



Residential Customer Satisfaction Survey on a Call Center  
in the Power Utility Business

by

Ms. Mayura Watananont

A Final Report of the Three-Credit Course  
CE 6998 Project

Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Science  
in Computer and Engineering Management  
Assumption University

July 2004

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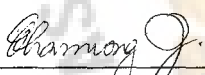
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Academic Year	July 2004

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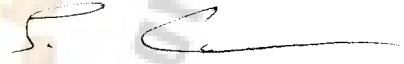
The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

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July 2004



## ABSTRACT

The call centre industry is a relatively new phenomenon. As many organizations are now providing customer service and support via call centers, due to the lower cost of operating, issues addressing the service quality are being raised. Call centers do not exist for the customer to physically interact with, apart from via the telephone, and are in effect virtual organizations. The nature of the service encounter between the call centre and customer is predominantly undertaken using enabling technology; the conventional speech telephone. Many organizations are still grappling with how to best manage their call centers. For some this involves focusing on how they deliver a quality service to the customer. The power utility businesses also need to apply call centers to deliver best service to their customers. Metropolitan Electricity Authority (MEA) is one of the big three power utility organizations in Thailand who established its own call center to support its customers. This research investigated in service quality in a call centre context using the widely applied SERVQUAL model. In this survey, the researcher uses the sample size of 400 customers. The factors that affect the customer satisfaction of MEA call center customers in this survey are covered with three perspectives, service system, service process and agents. The researcher found that the scores of customer satisfaction on the MEA call center was in 'satisfied' score, that means the MEA call center's service quality is in medium level. Nevertheless, the customers do not use the services of the MEA call center widely. Only ten percentage of all residential customers use the service. Up to ninety percentage of MEA residential customers don't know and have never used it before. The MEA call center should improve the public information and should use more channels of advertising to inform the customers about the services of the MEA call center.

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## I. INTRODUCTION

Today the computer systems are used worldwide in every field in the organization not only Human Resource, Production or Finance but also Operation. In the power utility business, the product is the invisible electricity that is difficult to evaluate product quality. The simple method to measure the product quality is time measuring of outage utility. The best quality of electricity means the shortest time of power outage. The other method to measure the quality of business is the customer satisfaction on customer service.

Call centers have now permeated everyday life and become increasingly difficult to avoid. Many industries now conduct standard business via call centers. Examples of this are banking, insurance, travel, taxi, and airline companies, in addition to utilities such as gas, electricity and water. In this context, these service encounters are conducted by virtual organizations that could be located anywhere in the world, adding weight to the literature that considers organizations have no geographical boundaries in a global economy (Electronic Commerce Center, 2002). This is particularly true in the case of the call centre. The call centre does not exist for the customer to interact with apart from via the telephone, which allows the service to be delivered from anywhere in the world. The development of technology, of which call centers are a byproduct, has forced companies to revisit the ways in which they manage relationships with their customer base. Many organizations have been innovative in the method of service delivery, for example banking via telephone or Internet. Call centers provide companies with valuable information about the performance of their goods and services (Staples et. al, 2001). They allow the organization to learn how the customer felt or how the employee thought the customer felt (Gilmore, 2001).

The call centers are applied in many industries. The power utility business is one who applies the call center to improve product and service. In Thailand, there are three main companies in the power utility business; one is EGAT, Electricity Generating Authority of Thailand. The other two companies are PEA, Provincial Electricity Authority, and MEA, Metropolitan Electricity Authority, as the distributors who contact directly to the customers. The MEA has the service coverage areas in three provinces, Bangkok, Samut Prakarn and Nonthaburi. The PEA has the service coverage areas in the rest of Thailand.

In MEA, the business areas are in the big city and the major economy of Thailand. The customers of MEA want the best service and the best power quality. In the big city such as Bangkok, traffic is quite bad and it takes time to contact the office of MEA. So in year 2000, MEA developed the call center system to support the customer service, to give the information to the customer as real time. MEA planned to develop their database of their power system and the customers' information to support the call center service for many years because MEA had more than a million customers on hands with more than 30,000 kWh Sales per year.

MEA applied and integrated the technology of Interactive Voice Response (IVR), Customer Information Service, GIS of the transmission system to create the call center. The call center of MEA services the customers for 24 hours.

With the satisfaction of customer on using call-center can show the image of the organization. This survey will study the satisfaction of the residential customers which is 82 percentages of all customers on the call-center services. The results of this research will help the MEA to improve its service on the call-center.

## 1.1 Company Profile

### 1.1.1 History of Metropolitan Electricity Authority

The Metropolitan Electricity Authority is a state enterprise under the Ministry of the Interior. It was established on August 1, 1958 under the Metropolitan Electricity Authority Act 1958 by combining Bangkok Electricity Authority (Wat Liab) with Samsen Royal Electricity Authority under the Department of Public Works and naming the new organization "The Metropolitan Electricity Authority." This organization was responsible for generating and selling electrical power in the metropolitan area until 1961 when the generating plant was transferred to Yanhee Electricity Authority, which was later renamed the Electricity Generating Authority of Thailand. Since then The Metropolitan Electricity Authority has only been in charge of the distribution of electrical power. The Metropolitan Electricity Authority is responsible for providing power services in Bangkok, Nonthaburi, and Samut Prakan Provinces, covering an area of 3,192 square kilometers.

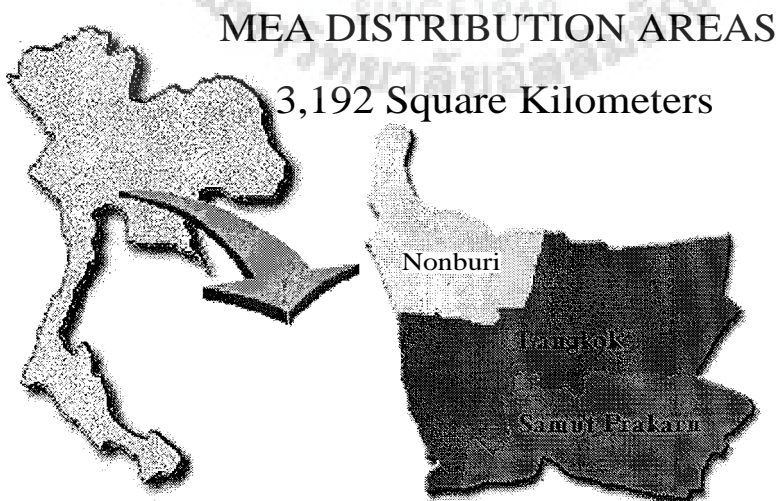


Figure 1.1. MEA Distribution Areas.

### 1.1.2 Location

The headquarters of the Metropolitan Electricity Authority is located at 30 Soi Chidlom, Pleonchit Road, Lumpini, Patumwan, Bangkok 10330.

The Metropolitan Electricity Authority divides its distribution area into 14 districts, which can be divided as follows: Wat Liab, Min Buri, Sam Sen, Thorn Buri, Nonta Buri, Bangkapi, Rat Burana, Samut Prakarn, Bang Yai, Klong Toei, Yannawa, Bangplee, Bang Khen, and Bang Khunthian.

### 1.1.3 Vision

To be a leading organization of electrical public utility, with strengths of services and social responsibility.

### 1.1.4 Mission

To distribute adequate, reliable and safe power at fair rate-tariffs, with efficiency to meet requirements of customers and the public, upon social and environmental consciousness, leading to favourable atmosphere of national economic development.

### 1.1.5 Policies

MEA runs the business under 5 main policies, Power Distribution System Development, Service, Finance and Accounting, Management, and Safety and Environment. Besides the 5 major policies, MEA also prescribed 2 other significant policies emphasizing on quality services and safety due to careful consideration of quality services equivalent to the international standards with full efficiency and safety.

**Power Distribution System Development:** To expand, improve and maintain power distribution system to be reliable, adequate and safe according



to the international standards so that the public shall be provided with electricity continuously and at all times.

Service: To improve and expand scope of services to be services of quality, efficiency, convenience, quickness, accuracy and courteousness.

Finance and Accounting: To maintain financial stability and to prioritize necessity of investment to be compliant with the government's policies as well as to develop accounting system which is favorable to increase management efficiency.

Management: To develop management system and organizational structure to be business-oriented and to increase employee's potential in terms of knowledge, capability, skill and appropriate attitudes as well as to improve and develop technology and to increase efficiency in public relations.

Safety and Environment: To disseminate electrical-associated safety knowledge in order to enhance the public consciousness and to provide services of prevention and reduction of electrical hazards. Besides, to elevate employee's consciousness of safe performances and to enhance the Demand Side Management for environment conservation as well.

Quality Policy: MEA will run its business of power distribution in terms of sufficiency, reliability, safety, fairness and excellent services. Additionally, associated businesses and some other tasks shall be implemented along with progressive organization development in order to respond to requirements of customers and the public efficiently with social and environmental consciousness, plus support of economic development fundamentally.

Safety, Occupational Health and Work Environment Policy: Safety, Occupation) Health and favourable environmental workplaces of employees,

including safety of the public and customers are MEA's ultimate aims and support, consequently, the following tasks have been implemented : intensive management of occupational health and safety at work; adoption and certification of occupational health and safety management (TIS 18000); control, improvement and protection of possible accidents occurred from electrical-related performances and services; and lastly, campaigns for enhancement of safety consciousness and participation among employees and the public as well.

#### 1.1.6 Highlights

The implementation of the Geographic Information System (GIS) phase 3 covering MEA Districts of Bang Kapi, Bang Khen, Bang Khunthian, Yan Nawa and Min Buri, total area of 1,100 sq.km., for the benefits of the provision of electrical services and planning of power distribution system development.

