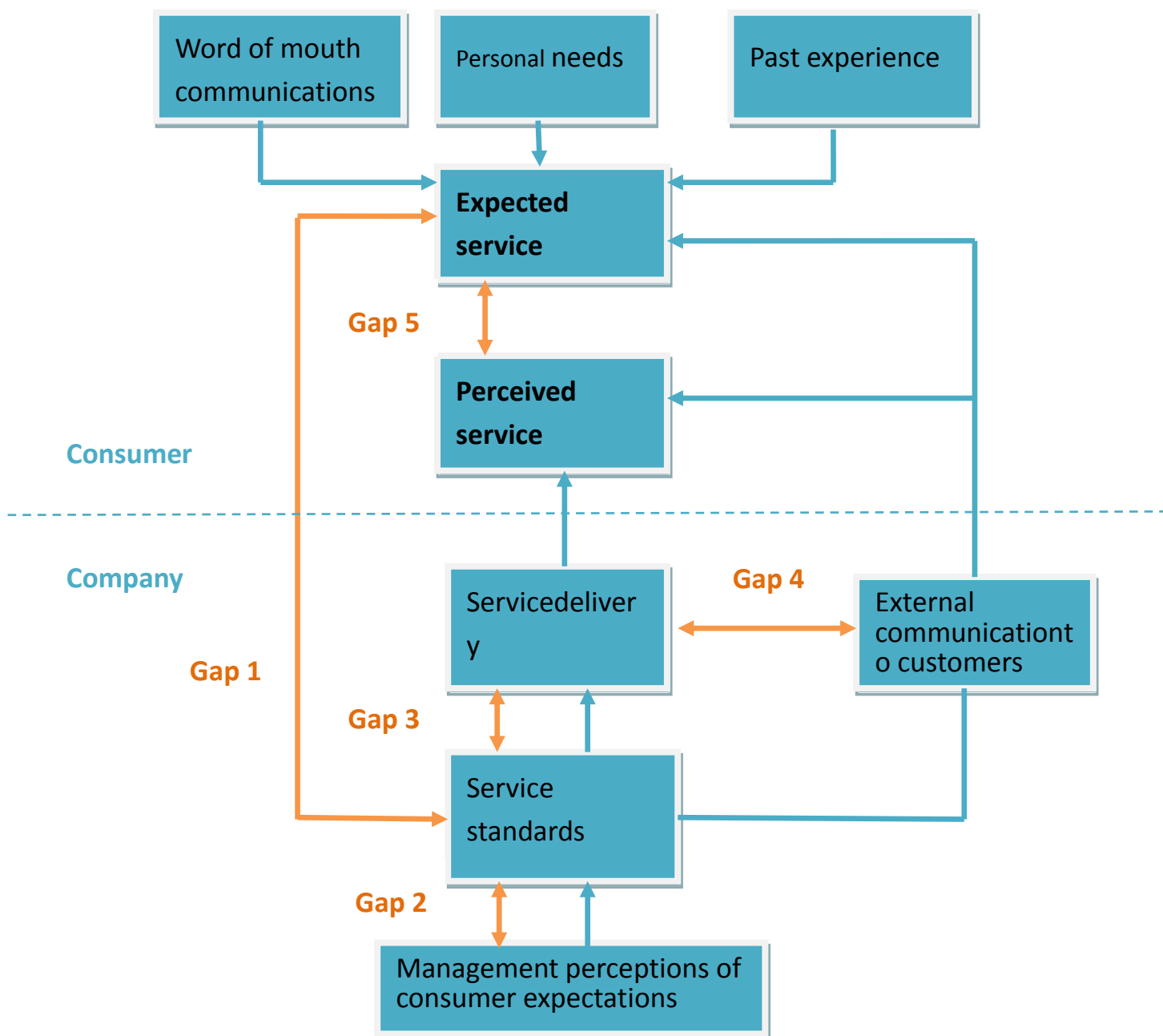


**Fig. 7 Grönroos' Perceived Service Quality model**

**Grönroos's model** clearly shows the existence of a perception gap, although there is no suggestion of "delighting" only of narrowing the gap. However the model has more practical application because it illustrates factors that could contribute to each side of the gap. It demonstrates that the supplier can affect either side of the gap – most notably by managing customer expectations. In addition it shows that the customer experience is a consequence of the image of provider's service quality, not just the real world communications and etc. Apart from all those, it is quite clearly that marketing as well as process and technical quality has an influence on the perception gap.

#### **2.4.2 GAP Model of Parasuraman, Zeithaml and Berry (PZB in short)**

The Gap model tells us that the expected service can be influenced by the word-of-mouth, the personal needs, past experience as well as the external communication to customers. A perception gap can appear between the expected service and the perceived service. This gap is called the GAP 5 (also called the service quality gap), it occurs if the customer is not satisfied (or over satisfied) and depends on the other 4 gaps.



**Fig.8 Gap Model of Service Quality**

However the GAP model goes further in its analysis of these key contributory factors. It not only provides a more rigorous description of the contributory Gaps, it also lists key drivers for each gap and generic breakdown of each of these drivers. These are illustrated below in

summary form below.



**Fig. 9 Key factors in the GAP model (Zeithaml 1990)**

This level of detail allows more in depth analysis of the contributory factors to a perception gap at a level in practice. The model shows the importance of marketing, business leadership quality and HR systems in the management of the expectation gap.

## **2.5 SERVQUAL MODEL**

Service quality is often conceptualized as the comparison of service expectations with actual performance perceptions. On an operational level, research in service quality has been dominated by the SERVQUAL instrument, a multiple-item scale for measuring consumer perceptions of

service quality, based on the so-called gap model.

The core idea in this model is that service quality is a function of the difference scores or gaps between expectations and perceptions (P - E).

It has been proposed that service quality is a multidimensional concept (Parasuraman et al., 1985). Five key dimensions of service quality have been identified:

- Reliability is defined as the ability to deliver the promised service dependably and accurately. It is about keeping promises about delivery, pricing, complaint handling, etc.
- Responsiveness can be described as the willingness to help customers and provide prompt service. This dimension stresses service personnel's attitude to be attentive to customer requests, questions and complaints.
- Assurance is the service quality dimension that focuses on the ability to inspire trust and confidence. Empathy is the service aspect that stresses the treatment of customers as individuals.
- Tangible is the service dimension that focuses on the elements that represent the service physically.
- Empathy is the service quality dimension that illustrates the ability to be approachable, for instance, the appearance of the staff, or the manner of the staff.

A detailed summary of steps employed in developing SERVQUAL model



displayed in Appendix 6.

## **CHAPTER 3: RESEARCH OBJECTIVE AND METHODOLOGY**

This chapter mainly discusses the reason for study of the subject and the research objectives. As described before, the research objective is to evaluate the customer satisfaction and service quality in the telecom industry. Besides, this session provides the methodology of research which includes approach of the research, how data has been collected, who is the participants and construction of survey questionnaire.