The establishment of the Call Center, a two-way communication system, with 2 channels of customer services an automatic communication system: a 24-hour officer provided system, access by telephones number 1130.

The improvement of the Supervisory Control and Data Acquisition (SCADA) and Energy Management System (EMS) for the benefits of an efficient power distribution system control that is capable of controlling of 240 substations effectively without and increase in the number of employees working at substations. The system can be linked with other relevant work systems of information such as the Geographic Information System (GIS) and the Call Center etc.

The implementation and the adoption of ISO 9002 at the MEA' Districts and the Service Stations as well as the four departments namely, District Affairs

Department, Training Department, Internal Audit Department, Mapping and Distribution Equipment Department as well.

The prescription of quality services standards covering areas of technique, general services and the MEA' Guaranteed Standard of Performance for customers' confidence with our standardized, convenient and rapid services.

The upgrades and improvement of computers and peripherals as well as the development of the Customer Service System (CS S) for efficient and rapid customer services of the MEA's Districts and Service Stations.

The implementation of the Business Process Reengineering project for efficiency improvement and development. Being the new business-processes design comparable to the international standards together with using technology as a significant tool for adjustment and development, resulting in a streamlined-organizational structure as well as higher efficient performances.

The improvement of electrical bill payment through the following: increasing of the express electrical bill payment channel, improving the receipt form and applying electronic barcode system for bill printing resulting in satisfactory, convenient and rapid services.

The preparation of establishment of the high-voltage equipment maintenance service center and electrical installation service center that will be all-day and everyday-open officers to facilitate the public.

## **1.2 Statement of Problem**

The connection between customer satisfaction and government organizations is less direct than for many businesses. Dissatisfied customers in business mean decreasing sales and new competition. Dissatisfied customers in government enterprise cannot express themselves through direct process. Most government enterprises serve

customers as non-profit business. MEA is one of the government enterprises. MEA supplies electrical utility to customers. In Thailand, electrical utility is a kind of monopoly. In business, customer problems will affect the bottom line in a few months, but in government enterprise the impact of dissatisfaction can take years. Therefore, there is a need to develop more timely methods to assess satisfaction. Citizen complaints, if unknown or ignored, can result in the failure of efforts and a depletion of support and validity of all government. Customer satisfaction involves an orientation that says, "take care with all parts of the process that develops a good or service for the ultimate customer." In most settings the customer will be the one who pays to buy the good or service. A process orientation is very important in settings in which the customer is not the one who 'buys' the service and thus provides the most important feedback about quality and acceptability of the service. The process orientation allows an organization to look at what the contributions of all departments are in satisfying the multiple customers. The process orientation forces an organization to examine the internal processes that contribute to the whole. When the processes are examined and documented, the managers can then identify the internal customers of each process and say to each worker "you must add value at each step" and "you must improve the quality of what you do as seen by your customers."

MEA developed a call center for the purpose of improving service quality. The call center is one channel for the customers to contact the office of MEA. The MEA call center has been established since Feb 2000. The customers of call center have increased continually; in consequence, the MEA call center has improved its service. The external data or customer attitude is one of three elements for continued organizational success; the others two are internal data and visionary leadership. The result of development of call center service is good or not, the regular collection of data

from the environment of the organization can be an instrument to measure the service quality.

Service quality of call center can be measured by the comparison between customer expectation and perception. Furthermore the other factors such as words of mouth, past experience and personal needs effect on the customer satisfaction. According to many factors effect on the satisfaction, only once the customer received poor service from the call center can lead to the bad impression on the service of call center. The MEA call center, as the role of the center of information and organization representation, is one of the main departments of the service sector. The direct benefit of call center in MEA service is serving customers with information to fulfill needs and satisfaction. The indirect benefit of call center is creating good image of the organization. So the researcher is interested to do the research of customer satisfaction of MEA call center. With the results of the survey, the MEA call center will know attitude of customers on service of call center and how to improve service based on customer satisfaction.

### 1.3 Research Objectives

The study of customer satisfaction on call-center in the power utility business has purposes as follows:

- (1) To survey the residential customer satisfaction on call-center in the Metropolitan Electricity Authority or MEA as the case study of the power utility business
- (2) To survey what the customers want to be improved on customer service by using call centers
- (3) To survey and collect major problems in service of the power utility business to finalize the problem by using call centers

- (4) To provide recommendations to MEA on how to improve its services in order to ensure customers satisfaction

#### **1.4 Scope of the Study**

This project is a study of call centers in the power utility business. MEA is the company that the project talks to as the case study. The service area is in the 14 distribution areas. The research focuses on the residential customers only.

#### **1.5 Hypothesis**

This project studies the satisfaction on the MEA call center service. Therefore the researcher considers the factors that affect the satisfaction into three main factors: the general factors, the utility service factors, and the call center factor. The satisfaction of service is described into three terms of services: the service system, the service process, and the agents. The researcher sets the hypothesis of this research as follows:

- (1) The satisfaction of the MEA call center is in High level. The residential customers are satisfied on the service of the MEA call center.
- (2) The factors that effect on the satisfaction of the MEA call center are the general factors, the utility service factors, and the call center factors.



## II. LITERATURE REVIEW

### 2.1 History of Call Center

In today's rapidly changing business climate, it forces every organization to focus on the strategy of how to keep the loyal customer and increase the market share. Many of them use the call centers to help their customers get service fast, conveniently and gain satisfaction on their service.

Over the past 20 years or so, call centers have evolved as a convenient and cost-effective way for organizations to keep contact with their customers. The recent research (<http://www.callcenters.net>, 1 May 2003) shows that most call centers are under pressure to reduce costs, causing them to explore means of customer contact that are not so labors-intensive as the telephone. The major cost in running a call center, even in less mature markets, is labor. When talking about call center, many people thinking of operator receiving telephone. In fact call center means more than that. Call center is a department that serves customers of that organization via telephone by more than one operator. Call center is the element of CRM or customer service under trend of information technology, Communications Authority of Thailand, CAT.

### 2.2 The MEA Call Center

For public access, MEA improved efficiency in information services, covering its distribution areas. From the former development of automation call, MEA Tel, MEA made a progress in changes to two-way communication providing convenience for the public with related electricity problems and recommendations. The call center was established, working on computer system control, and planned of officially on 25<sup>th</sup> February 2000 to provide 24 hours services on five main topics as explained in Figure 2.1:

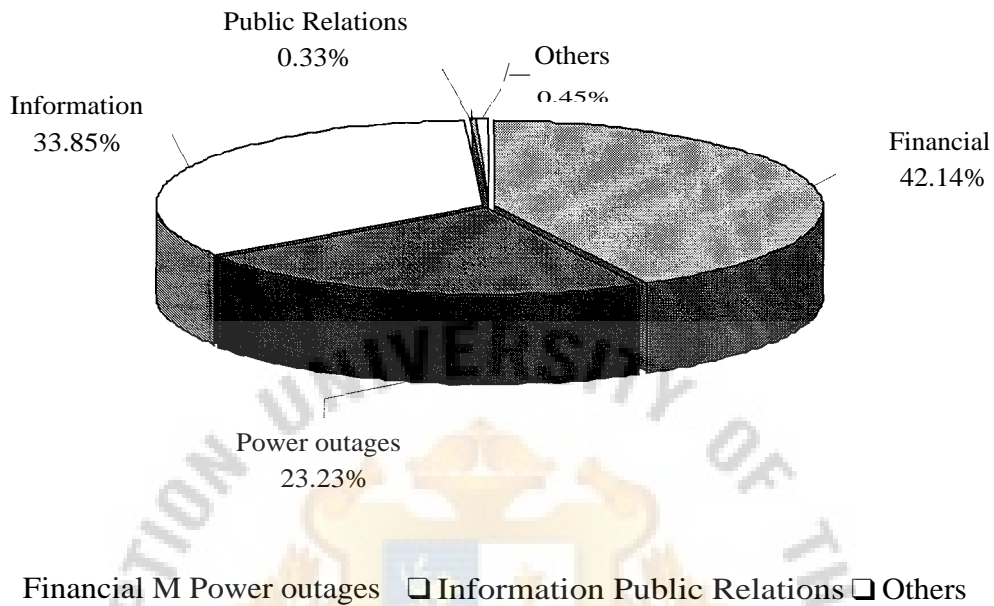


Figure 2.1. Statistic of Customers' Service Usage MEA Call Center (June 2003).

- (1) Financial: inquire on energy outstanding balance and tariff
- (2) Power outages: power outages information, announcement of scheduled outage, and notification of other electricity failure.
- (3) Information: information on services, office stand, bill delivery, and others
- (4) Public Relations: public relations news and information of MEA.
- (5) Others: complaints, suggestions and comments on services.

MEA Tel system, in the past, was the Interactive Voice Response (IVR) without agents answering. All service information was recorded in the IVR system and the IVR phone answering service answered customers. With this IVR system, customers contacted the system increasingly. However the IVR system

cannot satisfy all customers because the MEA has many categories of service and some services need many details to understand. Therefore only the IVR phone answering service was not enough to support call service to customers. To reach the MEA services policies; to improve scope of services to be services of quality, efficiency, convenience, quickness and courteousness, MEA developed the MEA Tel system by integrating the IVR system with the Customer Information Service (CIS), Intranet and the Geographic Information System (GIS). Moreover, there are many well-trained agents who stay online to answer the phone. By calling 1130, the Call Center starts to serve the customer with more satisfaction. The new developed call center of MEA will be available on services with two options, the call center will be able to make a choice by speaking either to an automated voice system or with an officer, furthermore, the call center will be developed to be linked with the GIS to display the locations of the electricity meters, on a scale of 1:4000 and it is also planned to be developed and applied to web application on internet. The call center serves customers with 60 phone-lines 24 hours a day service.

#### 2.2.1 Objectives of the MEA Call Center

The Objectives of establishing MEA call center are being the information center of customers to ask for information of MEA services and to inform any event of outage or any others to related department of MEA completely in one step. Customers will be answered on their questions by the online agents immediately. With this service of call center, customers can reach MEA's services by only dialing to the call center number 24 hours a day.

### 2.2.2 Technology of the MEA Call Center

Call Center system has been designed to support the existing information system that MEA developed. The four major components of the call center consist of PSTN, PABX, IVR, CTI as shown in Figure 2.2.

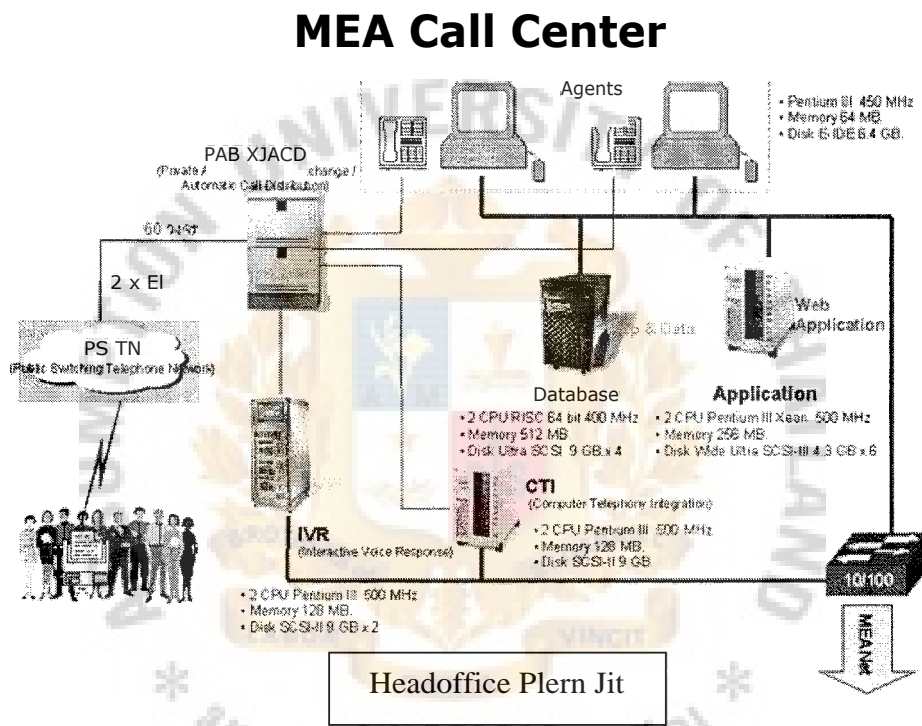


Figure 2.2. Configuration of the MEA Call Center.

(1) PSTN, Public Switched Telephone Network services. PSTN provides the link between the customers and the customer service center. It provides information regarding the phone that the caller is calling from (Automatic Number Identification, or ANI), as well as the phone number that the caller dialed (Dialed Number Identification Service,

or DNIS). The network telephone services identify both the caller's phone number and the number caller dialed and passes this to the PABX or ACD. That phone switch determines the intelligent call routing on the basis of the ANI/DNIS information and the availability of appropriately skilled customer service agent.

- (2) PABX, Private Automatic Branch Exchange phone switch or ACD, Automatic Call Distribution. The PABX or ACD provides the intelligent switching and call routing capability. It links the information about the call, as well as the call itself to the customer service call center.
- (3) IVR, Interactive Voice Response. The IVR can be an integral part of providing high levels of customer service. The IVR acts as the catalyst. It receives the "caller-entered digits" from the caller's touchtone or rotary phone, or recognizes speech to get the information required to access previous contact history, customer profile information, and subscription information.
- (4) CTI, Computer Telephony Integration. The CTI identifies the customer and displays the appropriate screen to the agent as he or she receives the call. It enables the agent to immediately get to the purpose of the call, saving time for both the agent and the customer. CTI technology has the potential to significantly reduce talk time, improve service levels and results.

### 2.2.3 The MEA Call Center Applications

- (1) Database Management System, DMS.

The DMS is the computer application system where MEA stores customers' database and service information to support call center agents such as tariff information, billing information. Further, DMS records the voice data to answer the caller by IVR technology.

- (2) Geographic Information System, GIS.

MEA applies the GIS to show the position of customers and infoii the outage area by map of GIS. The call center adopts the GIS in service to answer the outage area.

- (3) Web Application

The agents use this web application technology as the tool to get information from database to answer and serve the callers. With this web application, the database will be easy to modify and update and convenient to use.

### 2.2.4 Human Resource of the MEA Call Center

Agent 30 positions

Supervisor 4 positions

Administrator 1 position

Clerk 1 position

Service Time of call center

Office hour 07.30am. — 05.30pm. Supported by 12 agents and 2 supervisors.

Over Office hour supported by 6 agents and 1 supervisor.



Statistics of customers using the service of call center is shown in figure 2.3.

From the statistics of customers using the service, we found that in May 2002 there is a maximum usage 158,483 customers. This showed that the customers who used the service of call center was approximately 8.5 percentage from a total of 1,899,119 residential customers; (<http://www.mea.or.th>, 1 May 2004).

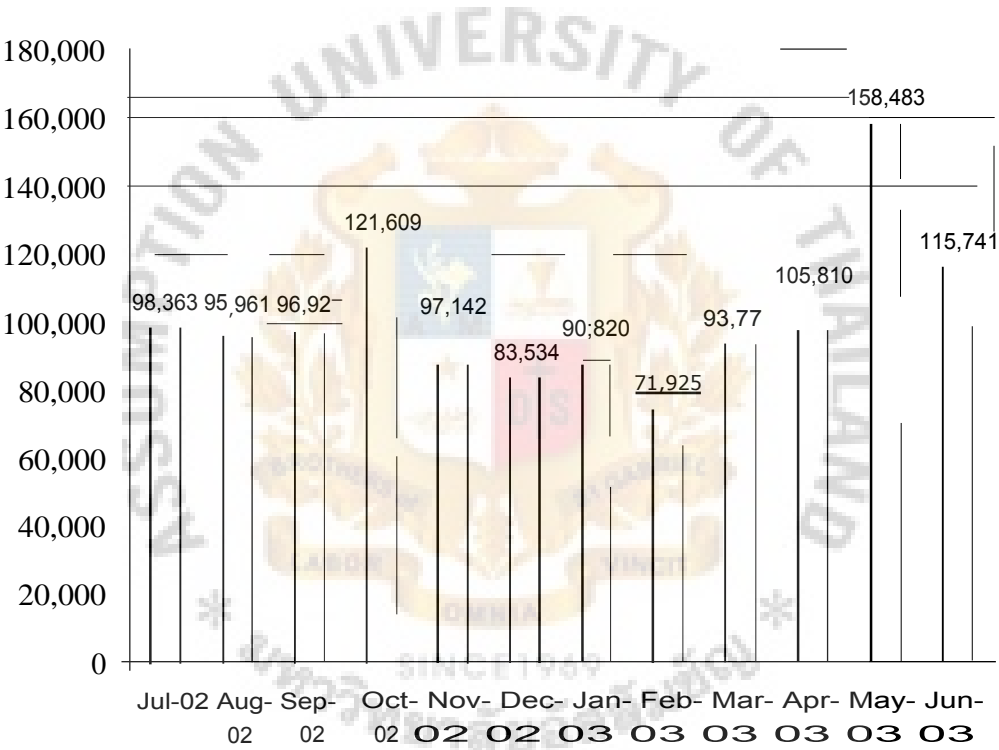


Figure 2.3. Statistics of Callers of Call Center from July 2002 to June 2003.

### 2.3 Theory of Needs

Among the insights of the human relations movement, Abraham Maslow's work in the area of human 'needs' is a key foundation. A need is physiological or psychological deficiency a person feels the compulsion to satisfy. This is a significant concept for customer service management because needs create tensions that can influence a person's service attitudes and satisfactions.(Management sixth Edition, Schermerhorn, 1999).

Maslow identified the five levels of human needs, shown in Figure 2.4 : physiological, safety, social, esteem, and self-actualization. His theory is based on two underlying principles. The first is the deficit principle — a satisfied need is not motivator of behavior. People act to satisfy 'deprived' needs, those for which a satisfaction 'deficit' exists. The second is the progression principle — the five needs exist in a hierarchy of 'prepotency'. A need at any level only becomes activated once the next lower level need has been satisfied.

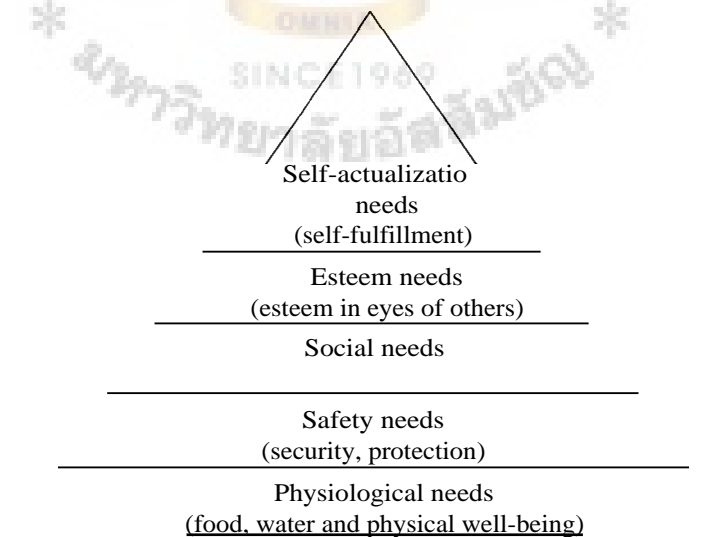


Figure 2.4. Maslow's Hierarchy of Human Needs.