### **3.1 Research Design**

The objective of the research is to find the gap between customer perception and expectation by developing a reliable statistic profile of the telecom industry service sectors and the factors which affect the evaluation of service quality. The previous chapters includes the overview of the definition of telecom industry and its latest trends, the service quality conceptual models and introduce the methodology to analyze service quality, SERVQUAL model.

With intensive questionnaire interviews aiming to collect the statistic data about customer expectations, customer perceptions based on different locations and age, in the next chapter, the data is analyzed with SERVQUAL model by being divided into different location and age.

Besides, assessment of research model is carried out to analyze both advantage and disadvantage of the research in order to bring out other

methodology to improve the result of the research.

### 3.1.1 Research population

Research population is divided by age and nationality:

	European	Asian
15~25	30	30
25~35	30	30
35~45	30	30

**Table3 Research population (Most of the survey is performed to particular research population in the table.)**

### 3.1.2 Construction of survey questionnaire

The survey consists of 21 questions collecting the information about telecom service reliability, responsiveness, assurance, empathy and tangibles. Every question has two parts, one is the expectation of customer, which is the service supplier should do, the other one is the perception of customer and the answer should rate from 1 to 7, 1 means not at all, 7 means very satisfied.

The first 4 questions is point to collect demography information, which are to report the demographic profile. This would be very useful for analyze the differences in ages, locations, experience and the expectation of different ages and locations according to their demographic pattern.

## **Reliability**

1. they are able to do what they promised
2. they are willing to solve customers' problems
3. they provide consistent service
4. they are accessible at the times they promised
5. they tell customers the exact opening times

## **Responsiveness**

6. they are fast to respond
7. they are fast to respond at busy times
8. they are friendly

## **Assurance**

9. they are polite
10. they are a reliable and trustworthy company
11. they are passionate
12. they have knowledgeable staff

## **Empathy**

13. they have individualized service for customers
14. they have personalized service from staff
15. they know what customers need
16. they know what customers are interested in

## **Tangibles**

17. they have modern facilities

18. they have facilities with nice appearances
19. they have well dressed staff
20. they have materials provided for the services
21. they have convenient opening times

### **3.2 Research methodology**

Regarding service quality research, Parasurama, Zeithama and Bery first proposed SERVQUAL model in 1988, which has been recognized by many marketing experts and considered to be a typical model, that is applicable for evaluation of the quality of various services. SERVQUAL model includes a total of 22 aspects for evaluating the quality of service. Along with the PZB service quality model proposed, five factors affecting the quality of service that include reliability, responsiveness, assurance, empathy and tangibles are also developed, also known as the "five dimensions". These five service quality properties proposed are widely recognized by the international research community and experts in the field (PZB, 1998, P12-40). There are two sets of measurement scale: measurement service expectations and measuring service awareness. In scale, the customer expectations are defined as "Should", meaning "what services SHOULD be". Measurements are taken with seven scales, "7" means very satisfied, "1" is very dissatisfied, mid-scale were "fairly satisfied", "a little satisfied", "neither satisfied nor

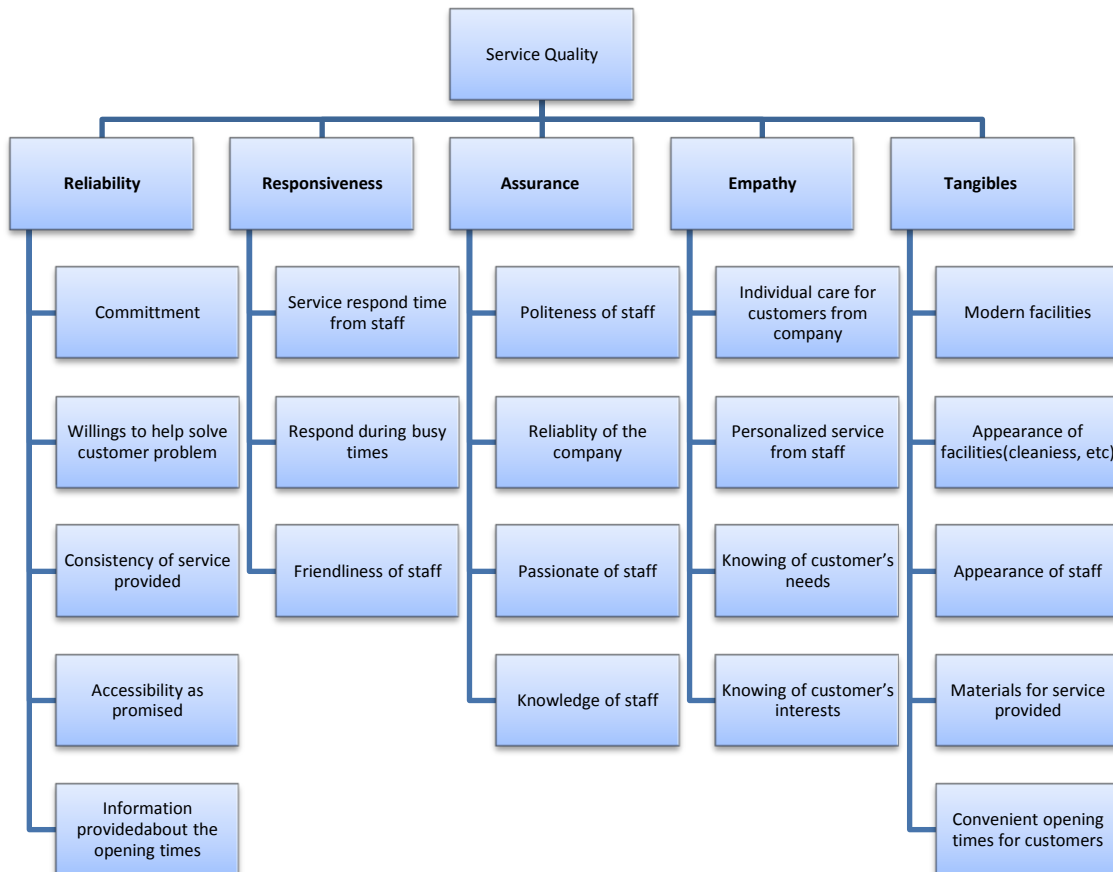
dissatisfied”, “a little dissatisfied”, “fairly dissatisfied”, with decreasing score. Survey method is to first measure customer expectations, which are mainly influenced through their experience, advertising, promotion, corporate image and customer word of mouth and other factors; then the score of customer experience: this is a kind of experience of quality; finally calculate the difference between the two, to determine the level of service quality. Based on the whole evaluation of the expectations and experience, a service quality is quantized using the formula given below:

$$Q = \frac{1}{22} \sum_{t=1}^{22} (P_i - E_i)$$

where, Q is the quality of service; P is the service-aware, in other words, experience; E is the service expectations.