The five levels of human needs are described as follows:

(1) Physiological Needs

Physiological needs are the very basic needs such as air, water, food, sleep, sex, etc. When these are not satisfied we may feel sickness, irritation, pain, discomfort, etc. These feelings motivate us to alleviate them as soon as possible to establish homeostasis. Once they are alleviated, we may think about other things.

(2) Safety Needs

Safety needs have to do with establishing stability and consistency in a chaotic world. These needs are mostly psychological in nature. We need the security of a home and family. However, if a family is dysfunction, i.e., an abusive husband, the wife cannot move to the next level because she is constantly concerned for her safety. Love and belongingness have to wait until she is no longer cringing in fear. Many in our society cry out for law and order because they do not feel safe enough to go for a walk in their neighborhood. Many people, particularly those in the inner cities, unfortunately, are stuck at this level. In addition, safety needs sometimes motivate people to be religious. Religions comfort us with the promise of a safe secure place after we die and leave the insecurity of this world.

(3) Social Needs

Love and belongingness are next on the ladder. Humans have a desire to belong to groups: clubs, work groups, religious groups, family, gangs, etc. We need to feel loved (non-sexual) by others, to be accepted by others. Performers appreciate applause. We need to be needed. Beer commercials, in addition to playing on sex, also often show how beer makes for

camaraderie. When was the last time you saw a beer commercial with someone drinking beer alone?

#### (4) Esteem Needs

There are two types of esteem needs. First is self-esteem which results from competence or mastery of a task. Second, there's the attention and recognition that comes from others. This is similar to the belongingness level, however, wanting admiration has to do with the need for power. People who have all of their lower needs satisfied, often drive very expensive cars because doing so raises their level of esteem. "Hey, look what I can afford-peon!"

#### (5) Self-Actualization

The need for self-actualization is "the desire to become more and more what one is, to become everything that one is capable of becoming." People who have everything can maximize their potential. They can seek knowledge, peace, esthetic experiences, self-fulfillment, oneness with God, etc. It is usually middle-class to upper-class students who take up environmental causes, join the Peace Corps, go off to a monastery, etc.

Maslow suggested that people try to satisfy the five needs in sequence. They progress step by step from the lowest level in the hierarchy to the highest. Along the way, a deprived need dominates individual attention and determines behavior until it is satisfied. Then, the next higher level need is activated and progression principles cease to operate. The more this need is satisfied, the stronger it grows.

Two principles are central to Maslow's theory about how these needs affect human behavior. The deficit principle holds that a satisfied need is not a motivator of behavior. People are expected to act in ways that satisfy deprived needs. The

progression principle holds that a need at one level does not become activated until the next lower level needs is already satisfied.

## 2.4 Theory of Customer Satisfaction

### 2.4.1 Definition of Customer Satisfaction

An analysis of the literature concerned with customer satisfaction in 1992 revealed a large and ever growing body of research with some 15,000 trade and academic articles, which had been written on the topic over the previous two decades (Peterson and Wilson, 1992).

Despite the many studies on customer satisfaction, there appeared to be no overall agreement over important issues such as concepts, constructs, definitions, measurements, methodologies and various interrelationships (Yi, 1990; Brooks, 1995).

Currently the constructs of customer satisfaction are built upon concepts such as individual wants, needs and expectations. These concepts emerged from theories about consumer choice for goods and services, which are sought to meet needs and wants. Issues such as prices, convenience, appeal and quality were seen as moderating the choices.

The concept of satisfaction itself needs to be defined. The Shorter Oxford English Dictionary (1994,p. 1792) defined satisfaction as '[1] being satisfied, [2] thing that satisfies desire or gratifies feeling'. It describes satisfy as '[1] meeting wishes of content, [2] be accepted as adequate, [3] to fulfil, [4] comply with, [5] come up to expectations.' Customer is defined as 'a person who buys a product or uses a service.' Hence using these definitions, customer satisfaction can be thought of as a user or purchaser having their needs and expectations fulfilled.

The concept of customer satisfaction has been defined in various ways. Zeithaml, Berry and Parasuraman (1993) suggested that customer satisfaction is a function of the customer's assessment of service quality, product quality and price. Oliva, Oliver and Bearden (1995) suggested that satisfaction is a function of product performance relative to consumer expectations. Bachelet (1995) considered satisfaction to be an emotional reaction by the consumer in response to an experience with a product or service. He believed that this definition included the last contact with a product or service, the satisfaction experience since the time of purchase as well as the general satisfaction experienced by regular users. Hill (1996) defined customer satisfaction as the customers' perceptions that a supplier has met or exceeded their expectations. Jones and Sasser (1995) defined customer satisfaction by identifying four factors they postulated affected it. The factors were: (1) essential elements of the product or service that customer expected all rivals to deliver, (2) basic support services such as customer assistance, (3) a recovery process to make up for bad experiences and, (4) "customization" which were factors that met customers' personal preferences, values, or needs. Ostrom and Iacobucci (1995) examined a number of definitions from other researchers and distinguished between the concept of consumer value and customer satisfaction. They stated that customer satisfaction was best judged after purchase, was experiential and took into account the qualities and benefits as well as the costs and efforts associated with a purchase. Gerson (1996) suggested that a customer was satisfied whenever his or her needs, real or perceived were met or exceeded. He put it succinctly as "Customer Satisfaction is simply whatever the customer says it is" (p.24).



#### 2.4.2 Importance of Customer Satisfaction

The significance of customer satisfaction to the business world is the concept that a satisfied customer will be a positive asset for the company through reuse of the service, repurchase of the product or positive word of mouth, which should lead to increased profit. The converse of this is that a dissatisfied customer will tell more people of their dissatisfaction, possibly complain to the company and if sufficiently disenfranchised, change to another company for their product or service, or totally withdraw from the market (Anderson and Sullivan, 1993; Fornell, Ittner and Larcker, 1995; Oliva, Oliver and Bearden, 1995).

The call centre industry is a relatively new phenomenon. As many organizations are now providing customer service and support via call centers, due to the lower cost of operating, issues addressing the service quality are being raised. Call centers do not exist for the customer to physically interact with, apart from via the telephone, and are in effect virtual organizations. The nature of the service encounter between the call centre and customer is predominantly undertaken using enabling technology; the conventional speech telephone. This suggests the criteria used to assess it may be different from that of a more traditional face-to-face method of service delivery. Combining the different method of service delivery with the relative youth of the industry has meant that many organizations are still grappling with how to best manage their call centers. For some this involves focussing on how they deliver a quality service to the customer. These issues prompted our investigative research into service quality in a call centre context using the widely applied SERVQUAL model. Initially the SERVQUAL model was used to analyze the service encounter with a virtual organization and examine the models applicability in this context. SERVQUAL

was then used to examine the way in which a case call center's management had tried to deliver a 'quality call' to the customer.

Customer Satisfaction is a growing concern to business organizations throughout the world. Consumers are becoming aggressive in demanding that products meet or exceed expectations. Outstanding product or service performance is required. Customer satisfaction is an integral part of total quality management. The customer drives total quality management by establishing expectations, standards, and performance requirements. Total quality management focuses on viewing products and services as solutions to customer problems. (AMA Handbook for Customer Satisfaction, 1994)

Customer satisfaction research focuses on two key issues:

- (a) Understanding the expectations and requirements of the customer.
- (b) Determining how well a company and its major competitors are succeeding in satisfying these expectations and requirements.

Customer satisfaction research is one of the fastest growing segments of the marketing research industry. Satisfied customers offer businesses a promise of enhanced revenues and reduced operating costs. The promise must be pursued since recent trends in the business environment seem to have the opposite effect.

Initial customer satisfaction research indicated that both satisfied and dissatisfied customers dramatically affected a firm's bottom line. Here are three such findings:

- (1) One hundred satisfied customers generate 25 new customers.
- (2) For every complaint received, there are 20 other customers who feel the same way but do not bother to complain.
- (3) The cost of acquiring a new customer is five times as great as the cost of keeping a satisfied customer.

The numbers may differ by business or industry, but the message is obvious: Satisfied customers improve business and dissatisfied customers impair business.

Customer satisfaction research must achieve these four major objectives: first determine the critical performance attributes that result in customer satisfaction, second assess performance of the company and its major competitors, third establish priorities and take corrective action, and fourth monitor progress. Achieving the four objectives of customer satisfaction research listed above will reduce the number of negative comments. A truly customer-oriented company will convert negative perceptions to positive impressions. Even more significantly, the customer-focused company will prevent negative perceptions from occurring in the first place.

The challenge in researching customer satisfaction lies in recognizing that such research is only the first stage of an ongoing process of improving customer satisfaction. There must be a strong commitment on the part of the business firm to making the changes called for by the research. The pressures of competition necessitate vigilance over customer satisfaction, and research in this area will provide the knowledge essential for competitive advantage. (Alan Dutka, 1994)

Thus after MEA established the new customer service 'Call Center' for the purpose of center of MEA service information online 24 hours a day as mentioned in the objective of call center, MEA has to measure attitude of customers on using the service. Customer satisfaction is a tool to improve the service of call center to meet the goal of MEA mission of being the best service of power utility in Thailand.