According to the sign and value of the Q value, service companies can determine their own level of service quality: positive Q meaning that the quality of service is higher than previous or above average; negative Q, indicating the services provided did not meet customer requirements, improvements required; Q approaching zero meaning that companies provide a normal service, just exactly meeting the customer's requirements. Through the analysis of specific scores of each index, the existing problems can be found on the specific aspect of service quality; then the quality of service can be improved and enhanced accordingly. In the year 1994, based on the research results in

year 1988, 1991, PZB again extended the SERVQUAL model: customer's expectations are divided into two parts: the customer's expectations during the time of service and the ideal service, and the questions are then reduced to 21 (as shown below).



**Fig. 10 Twenty-one questions for investigating service quality**

## **CHAPTER 4 FINDING AND ANALYSIS**

Analysis of the findings is generated from the results of survey which conducted in person or through the online survey. They would deliver the following objectives:

- Understanding the important factors which customers' expectation and perception base on.
- Reveal the differences between different groups of ages and locations in service evaluation and desire.
- Understand the gap between customer expectation and perception.

### **4.1 Data collection**

In order to identify important quality attributes for the telecom services and the different expectation of European and Asian customers from different ages, a total 180 respondents were asked to participate. The personal interviews are conducted in telecom stores, schools and the city centers, while the online survey is giving the questionnaire to volunteers from designed research population. All respondents have had experiences with the telecom service; they would provide a valuable respond regarding the services. Moreover, the response rate was quite high and easy to get responded in research population, which is the reason that this survey method was chosen. The participants answered



the questionnaire and then the results was gathered from the all survey and computed for interpretation.

#### **4.2 Problems encountered during data collection process**

Originally, my survey was designed to get an expectation value from each customer (refer to appendix 2). However, out of my expectations, after several surveys in person, I found that they hesitated a lot when choosing their expectations from their telecom service providers; while choosing their perceptions, there is almost no such case. So when I talked to the participants after the survey, they expressed their uncertainty about their expectations, since they are not sure of what their providers are capable of, while they demonstrated a lot more confidence when talking about their perceptions.

This leads to my second thought about my questionnaire: if it's not accurate at all with their expectations, should I change my method of obtaining their more accurate expectations?

Therefore, I redesigned my questionnaire, rather than obtaining their expectations on existing providers, I decided to obtain their expectations from their ideal providers. In this way, they should be more confident about their expectations; at the meantime, the results of such questionnaire tells exactly what are the gaps between "real" companies

and “ideal” companies, then we can improve towards the “perfect” companies in customers’ heart.

## **4.3 Data analysis**

### **4.3.1 Overall analysis**

After a modified questionnaire are brought up, the participants in the survey no longer hesitate when they choose the answers for expectation values, and the expectation values collected from consumer are very close to 7 (mostly over 6.9) for each question. So for simplicity while not losing accuracy, we can use:

$$Q = \frac{1}{21} \sum_{t=1}^{21} (P_i - 7)$$

According to appendix 1, the overall quality is equal to -2.18. The quality for each object is sorted from biggest to smallest (absolute value). We can see from the column of quality, that all the factors are negative, which indicates that all the 21 factors in telecom industry service do not meet the expectation of consumers.

Object	Perception	Quality
7.they are fast to respond at busy times	3.73	-3.27
4.they are accessible at the times they promised	4.20	-2.80
11.they are passionate	4.28	-2.72
21.they have convenient opening times	4.39	-2.61
10.they are a realizable and trustworthy company	4.45	-2.55
12.they have knowledgeable staff	4.45	-2.55
13.they have individualized service for customers	4.52	-2.48
14.they have personalized service from staff	4.56	-2.44
6.they are fast to respond	4.60	-2.40
1.they are able to do what they promised	4.64	-2.36
2.they are willing to solve customers' problems	4.76	-2.24
3.they provide consistent service	4.77	-2.23
18.they have facilities with nice appearances	4.81	-2.19
8.they are friendly	4.92	-2.08
9.they are polite	5.19	-1.81
19.they have well-dressed staff	5.35	-1.65
17.they have modern facilities	5.44	-1.56
20.they have materials provided for the services	5.46	-1.54
15.they know what customers need	5.49	-1.51
5.they tell customers the exact opening times	5.56	-1.44
16.they know what customers are interested in	5.63	-1.37
Average	4.82	-2.18

**Table4 Perception and Quality Analysis**

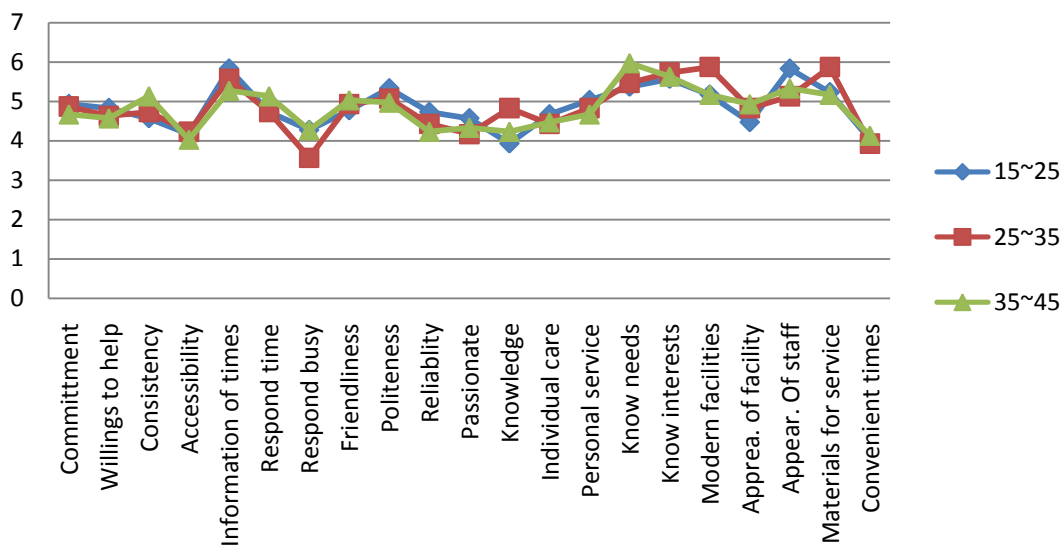
According the data in the table, knowing of customer interests get best quality in the research, in the contrary, the gap between perception and expectation for respond in busy time is -3.27, which indicates the lowest quality in the research.

#### **4.3.2 Analysis based on age**

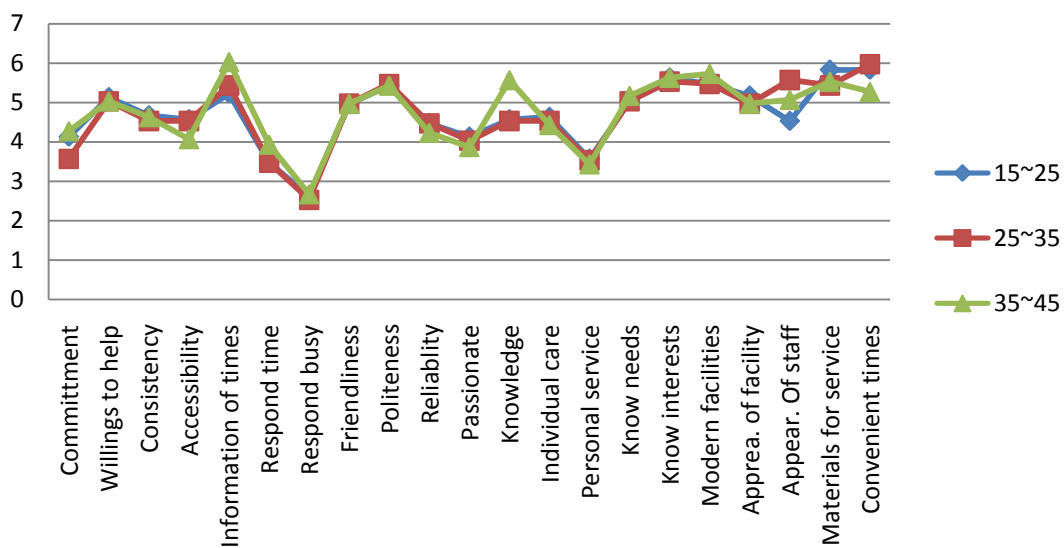
As the consuming habit among various ages is different, research

population is divided by different age groups. (15~25; 25~35; 35~45)  
 According to both figure 11 and 12, all three lines almost change simultaneously, which indicates that the age is not the critical factor that affects the consumer habit in telecom service industry.

**Fig. 11 European Consumers**



**Fig. 12 Asian Consumers**



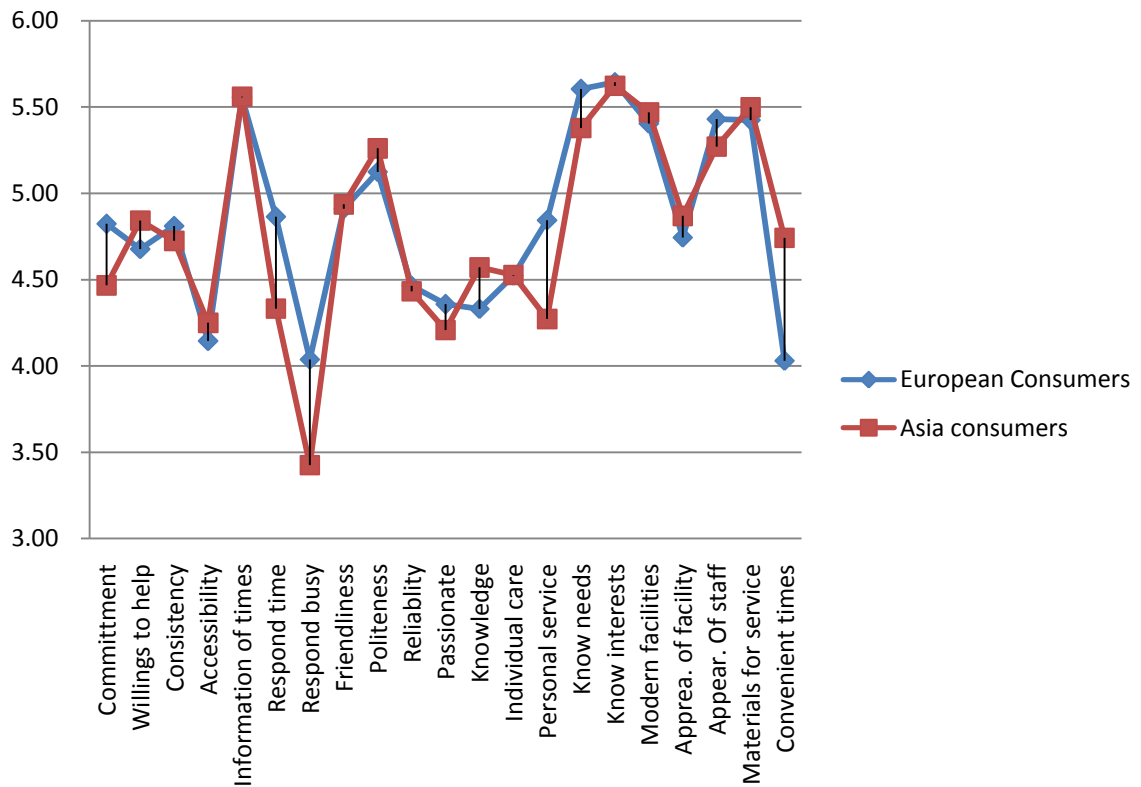
### **4.3.3 Analysis based on location**

Difference in location leads to diversity of culture and economic level. The research population takes European (Mainly in the UK and Italy) and Asian (China) consumers for sample, which present that under two kinds of distinct cultures and economic levels, how the perception of consumers and the quality level that the service suppliers delivered to customers.

According to figure 13, basically telecom industry service quality in Euro is slightly better than that of Asia, especially in friendliness of staff, politeness of staff and personalized service from staff. However, for the aspect of convenient opening times for customers, the service quality in Asia is obviously better than Europe. European service suppliers' advantages derive from its well-developed economic system and life style, while Asian telecom service industry is still on its way to be more developed. On the other hand, owing to nonworking days service supplement, Asian telecom service suppliers have absolutely advantage in the aspect of convenient opening times. For instance, most of European service suppliers are closed or open for a short time on Sunday, when most people have time to deal with their problems. To summarize, culture and economic level and system play an important role in the level of service quality. The strategy to improve service quality in telecom industry should be considered with culture and economic system in

different locations.

**Fig. 13 European and Asia consumers**



#### 4.2.4 Weight analysis

In order to get a more precise service quality value, the weight of each aspect should also be analyzed. Once the weight of each aspect is calculated, the service quality is then derived as:

$$Q = \frac{\sum_{i=1}^{21} W_i(P_i - E_i)}{\sum_{i=1}^{21} W_i}$$

Where W is the weight of each aspect.

For the weight, we use the following scheme:

1. The minimum weight, that is the weight for the least important factor, is 1, while the maximum is 100;
2. The gap between second most important and the most important is 5, so on and so on. However, the second least important being 5, suggesting the gap between the second least and the least is only 4.

Therefore,  $W_1=1$ ,  $W_2=5$ ,  $W_3=10$ , ...,  $W_{20}=95$ ,  $W_{21}=100$ .

So for example, if participant A selects the  $n$ th aspect as the most important one, then it gets a weight of 100; then the weight of the  $n$ th aspect calculates as the average value of all the weight determined by all participants.