## **2.5 Theory of Service Quality**

SERVQUAL is based on the notion that service quality can be measured by comparing customer expectations against the service received. The gap between expectation and actual service is measured along key service dimensions. These

dimensions have been applied to service quality evaluations across many industries. SERVQUAL is easy to use and is based on an empirically derived, well-validated approach. However, there have been numerous criticisms of the approach particularly in terms of the relevance of the SERVQUAL dimensions to different industry and geographical contexts (e.g. Angur et al. 1999; Cronin and Taylor 1992; Gronroos et al. 2000). If the SERVQUAL instrument is not universally applicable it is debatable whether it should be modified to the service context, which can be time consuming and costly, or replaced by an alternative method altogether.

Regression on the other hand derives the importance of service dimensions by linking service ratings (the independent variables) to a measure of satisfaction (the independent variable). Regression models determine the significant drivers of satisfaction. They identify the amount of variation in satisfaction and thereby offer an objective, statistically driven methodology. However, the approach requires managers to have a greater statistical knowledge and the level of explanation provided by the model may be low in some situations (Chu 2002). There also appears to be some confusion over which method of regression is the more appropriate, although conventional multiple regression appears to be the more commonly used (e.g. Andaleeb 1998; Chu 2002; Terziovski and Dean 1998).

Both the SERVQUAL and regression approaches for evaluating service quality and satisfaction have supports as well as detractors. Despite ongoing debate within the service sector and scholarly journals there is actually little empirical evidence to suggest which is the more appropriate. In this survey the researcher inform the measurement of service quality debate by applying both SERVQUAL gap analysis and multinomial regression analysis for evaluating customer satisfaction and perceptions of the MEA call center service quality.

### 2.5.1 Evaluating Service Quality

Service quality has been defined by Robison (1999) as "an attitude or global judgement about the superiority of service". Service organizations frequently regard it as the Holy Grail that will provide distinct competitive advantages. Effective service quality evaluation and identifying ways to improve it are therefore paramount and significant resources are ploughed into these activities. Myriad qualitative and quantitative research activities are employed in this regard and may encompass customers, competitor customers, as well as staff. They frequently include mystery-shopping exercises, in branch observation, depth interviews, questionnaire surveys, advisory panels, complaints and suggestion boxes, as well as secondary data sources.

SERVQUAL and regression analyses are different survey techniques commonly used for assessing service quality and customer satisfaction (e.g. Avkiran 1999; Caruana et al. 2000; Chang et al. 2002; Lassar et al. 2000; Newman 2001, etc.).

### 2.5.2 SERVQUAL-Measuring Importance and Performance

Since its inception, SERVQUAL has become a popular method for measuring service quality (e.g. Bojanic and Rosen 1993; Llosa et al. 1998; Oldfield and Brown 2000; Saleh and Ryan 1991). Service quality is defined as the result of the comparison that customers make between their expectations about service and their perceptions of the manner in which service has been performed (Gronroos 1990). It involves measuring both customer perceptions and expectations of service along key service quality dimensions. Examining difference or gaps between the desired level of service and that actually delivered reveals where improvements in the service mix are required. In their original

paper, Parasuraman et al. (1985) identify the 10 core components of service quality as reliability (consistent performance and dependability), responsiveness (willingness/ readiness to service), competence (possessing knowledge and skills), access (approachability and ease of contact), courtesy (politeness, consideration and friendliness of staff), communication (updating and listening to customers), credibility (trustworthy and reputed, with customer interests at heart), security (freedom from danger and risk), customer knowledge (understanding needs and personalized attention), as well as tangibles (facilities and physical features).

In subsequent research (Parasuraman et al. 1988, 1991, 1994a), the service dimensions are collapsed into to five categories tangibles, reliability, responsiveness, assurance and empathy. They are assessed using a 22 items scale with customer providing performance and expectation, or importance scores using Likert scales. However, there is some evidence that the number of categories is not stable (Bouman and van der Wiele 1993; Cronin and Taylor 1994; Gagliano and Hathcote 1994).

Practitioners like SERVQUAL because the gap analysis approach seems a logical and straightforward concept. In addition, once data have been analyzed they can be visually presented so that it is easy to identify strengths and weaknesses relative to competition. However, the many operational and theoretical shortcomings associated with SERVQUAL are well documented (e.g. Bebeko 2000; Buttle 1996; Carman 1990; Grapentine 1998; Newman 2001; Robinson 1999). The more commonly reported criticisms of the SERVQUAL approach include:

From a conceptual point of view:

- (1) SERVQUAL assumes customers evaluate service quality by comparing service received against that expected, this might not be so
- (2) Just because a service aspect exceeds expectation does not necessarily mean it is a desirable thing from the customer's point of view
- (3) By concentrating on measuring satisfaction and expectation there is a danger of not connecting customer needs and business activities.

In other words, effective implementation and producing actionable findings may be neglected. The complex nature of service quality means that it is unlikely that any single approach can fully capture and explain it.

From a methodological point of view:

- (1) Respondent fatigue at having to rate all service attributes twice
- (2) They also tend to rate most dimensions as being highly important, since they are unable to distinguish between aspects that are very and extremely important
- (3) Respondents may interpret the expectation/ importance questions in different ways

### 2.5.3 Concerning the Research Instrument:

Dispute over which scale is most appropriate and the number of points to include in it and perhaps most important, the number and dimensions of service quality vary depending on the context and culture involved.



#### 2.5.4 Regression Analysis- Measuring Performance and Deriving Importance

Other studies attempt to improve service quality by linking customer satisfaction to service performance (e.g. Bolton and Drew 1994; Hill 1986; Liljander and Strandvik 1995). Rather than collect customer ratings of the perceived importance associated with the various service attributes, regression models are used to identify the significant drivers of satisfaction. With this approach, the performance ratings alone are viewed as an effective indicator of service quality and customer satisfaction. The SERVQUAL dimensions are frequently used as the independent variables. Indeed the 22 items SERVPERF is a performance only version of the original SERVQUAL scale (e.g. Cronin and Taylor 1992). A general indicator of overall customer satisfaction serves as the dependent variable and regression analysis is used to identify the key drivers of satisfaction. However, there appears to be some vagueness over which regression method is the more appropriate. For example, Lassar et al. (2000) use ordinary least squares (OLS) regression to examine ratings of seven service quality dimensions to predict three measures of satisfaction. Caruana et al. (2000) use moderated regression analysis for a similar goal, while several other studies use multiple regression analysis (e.g. Andaleeb 1998); Chu 2002; Terziovski and Dean 1998).

Chu (2002) describes some of the more elementary benefits and limitations of the regression derived importance approach. Advantages are that regression enables the relative importance of predictor variables in explaining the criterion variable to be established (provided a 'stepwise' approach is used). As with most statistical methods, it determines the statistical significance of the relationship. Regression identifies the amount of variation in satisfaction that is accounted by

the model and thereby offers a more objective, statistically driven approach. Lastly using a derived importance measure also has the advantage of only having to ask respondents to rate the attributes once; interview length is therefore considerably shorter. The main disadvantages Chu (2002) reports are that the level of explanation of the regression equation maybe low and multicollinearity may mean attributes are highly correlated with one another. However, this latter problems is readily overcome by application of the Ridge Regression method (Coshall 1993; Hoerl and Kennard 1979), which is available in the widely used SPSS statistical package.

#### 2.5.5 SERVQUAL Instrument

The services marketing literature has made significant progress exploring fundamental questions regarding service quality. One area that has received significant attention is the multidimensional nature of services. In a seminal research study, Parasuraman, Zeithaml, and Berry identified 10 dimensions of service quality - tangibles, reliability, responsiveness, competency, courtesy, communication, credibility, security, access, and understanding, based upon a series of focus group studies. From that initial research, Parasuraman, Zeithaml, and Berry developed a service quality instrument called SERVQUAL, which evaluated consumer perceptions of services. Factor analysis of consumer responses to SERVQUAL resulted in a conclusion that there are 5 key dimensions of service quality.

The five SERVQUAL dimensions:

- (1) Tangibles: Appearance of physical facilities, equipment, personnel, and communication materials

- (2) Reliability: Ability to perform the promised service dependably and accurately
- (3) Responsiveness: Willingness to help customers and provide prompt service
- (4) Assurance: Knowledge and courtesy of employees and their ability to convey trust and confidence
- (5) Empathy: Caring, individualized attention the firm provides its customers

The service-quality-gap model

Gap analysis, as displayed on the graph below, indicates where satisfaction lags behind importance and where satisfaction exceeds the importance on each attribute:

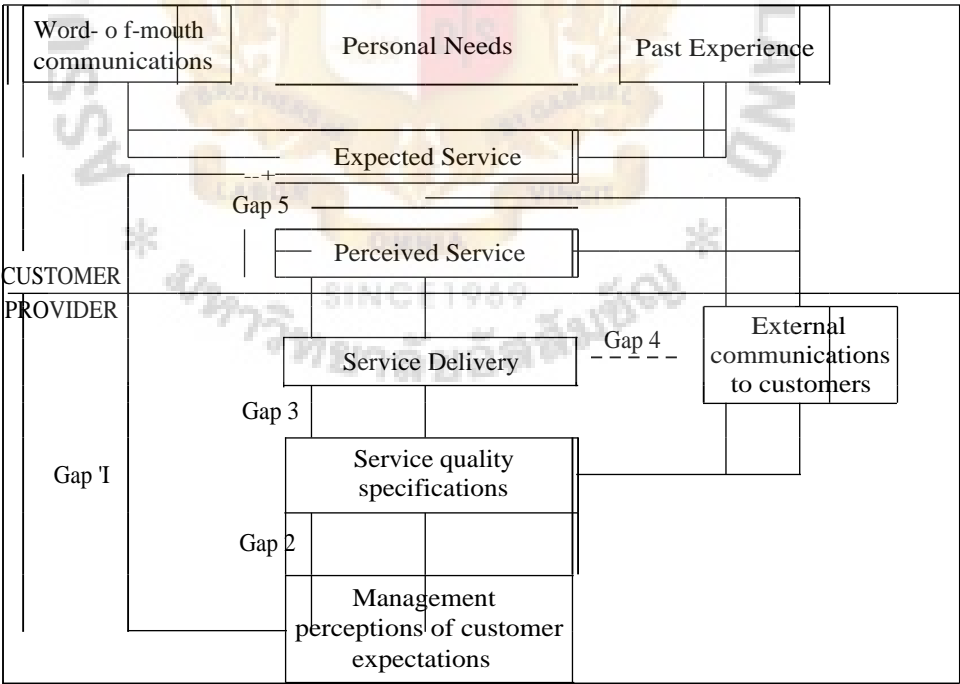


Figure 2.5. The Service-Quality-Gap Model.

Gap1, the discrepancy between customers' expectations and managements' perceptions of those expectations; Gap2, the discrepancy between managements' perceptions of customers' expectations and service quality specifications; Gap3, the discrepancy between service-quality specifications and actual service delivery; Gap4, the discrepancy between actual service delivery and what is communicated to customers about it. Then Gap5, customer-perceived quality shortfalls, are linked to these four gaps in the form of a conceptual model of service quality. The conceptual model serves as a concise framework for understanding, measuring, and improving service quality.

The various gaps discussed thus far are the key ingredients in a recipe for gaining a good understanding of service quality and its determinants. Figure 2.5 shows how these ingredients can be combined to parsimoniously portray the provider's and customer's sides of the service-quality equation and the linkage between the two. The conceptual model in Figure 2.5 conveys a clear message to managers wishing to improve quality of service: the key to closing Gap5 is to close Gaps1 through 4 and keep them closed. To the extent that one or more of Gaps1 through 4 exist, customers perceive service-quality shortfalls. The conceptual model also implies a logical process which companies can employ to measure and improve quality of service.

### III. RESEARCH METHODOLOGY

#### 3.1 Research Design

One objective of this research is to improve service quality that means customer satisfaction measurement is applied on this research. Customer satisfaction measurement study is based on the same basic methods of the marketing research (e.g., survey research, multivariate data analysis). There are three basic research methods: survey, observation, and experiment. According to the research process, research design is the plan to be followed to answer the research objectives or hypotheses. The researcher applied causal studies to investigate whether what variables causes or determines the value of customer satisfaction.

A variable is simply a symbol or concept that can assume any one of a set of values. There are two types of variables that are:

- (1) Dependent variable is a variable expected to be predicted or explained. A symbol or concept expected to be explained or caused by the independent variable.
- (2) Independent variable is a variable in an experiment that the researcher can, to some extent, manipulate, change, or alter. An independent variable is expected to influence the dependent variable.

This project identifies the factors influencing customer satisfaction on call center of MEA. According to the study, researcher categorizes independent variables into 3 categories, personnel factors, utility service factors, and call center service factors. Each category will be divided into many factors as shown as diagram in Figure 3.1,

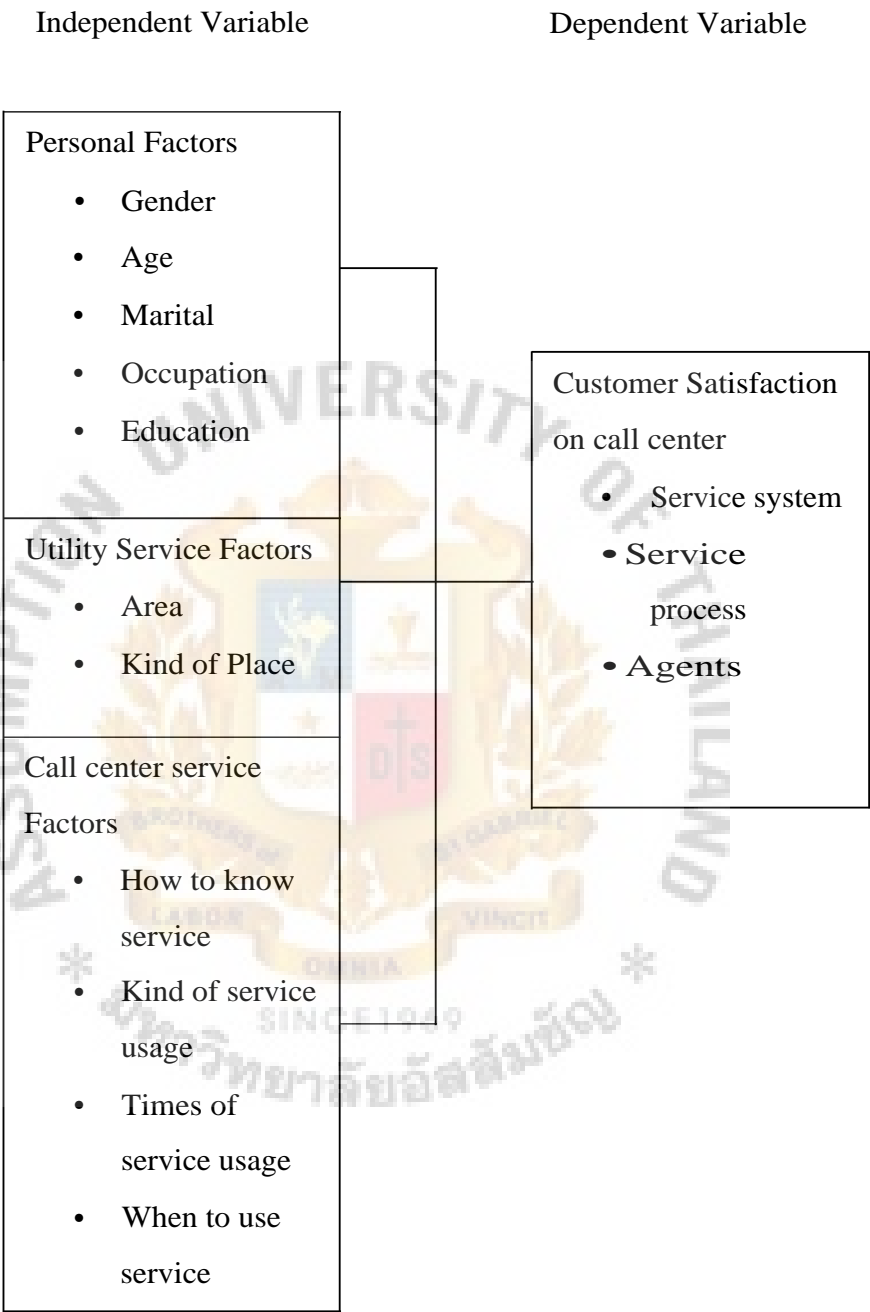


Figure3.1. Relationship between Independent Variables and Dependent Variables.

Survey research is basic research method that the researcher chose to collect the data. Survey research involves an interviewer (except in mail surveys) interacting with respondents to obtain facts, opinions, and attitudes. A questionnaire is used to provide an orderly and structured approach to data gathering. The researcher distributed the questionnaires in a shopping mall and business offices. According to the project focus on residential customer category that is the highest quantity of MEA customers, as shown in the diagram of customer use call center, as shown in Figure 3.2 below.



Figure 3.2. The MEA Customer Classifications.

### 3.2 Questionnaire Design

To design self-administration questionnaire, the questionnaire must be very explicit and usually rather short. The questionnaire of this survey consists of 5 parts.



3.2.1 Part I

**Personal Information:** In this part the questions are about personal information of each customer, such as, gender, age, married status, occupation, education, area of service, kind of residence. There are 7 questions in this part.

3.2.2 Part II

**Information of knowing of call center services,** in this part questions are for classifying the respondents. The questionnaires will terminate in this part for the one who has never known and used service. There are 4 questions.

3.2.3 Part III

**Information of making use of call center services,** in this part questions are related to how the respondents know the call center service and how they use it. There are 4 questions.

3.2.4 Part IV

**Customer Satisfaction on call center;** in this part questions are focused on customer satisfaction level on call center service. There are 15 questions of 3 service categories:

- |     |                        |   |           |
|-----|------------------------|---|-----------|
| (1) | Service System         | 7 | questions |
| (2) | Service of call center | 4 | questions |
| (3) | Agents                 | 4 | questions |

The satisfaction questions in this part are designed in response format of the Likert scaling method (Likert, 1932). The quality of the service can also be indexed by the strength of response toward each satisfaction item. The Likert-type format is designed to allow customers to respond in varying degrees to each item that describes the service. The low end represents a negative response while the high end represents a positive response, as shown in Table 3.1.

3.2.5 Part IV

Opinion and Suggestion about call center service, in this part questions are 3 open-ended questions to fill the opinion of the respondent about service and improvement.

Table 3.1. The 5 levels Likert Scaling of Customer Satisfaction.

Scale	Level of customer satisfaction
5	Very Satisfied
4	Satisfied
3	Neither Satisfied nor Dissatisfied
2	Dissatisfied
1	Very Dissatisfied

3.3 Sampling Process

3.3.1 Population

The population or population of interest is the total group of people from whom we need to obtain information. In this case, the researcher defined the population of interest as the residential customers. The residential customer of MEA in year 2003 is 1,899,119 (January 2003). It is 82 percentages of all MEA customers.

3.3.2 Sampling Method

The next step in the process involves the selection of a sampling method. The selection of a particular sampling method will depend on the objectives of the study, the financial resources available, time limitations, and the mature of the

problem under investigation. The major alternative sampling methods can be grouped under two headings: probability sampling methods and nonprobability sampling methods. Probability samples are samples in which every element of the population has a known, nonzero probability of selection. Nonprobability samples are samples that include the selection of specific elements from the population in a nonrandom manner.