To get the weight of each 21 factor, interview is carried out focusing on employees in marketing department in Telecom Companies: Wind, Vodafone and China Mobile. Participants are asked to rank these 21 factors from most important to least important, by using the scheme introduced before, weight for 21 factors can be obtained for each participant. The average value among participants equals to the weight of factors. (Refer to appendix 5)

According to appendix 5, the weight of 21 factor as follows:

Factor	Weight	Quality	Weighted Quality
1. Commitments with their promises	8.47%	-2.36	-0.199
2. Willingness to help solve costumers' problems	7.99%	-2.24	-0.179
3. Consistency of service provided	7.14%	-2.23	-0.159
4. Accessibility as promised	7.04%	-2.80	-0.197
5. Information provided about the opening times	2.95%	-1.44	-0.043
6. Service respond time from staff	6.28%	-2.40	-0.151
7. Respond during busy times	3.24%	-3.27	-0.106
8. Friendliness of staff	4.38%	-2.08	-0.091
9. Politeness of staff	4.19%	-1.81	-0.076
10. Reliability of the company	8.66%	-2.55	-0.221
11. Passionate of staff	3.24%	-2.72	-0.088
12. Knowledge of staff	4.95%	-2.55	-0.126
13. Individual care for customers from company	2.76%	-2.48	-0.068
14. Personalized service from staff	2.61%	-2.44	-0.064
15. Knowing of customer's needs	6.57%	-1.51	-0.099
16. Knowing of customer's interests	5.90%	-1.37	-0.081
17. Modern facilities	1.16%	-1.56	-0.018
18. Appearance of facilities(cleanliness, etc)	2.76%	-2.19	-0.061
19. Appearance of staff	0.89%	-1.65	-0.015
20. Materials for service provided	3.24%	-1.54	-0.050
21. Convenient opening times for customers	5.61%	-2.61	-0.147

Table 5 Weight of 21 factors

According to the following equation:

$$Q = \frac{\sum_{i=1}^{21} W_i (P_i - E_i)}{\sum_{i=1}^{21} W_i}$$

We can obtain a weighted Q=-2.24. Comparing this result with the



normal average  $Q=-2.18$ , it can be seen that the weighted quality factor is even worse than the normal average. This is due to the fact that in this survey, almost all the important (weight larger than average) factors have relatively big (larger than normal average) perception and expectation gap.

Regardless the result, this weighted model is a more accurate model. This is because the process of weighting involves emphasizing the contribution of some aspects of service quality to the final result. In other words, rather than each variable contributing equally to the final result, some of the most important data are adjusted to contribute more than the less important ones. Therefore, a more accurate model to what people really think should be weighted.

#### **4.4 Limitation of SERVQUAL model**

Francis Buttle criticized SERVQUAL in the article "SERVQUAL: review, critique, research agenda" on a number of theoretical and operational basis. He particularly pointed out that SERVQUAL's 5 dimensions (Reliability, Assurance, Tangibility, Empathy, and Responsiveness) were not universal, and that the model failed to draw on established economic, statistical and psychological theory. Moreover, SERVQUAL model is only a

measured way to perception of service quality, it cannot come to the effective method to improve the service quality.

So that leads to the next question, how can we improve service quality?

## **CHAPTER 5: HOW TO IMPROVE SERVICE QUALITY IN TELECOM INDUSTRY**

From previous chapters, it is suggested that improving service quality is related to fulfill customer satisfaction, in the other words, customer satisfaction is the feedback of the service quality. As a result, what we should do is evaluating customer interests and then fixing, improving and making changes to current service. However, the way to improve service quality faces a special and difficult challenge: meet customers' needs while remaining economically competence. Automated processes can make an impact, but services are still labor-intensive. There can be no substitute for high-quality personal interaction between service employees and customers. Use quality practices to:

- Understand and improve operational processes;
- Identify problems quickly and systematically;
- Establish valid and reliable service performance measures;
- Measure customer satisfaction and other performance outcomes.

### **5.1 Define KPI for customer satisfaction**

How to meet customer needs while remaining economically competence?

It is obvious that we have to find out the tradeoffs between expense and profit. There are hundreds of performances factors have a relationship

with customer satisfaction, but only a few play critical roles in the result, that is the Key Performance Indicator (KPI).

### **5.1.1 Why KPI?**

KPI is widely used in organizations to evaluate its success, and choosing the suitable KPI is related to good understanding of what is important to the organization. For example, the telecom company needs to improve service quality, the organization choose the right KPI, which makes the strategy of the company consume less resource and get more customer satisfaction. Otherwise, the company spend a lot but without increasing customer satisfaction. Because of developing a good understanding of what is important; performance indicators selection is often chosen by using practical methodologies to evaluate the present state of business, and its key activities. The right selection of KPIs often results in the potential improvements. A very common method for choosing KPIs is Ishikawa Diagram.

### **5.1.2 Ishikawa Diagram**

Ishikawa diagrams (also called fishbone diagrams, or herringbone diagrams, cause-and-effect diagrams or Fishikawa) are causal diagrams

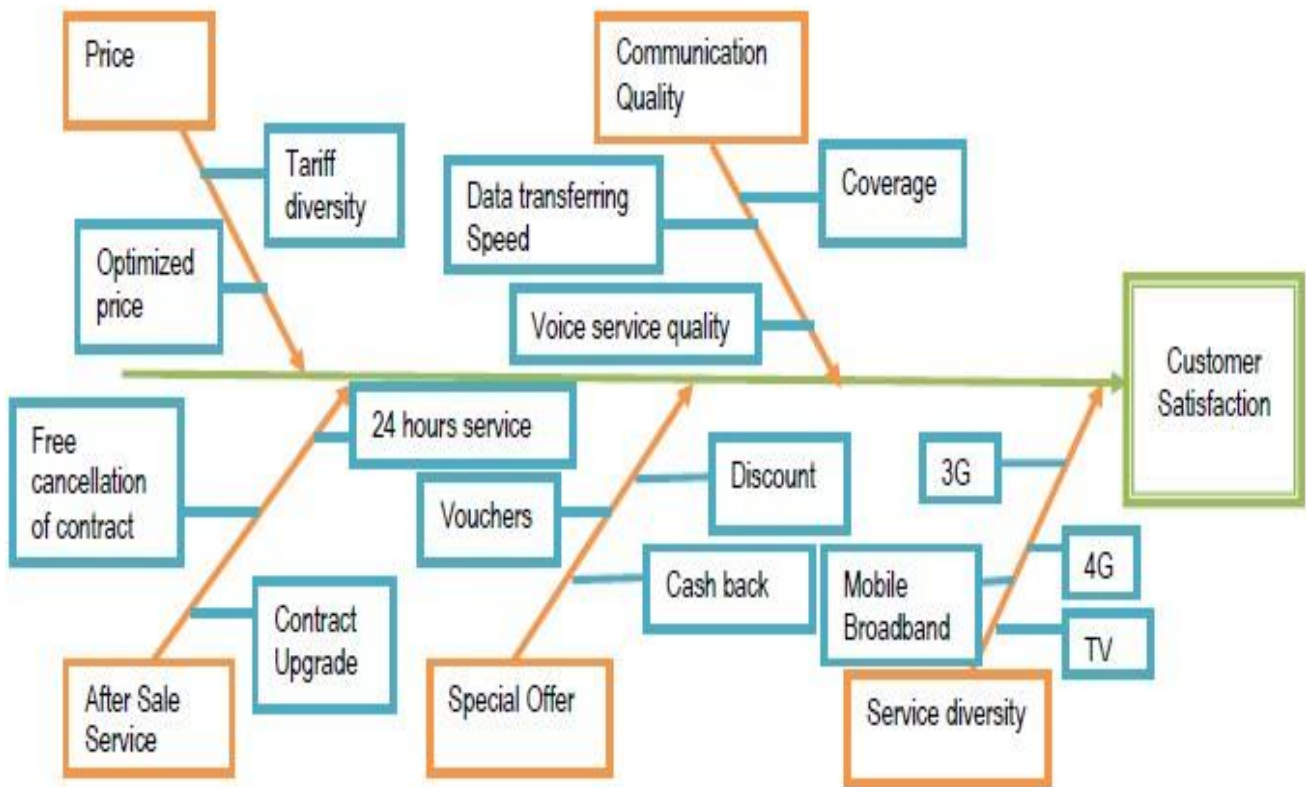
that show the causes of a certain event -- created by Kaoru Ishikawa (1990). Each cause or reason for imperfection is a source of variation. Causes are usually grouped into major categories to identify these sources of variation. The categories typically include:

- People: Anyone involved with the process
- Methods: How the process is performed and the specific requirements for doing it, such as policies, procedures, rules, regulations and laws
- Machines: Equipment, computers, tools etc. required to accomplish the job
- Materials: Raw materials, parts, pens, paper, etc. used to produce the final product
- Measurements: Data generated from the process that are used to evaluate its quality
- Environment: The conditions, such as location, time, temperature, and culture in which the process operates

## **5.2 Build Ishikawa Diagram for service quality of telecom industry**

All six categories are usually advised to consider while building a Fishbone Diagram. Causes in the diagram are categorized to 8 Ps, which is used in service industry. The 8 Ps includes:

- Product=Service
- Price
- Place
- Promotion/Entertainment
- People(key person)
- Process
- Physical Evidence
- Productivity & Quality



**Fig. 14 Fishbone diagram for telecom service quality**

### **5.3 Proposals to improve service quality**

According to the Figure Fishbone diagram for telecom service quality, the key factors to improve telecom service quality are:

<b>Price</b>	Tariff diversity
	Optimized price
<b>Communication Quality</b>	Coverage
	Voice service quality
	Data transferring Speed
<b>After Sale Service</b>	Free cancellation of contract
	Contract Upgrade
	24 hours service
<b>Special Offer</b>	Vouchers
	Cash back
	Discount
<b>Service diversity</b>	Mobile
	Broadband
	4G
	3G
	TV

**Table 6 Key factors proposed to improve service quality**

So, in order to improve service quality, it might be a good idea to adopt one or several items listed above.

For example, one company that has the reputation of poor signal coverage can invest funds to improve the coverage of the communication signal; at the same time adopt price discount and free cancellation of contract, in order to get more people experiencing the new signal quality. In this way, perception of the consumer of this particular company increases, service quality increases simultaneously.



## **CONCLUSION& FUTURE WORK**

In this thesis, service quality of telecom companies is analyzed. Furthermore, in order to analyze in depth and reality, surveys and interviews are conducted accordingly. Valuable data from different age groups, various regions and different backgrounds are collected and analyzed, theoretical analysis is undergone afterwards.

In addition to analysis of current service quality of telecom industry, an improvement suggestion is also brought up.

In the future, a further survey could be carried out to verify the improvement suggestions. Perhaps another survey can also be done to shape up an improved suggestion.

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## Appendix 1: Telecommunications Industry Overview

	Number	Unit	Year	Source
<b>U.S. Telecommunications Industry Revenues</b>	985.0	Bil. US\$	2010	TIA
<b>Worldwide Telecommunications Industry Revenues</b>	3.1	Tril. US\$	2010	TIA
<b>Landline</b>				
<b>Households with Wired Subscribership, U.S.</b>	113.5	Mil.	Jul-10	FCC
<b>Landline Revenue, U.S.</b>	286.6	Bil. US\$	2010	TIA
<b>Global Landline Subscribers</b>	1.18	Bil.	2010	ITU
<b>Landlines, Compound Annual Growth Rate 2003-2008, Worldwide</b>	2.39	%	2005-10	ITU
<b>Global Landlines per 100 Population</b>	17.2	per 100	2010	ITU
<b>Wireless</b>				
<b>Annualized Total Wireless Service Revenues, U.S.</b>	159.9	Bil. US\$	2010	CTIA
<b>Annualized Wireless Data Revenues, U.S.</b>	50.1	Bil. US\$	2010	CTIA
<b>Number of Wireless Connections, U.S.</b>	302.9	Mil.	Dec-10	CTIA
<b>Market Penetration, U.S.</b>	96	%	Dec-10	CTIA
<b>Portion of Mobile Consumers with a Smart Phone, U.S.</b>	31	%	Dec-10	Nielsen
<b>Cellular &amp; Other Wireless Revenue, U.S.</b>	184.4	Bil. US\$	2009	Census
<b>Mobile Advertising Revenue, North America, 2010</b>	304.3	Mil. US\$	2010	Gartner
<b>Mobile Advertising Revenue, North America, 2011**</b>	701.7	Mil. US\$	2011	Gartner
<b>Wi-Fi &amp; Cellular Device Shipments, U.S.</b>	247	Mil. Units	2010	In-Stat
<b>Mobile Cellular Service Subscriptions, Worldwide*</b>	5.3	Bil.	Mar-11	LM Ericsson
<b>Individual Subscribers, Worldwide**</b>	4.2	Bil.	Jun-11	PRE
<b>Mobile Broadband (3G) Subscribers, Worldwide</b>	940	Mil.	2010	ITU
<b>SMS Messages Sent, Worldwide</b>	6.1	Tril.	2010	ITU
<b>Handset Sales 2010, Worldwide</b>	1.6	Bil. Units	2010	Gartner
<b>2010 Mobile Advertising Revenue, Worldwide</b>	1.6	Bil. US\$	2010	Gartner
<b>Mobile Application Downloads, Worldwide **</b>	17.7	Bil.	2011	Gartner
<b>Mobile Application Revenue, Worldwide (Includes Purchases &amp; Ad Revenue)**</b>	15.1	Bil. US\$	2011	Gartner
<b>2010 Smart Phone Sales, Worldwide</b>	296.6	Mil. Units	2010	Gartner
<b>Equipment Revenue</b>				
<b>U.S. Exports of Telecommunications Equipment</b>	28.1	Bil. US\$	2010	ITA