As there are limitations of the project that the researcher has, such as time, human assistance and money, so the researcher cannot ask the customers who call directly to the call center. The researcher used the nonprobability sampling method. Nonprobability is the probability of any particular member of the population being chosen who are unknown. The selection of sampling units in nonprobability sampling is quite arbitrary. There are several kinds of nonprobability samples, as shown on the diagram in Figure 3.3. The researcher selected to use the convenience samples, samples used primarily for reasons of convenience. This method is suitable for general research that is to survey the attitude and factors that are not specific problems.

### 3.3.3 Sample Size

The sample size can be found by the formula of Yamane:

$$n = \frac{N}{1 + Ne^2}$$

where  $n$  = the size of group to take samples from

$e$  = tolerance of sampling error

$N$  = total population

Following the population of this project, the population of interest is 1,899,119 and assumes  $e$ , tolerance of sampling error, 5 %.

Then

$$n = \frac{1,899,119}{(1 + 1,899,119 \times 0.05^2)}$$

$$399.92$$

$$400$$

Based on this calculation, a sample size of 400 is necessary to meet the requirements outlined. No need for adjustment in sample size, one rule of thump suggests that we need to make an adjustment in the sample size if the sample size is more than 5 percent of the size of the total population.

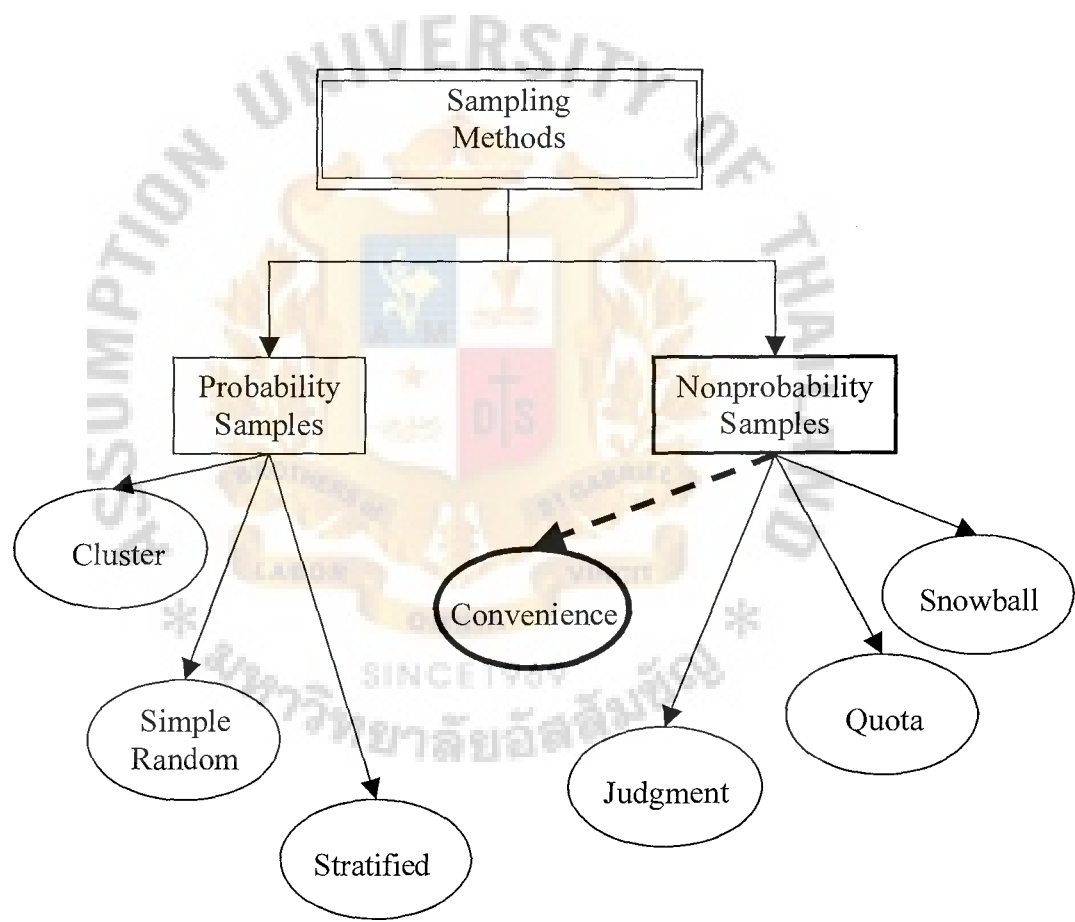


Figure 3.3. Sampling Method.

### 3.4 Research Instrument and Data Collection

There are many ways to survey and gather data, such as in-person, telephone, mail, self-administration. In the case of customer satisfaction survey, the researcher used the self-administration questionnaire as research instrument for this project. The data is collected from questionnaire survey with the 400 samples. The researcher made the survey in the place where the respondents mostly spend their time. The researcher found that the shopping mall and the business office were places that most of people in Bangkok spent their time. And the other reason for this survey place is the limit of time that the researcher was not be able to make the survey during the office-hours. The researcher made the survey in the shopping malls on weekends and after office-hours. Some of the questionnaires were made in the business offices where the researcher asked for officers in that place to distribute them.

### 3.5 Data Analysis

The researcher used the Statistical Package for the Social Sciences (SPSS) program to analyze the data. The steps in the analysis of data are as follows:

- (1) The data of the personal information of the respondents is analyzed by tabulation analysis.
- (2) The data that influenced in customer satisfaction is analyzed by the multivariate analysis. The term multivariate analysis is used to refer to a group of statistical procedures that simultaneously analyze multiple measurements on each individual or object being studied. According to the variables of this project, there are more than two variable. The multiple regression analysis is the appropriate multivariate technique for the survey examining the relationship between many independent variables and one

criterion variable (customer satisfaction). The general equation for multiple regression is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_nX_n$$

Where  $Y$  = dependent variable

$a$  = estimated constant

$b_1, b_2, \dots, b_n$  = coefficients associated with the independent variables so that a change of one unit in  $X$  will cause a change of  $b_i$  units in  $Y$ ; the values for the coefficients are estimated from the regression analysis

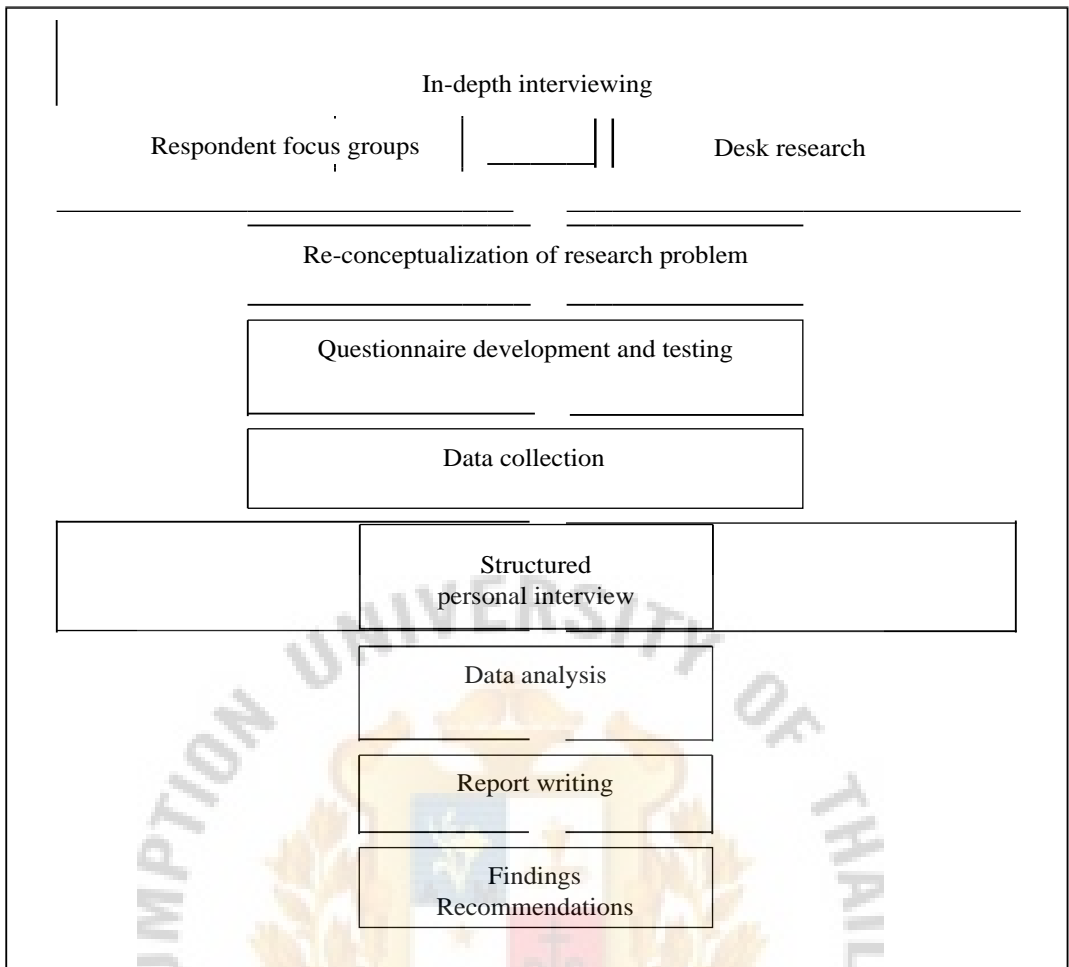
$X_1, X_2, \dots, X_n$  = independent variables that influence the dependent variable

### 3.6 Research Process

The concept of using service quality to measure the performance of the MEA call center is due to the acknowledgment that its service performance can be determined by the perception of customers. This case study is designed to understand and track residential customers' attitudes towards the service of the MEA call center. The following approach was used for this study to ensure that the results were both reliable and valid. The research model consisted of four major phases. These phases have been illustrated in Figure 3.3.