<b>U.S. Imports of Telecommunications Equipment</b>	80.8	Bil. US\$	2010	ITA
<b>TV, Cable &amp; Internet</b>				
<b>Number of High Speed Internet Lines, U.S. (including mobile wireless)</b>	200	Mil.	Dec-10	PRE
<b>Number of High Speed Internet Lines, U.S. (not including mobile wireless)</b>	100	Mil.	Dec-10	PRE
<b>Number of Global Internet Users</b>	2	Bil.	2010	IWS
<b>Monthly Global Internet Traffic</b>	20,151	PetaBytes	2010	Cisco VNI
<b>Projected Monthly Global Internet Traffic</b>	80,456	PetaBytes	2015	Cisco VNI
<b>Number of Basic Cable TV Subscribers, U.S.</b>	59.8	Mil.	Dec-10	SNL Kagan
<b>Number of Satellite TV Subscribers, U.S.</b>	33.6	Mil.	Q1 2010	The BRIDGE
<b>Employment</b>				
<b>Employment in the Telecommunications Industry, U.S.</b>	899.7	Thous.	Dec-10	BLS
<p><b>TIA = Telecommunications Industry Association; FCC = U.S. Federal Communications Commission; ITA = International Trade Administration (Dept. of Commerce); ITU = International Telecommunication Union; ITW = InternetWorldStats; CTIA = Cellular Telecommunications &amp; Internet Association; Portio = Portio Research; CDG = CDMA Development Group; Census = U.S. Census Bureau; PRE = Plunkett Research Estimate; Cisco VNI = Cisco Visual Networking Index; The Bridge = Media Business Corporation; BLS = U.S. Bureau of Labor Statistics</b></p> <p><b>* The actual number of individuals who own cell phones is lower, as some people own more than one "subscription."</b></p> <p><b>** Forecasted or estimated figure.</b></p>				

## Appendix 2: Questionnaire 1

### *Questionnaire*

1. Have you heard of any stories about a telecom company in the past 3 months?  
Yes      no
  
2. Have you heard of any stories about a telecom company in the past 12 months – 24 months?  
Yes      no
  
3. What is your continent of origin?  


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4. Your age is?  


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According to the stories you heard about the telecom company, how do you match the following statements to the telecom company? Rate from 1-7, 7 means very well, 1 means not at all.

1. They are able to do what they promised.  
1      2      3      4      5      6      7
  
2. They are willing to solve customers' problems.  
1      2      3      4      5      6      7
  
3. They provide consistent service.  
1      2      3      4      5      6      7
  
4. They are accessible at the times they promised.  
1      2      3      4      5      6      7
  
5. They tell customers the exact opening times.  
1      2      3      4      5      6      7
  
6. They are fast to respond.  
1      2      3      4      5      6      7
  
7. They are fast to respond at busy times.  
1      2      3      4      5      6      7

8. They are friendly.

1     2     3     4     5     6     7

9. They are polite.

1     2     3     4     5     6     7

10. They are a reliable and trustworthy company.

1     2     3     4     5     6     7

11. They are passionate.

1     2     3     4     5     6     7

12. They have knowledgeable staff.

1     2     3     4     5     6     7

13. They have individualized service for customers.

1     2     3     4     5     6     7

14. They have personalized service from staff.

1     2     3     4     5     6     7

15. They know what customers need.

1     2     3     4     5     6     7

16. They know what customers are interested in.

1     2     3     4     5     6     7

17. They have modern facilities.

1     2     3     4     5     6     7

18. They have facilities with nice appearances.

1     2     3     4     5     6     7

19. They have well dressed staff.

1     2     3     4     5     6     7

20. They have materials provided for the services.

1     2     3     4     5     6     7

21. They have convenient opening times.

1     2     3     4     5     6     7

For your own experience, rate from 1-7 for the following aspects of the telecom companies, 7 means very satisfied, 1 means not at all satisfied.

1. Comittment with their promises

- 
- 1      ○2      ○3      ○4      ○5      ○6      ○7
2. Willingness to help solve costumers' problems  
○1      ○2      ○3      ○4      ○5      ○6      ○7
3. Consistency of service provided  
○1      ○2      ○3      ○4      ○5      ○6      ○7
4. Accessibility as promised.  
○1      ○2      ○3      ○4      ○5      ○6      ○7
5. Information provided about the opening times  
○1      ○2      ○3      ○4      ○5      ○6      ○7
6. Service respond time from staff  
○1      ○2      ○3      ○4      ○5      ○6      ○7
7. Respond during busy times  
○1      ○2      ○3      ○4      ○5      ○6      ○7
8. Friendliness of staff  
○1      ○2      ○3      ○4      ○5      ○6      ○7
9. Politeness of staff  
○1      ○2      ○3      ○4      ○5      ○6      ○7
10. Reliability of the company  
○1      ○2      ○3      ○4      ○5      ○6      ○7
11. Passionate of staff  
○1      ○2      ○3      ○4      ○5      ○6      ○7
12. Knowledge of staff  
○1      ○2      ○3      ○4      ○5      ○6      ○7
13. Individual care for customers from company  
○1      ○2      ○3      ○4      ○5      ○6      ○7
14. Personalized service from staff  
○1      ○2      ○3      ○4      ○5      ○6      ○7
15. Knowing of customer's needs  
○1      ○2      ○3      ○4      ○5      ○6      ○7



16. Knowing of customer's interests

1       2       3       4       5       6       7

17. Modern facilities

1       2       3       4       5       6       7

18. Appearance of facilities(cleaniess, etc)

1       2       3       4       5       6       7

19. Appearance of staff

1       2       3       4       5       6       7

20. Materials for service provided

1       2       3       4       5       6       7

21. Convinient opening times for customers

1       2       3       4       5       6       7

## Appendix 3: Questionnaire 2

### *Questionnaire*

1. Have you heard of any stories about a telecom company in the past 3 months?

Yes      no

2. Have you heard of any stories about a telecom company in the past 12 months – 24 months?

Yes      no

3. What is your continent of origin?

\_\_\_\_\_

\_\_\_\_\_

4. Your age is?

\_\_\_\_\_

\_\_\_\_\_

If there is an ideal telecom company, how would you match the following statements to the telecom company? Rate from 1-7, 7 means very well, 1 means not at all.

1. They are able to do what they promised.

1      2      3      4      5      6      7

2. They are willing to solve customers' problems.

1      2      3      4      5      6      7

3. They provide consistent service.

1      2      3      4      5      6      7

4. They are accessible at the times they promised.

1      2      3      4      5      6      7

5. They tell customers the exact opening times.

1      2      3      4      5      6      7

6. They are fast to respond.

1      2      3      4      5      6      7

7. They are fast to respond at busy times.

1      2      3      4      5      6      7

8. They are friendly.

1       2       3       4       5       6       7

9. They are polite.

1       2       3       4       5       6       7

10. They are a reliable and trustworthy company.

1       2       3       4       5       6       7

11. They are passionate.

1       2       3       4       5       6       7

12. They have knowledgeable staff.

1       2       3       4       5       6       7

13. They have individualized service for customers.

1       2       3       4       5       6       7

14. They have personalized service from staff.

1       2       3       4       5       6       7

15. They know what customers need.

1       2       3       4       5       6       7

16. They know what customers are interested in.

1       2       3       4       5       6       7

17. They have modern facilities.

1       2       3       4       5       6       7

18. They have facilities with nice appearances.

1       2       3       4       5       6       7

19. They have well dressed staff.

1       2       3       4       5       6       7

20. They have materials provided for the services.

1       2       3       4       5       6       7

21. They have convenient opening times.

1       2       3       4       5       6       7

For your own experience, rate from 1-7 for the following aspects of the telecom companies, 7 means very satisfied, 1 means not at all satisfied.

- 
1. Comittment with their promises  
 1     2     3     4     5     6     7
  2. Willingness to help solve costumers' problems  
 1     2     3     4     5     6     7
  3. Consistency of service provided  
 1     2     3     4     5     6     7
  4. Accessibility as promised.  
 1     2     3     4     5     6     7
  5. Information provided about the opening times  
 1     2     3     4     5     6     7
  6. Service respond time from staff  
 1     2     3     4     5     6     7
  7. Respond during busy times  
 1     2     3     4     5     6     7
  8. Friendliness of staff  
 1     2     3     4     5     6     7
  9. Politeness of staff  
 1     2     3     4     5     6     7
  10. Reliability of the company  
 1     2     3     4     5     6     7
  11. Passionate of staff  
 1     2     3     4     5     6     7
  12. Knowledge of staff  
 1     2     3     4     5     6     7
  13. Individual care for customers from company  
 1     2     3     4     5     6     7
  14. Personalized service from staff  
 1     2     3     4     5     6     7
  15. Knowing of customer's needs

1      2      3      4      5      6      7

16. Knowing of customer's interests

1      2      3      4      5      6      7

17. Modern facilities

1      2      3      4      5      6      7

18. Appearance of facilities(cleaniess, etc)

1      2      3      4      5      6      7

19. Appearance of staff

1      2      3      4      5      6      7

20. Materials for service provided

1      2      3      4      5      6      7

21. Convinient opening times for customers

1      2      3      4      5      6      7

### Appendix 4: Data Analysis of SERVQUL Model

Question	European			Average	SD	Asian			Average	SD
	15-25	25-35	35-45	32.54		15-25	25-35	35-45	33.61	
1.they are able to do what they promised	4.93	4.87	4.67	4.82	0.14	4.13	3.57	4.27	4.47	0.37
2.they are willing to solve customers' problems	4.83	4.63	4.57	4.68	0.14	5.13	5.03	5.03	4.84	0.06
3.they provide consistent service	4.57	4.73	5.13	4.81	0.29	4.67	4.53	4.63	4.72	0.07
4.they are accessible at the times they promised	4.17	4.23	4.03	4.14	0.10	4.57	4.53	4.07	4.25	0.28
5.they tell customers the exact opening times	5.83	5.57	5.27	5.56	0.28	5.23	5.43	6.03	5.56	0.42
6.they are fast to respond	4.73	4.73	5.13	4.86	0.23	3.47	3.47	3.93	4.33	0.27
7.they are fast to respond at busy times	4.27	3.57	4.27	4.04	0.40	2.63	2.53	2.67	3.43	0.07
8.they are friendly	4.77	4.93	5.03	4.91	0.13	4.97	4.97	4.97	4.94	0.03
9.they are polite	5.33	5.07	4.97	5.12	0.19	5.43	5.47	5.43	5.26	0.02
10.they are a reliable and trustworthy company	4.73	4.43	4.23	4.46	0.25	4.47	4.47	4.23	4.43	0.14
11.they are passionate	4.57	4.17	4.33	4.36	0.20	4.13	4.03	3.87	4.21	0.13
12.they have knowledgeable staff	3.93	4.83	4.23	4.33	0.46	4.57	4.53	5.57	4.57	0.59
13.they have individualized service for customers	4.67	4.43	4.47	4.52	0.13	4.63	4.53	4.43	4.53	0.10
14.they have personalized service from staff	5.03	4.83	4.67	4.84	0.18	3.57	3.53	3.43	4.27	0.07
15.they know what customers need	5.37	5.47	5.97	5.60	0.32	5.03	5.03	5.17	5.38	0.08
16.they know what customers are interested in	5.57	5.73	5.63	5.64	0.08	5.63	5.53	5.63	5.62	0.06
17.they have modern facilities	5.17	5.87	5.17	5.40	0.40	5.47	5.47	5.73	5.47	0.15
18.they have facilities with nice appearances	4.47	4.83	4.93	4.74	0.24	5.17	4.97	4.97	4.87	0.12
19.they have well-dressed staff	5.83	5.13	5.33	5.43	0.36	4.53	5.57	5.07	5.27	0.52
20.they have materials provided for the services	5.23	5.87	5.17	5.42	0.39	5.83	5.43	5.53	5.50	0.21
21.they have convenient opening times	4.03	3.93	4.13	4.03	0.10	5.83	5.97	5.27	4.74	0.37

## Appendix 5: Weight analysis

	Wind		Vodafone		China Mobile
1. Comittment with theirpromises	8.56%	6.66%	9.51%	8.56%	9.04%
2. Willingness to help solve costumers' problems	8.09%	8.09%	7.61%	7.61%	8.56%
3. Consistency of service provided	7.14%	7.14%	8.56%	9.51%	3.33%
4. Accessibility aspromised	6.66%	7.61%	9.04%	9.04%	2.85%
5. Information providedabout the opening times	6.18%	4.28%	1.90%	0.95%	1.43%
6. Service respond time from staff	5.23%	5.71%	7.14%	5.71%	7.61%
7. Respondduringbusytimes	4.76%	1.43%	2.38%	2.38%	5.23%
8. Friendliness of staff	2.85%	9.04%	1.43%	1.43%	7.14%
9. Politeness of staff	3.81%	8.56%	0.95%	1.90%	5.71%
10. Reliability of the company	9.51%	9.51%	8.09%	8.09%	8.09%
11. Passionate of staff	1.43%	5.23%	4.28%	4.28%	0.95%
12. Knowledge of staff	3.33%	4.76%	4.76%	7.14%	4.76%
13. Individual care for customers from company	2.38%	0.95%	5.23%	4.76%	0.48%
14. Personalized service from staff	1.90%	0.10%	5.71%	5.23%	0.10%
15. Knowing of customer'sneeds	9.04%	3.81%	6.66%	6.66%	6.66%
16. Knowing of customer'sinterests	7.61%	3.33%	6.18%	6.18%	6.18%
17. Modernfacilities	0.10%	0.48%	0.48%	0.48%	4.28%
18. Appearance of facilities(cleaniess, etc)	0.95%	2.38%	2.85%	3.81%	3.81%
19. Appearance of staff	0.48%	1.90%	0.10%	0.10%	1.90%
20. Materials for service provided	4.28%	2.85%	3.81%	2.85%	2.38%
21. Convinient opening times for customers	5.71%	6.18%	3.33%	3.33%	9.51%

## Appendix 6 Summary of Steps Employed in Developing SERVQUAL model