Figure 3.3 gives an overview of the research process used for the purposes of this study. The process was divided into four phases, namely:

- (1) Phase 1: Qualitative exploratory research.
- (2) Phase 2: Problem re-conceptualization and questionnaire development
- (3) Phase 3: Sampling and quantitative data collection
- (4) Phase 4: Analysis reporting



*Source: Access Market International working document*

Figure 3.4. Research Methodology Process.

### 3.7 Reliability Test

In order to test the reliability of the questionnaire before doing the data analysis, 30 questionnaires were randomly selected to test the Alpha. By using SPSS to calculate the Alpha, the Alpha of the pre-test came out with 0.744 as shown in Appendix C, which is acceptable, as it is a lot greater than 0.5 and also closer to 1. Therefore, after key in the rest of the questionnaires, the next step of analyzing was starting to be continued. The Alpha of the actual sample was 0.757 as shown in Appendix C.



#### IV. DISCUSSION ON THE FINDINGS

This research is studying the customer satisfaction on the MEA Call Center. The researcher distributes 400 questionnaires to respondents in June 2004. The researcher distributed the questionnaires by random. The program SPSS version 12 is used to analyze the data in this survey. The result of data collection of this survey will be discussed into three parts as described below:

- (a) The general data analysis. The data of the respondents in the questionnaires part I, II, and III will be analyzed and shown the report in this part.
- (b) The factors on the customer satisfaction. According to the study, researcher categorizes independent variables into 3 categories, personnel factors, utility service factors, and call center service factors.
- (c) The analysis by regression method.

##### 4.1 The General Data of the MEA's Residential Customers

The general data is divided into three variations:

- (1) Personal data of the respondents. In the beginning of the questionnaires the personal questions such as, Gender, Age, Status, Occupation, and Education, are asked. The personal factors were analyzed by descriptive statistics method. The sample size was 400 respondents. The results of the personal factors are shown in Table 4.1.

Table 4.1. The Percentages of the Personal Factors of the Respondents (N=400).

Personal Factors	Number of items	Percentages (%)
1. Gender		
Male	218	54.5
Female	182	45.5
2. Age (year)		
less than 21	9	2.3
21-30	187	46.8
31-40	131	32.8
41-50	65	16.3
51-60	8	2.0
3. Marital status		
Single	219	54.8
Married	156	39.0
Widow	9	2.3
Separated	16	4.0
4. Occupation		
Government officer	33	8.3
State enterprise officer	47	11.8
Private employee	231	57.8
Own Business	47	11.8
Housewife/ Retirement	13	3.3
Others	29	7.3
5. Highest education		
Primary school	4	1.0
Junior high school	24	6.0
High school	55	13.8
Diploma	109	27.3
Bachelor degree	199	49.8
Higher	9	2.3

According to the information in Table 4.1, the male respondents (54.5%) are more than female respondents (45.5%).

In terms of Age factors, most of the respondents are aged in the range of 21-30 years; it is 46.8% of all samples. The next is the range of 31-40 years; it is 32.8% of all samples. The range of 41-50 years is 16.3% and the range of less than 21 years is 2.3% of all samples. The range of 51-60 years is the minimum; it is 2% of all samples.

In terms of Marital status, most of the respondents are single; it is 54.8% of all samples. The next is 39% of all samples; the respondents are married. The separated respondents are 4% of all samples. The minimum, 2.3% of all samples, is the widow status.

In terms of Occupation, most of the respondents work as private employees; it is 57.8% of all samples. The next is 11.8%, the state enterprise officers and own business are in the same level of quantity. The respondents who work as government officers are 8.3% of all samples. The other group (student) are 7.3% of all samples. The minimum number of respondents is 3.3% who work as housewives or are retired.

In terms of highest education, the bachelors degree group is the maximum; it is 49.8% of all samples. The next is the diploma group; it is 27.3% of all samples. The high school is 13.8%, the junior high school is 6%, and higher than bachelor degrees is 2.3% of all samples. The minimum is the primary school; it is 1% of all samples.

(2) Utility Service of the respondents. In the end of part 1 of the questionnaires the area of MEA service and kind of place are asked for this factors. The Utility Service Factors were analyzed by descriptive statistics method. The sample size was 400 respondents. The results of the personal factors are shown in Table 4.2.

Table 4.2. The Percentages of the Utility Service Factors of the Respondents (N=400).

Personal Factors	Number of items	Percentages (%)
1. Area of the MEA service		
Bangkok	284	71.0
Nonta buri	60	15.0
Samut Prakarn	56	14.0
2. Kind of place		
Single house	144	36.0
Commercial building	73	18.3
Condominium	125	31.3
Rental	41	10.3
Home office	11	2.8

According to the information in Table 4.2, most of the respondents have their places in Bangkok; it is 71% of all samples. Nonta Buri and Samut Prakarn are 15% and 14% respectively.

The kind of place that the respondents live in or are served the electricity by the MEA, the maximum level is the single house; it is 36%. The next is, not quite different, condominium; it is 31.3% of all samples. The commercial building is 18.3%, the rental is 10.3%, and the home office is 2.8% of all samples. The minimum is other (gas station), only 1.5%.

(3) Call center service. The researcher used these factors to describe the manner of the respondents that related to how they know the MEA call center service, how they contact to the MEA, what service they use the service, how many time they use the service, and what time of service used.

In this part, the respondents are separated into 2 groups, the former is the respondents who know the MEA call center; 75.3% of all samples, the latter is the respondents who don't know the MEA call center; 24.8% of all samples, as shown the details in Table D-8 in appendix D.

In the group of respondents who know the MEA call center; there are 301 respondents. Only 55 respondents have used the service of the MEA call center; it is 13.8% of all samples as shown in Table D-9 in appendix D.

Since some of the respondents know the service of the MEA call center, so the researcher will describe the Call center service Factors into 2 perspectives. The first view focuses on the respondents who know the service but have never used the service. This show how good of the media of the MEA call center. Table 4.3 shows the media that the respondents know the service.

According to data in Table 4.3, most of the respondents know the service of the MEA call center from the advise from MEA employees; it is 44.5% of the respondents who know the service. The next is the advise from others; it is 35.5%. The handbill is 9% and the advertisement is 6.6%. The poster and others are only 3.7% and 0.9%.

Table 4.3. The Percentages of the Respondents who know the service but have never used the service(N=301).

Personal Factors	Number of items	Percentages (%)
Media that the respondents know the service		
Advise from others	107	35.5
Advise from MEA	134	44.5
Poster	11	3.7
Handbill	27	9.0
Advertisement	20	6.6
Others	2	.7

The second view focuses on the respondents who know the service and have used the service. Only 55 respondents are the real targets of this survey. Because the MEA call center statistics shows only 10% of all customers who have used the service of the call center. Then this survey used the random method and found that only 13.8% of all samples have used the service of the MEA call center, as shown the details in Table D-9 in appendix D.

Because the small group of customers have used the service of the MEA call center. The 55 respondents should be analyzed again in the general data in the analysis of all samples. The general analysis is shown in Table 4.4 as below:

Table 4.4. The Percentages of the Personal Factors of the Caller Respondents (N=55).

Personal Factors	Number of items	Percentages (%)
1. Gender		
Male	40	72.7
Female	15	27.3

Table 4.4. The Percentages of the Personal Factors of the Caller Respondents (N=55). (Continued)

Personal Factors	Number of items	Percentages (%)
2. Age (year)		
less than 21	2	3.6
21-30	28	50.9
31-40	16	29.1
41-50	8	14.5
51-60	1	1.8
3. Marital status		
Single	30	54.5
Married	24	43.6
Widow	1	1.8
Separated	-	-
4. Occupation		
Government officer	2	3.6
State enterprise officer	4	7.3
Private employee	37	67.3
Own Business	4	7.3
Housewife/ Retirement	3	5.5
Others	5	9.1
5. Highest education		
Primary school	1	1.8
Junior high school	-	-
High school	5	9.1
Diploma	18	32.7
Bachelor degree	31	56.4
Higher	-	-



Table 4.4. The Percentages of the Personal Factors of the Caller Respondents (N=55). (Continued)

Personal Factors	Number of items	Percentages (%)
2. Age (year)		
less than 21	2	3.6
21-30	28	50.9
31-40	16	29.1
41-50	8	14.5
51-60	1	1.8
3. Marital status		
Single	30	54.5
Married	24	43.6
Widow	1	1.8
Separated	-	-
4. Occupation		
Government officer	2	3.6
State enterprise officer	4	7.3
Private employee	37	67.3
Own Business	4	7.3
Housewife/ Retirement	3	5.5
Others	5	9.1
5. Highest education		
Primary school	1	1.8
Junior high school	-	-
High school	5	9.1
Diploma	18	32.7
Bachelor degree	31	56.4
Higher	-	-

Table 4.4. The Percentages of the Personal Factors of the Caller Respondents (N=55). (Continued)

Personal Factors	Number of items	Percentages (%)
6. Area of the MEA service		
Bangkok	45	81.8
Nontaburi	6	10.9
SamutPrakarn	4	7.3
7. Kind of place		
Single house	18	32.7
Commercial building	11	20.0
Condominium	21	38.2
Rental	5	9.1
Home office	-	-
8. Media that the respondents know the service		
Advise from others	27	49.1
Advise from MEA	17	30.9
Poster	10	18.2
Handbill	1	1.8
Advertisement	-	-
Others	-	-

The second view of call center service factors is described in terms of "how to contact to MEA before knowing the call center? ", "Time to call the MEA call center", "Kind of the call center service", and "How many times of using the call center? ", as shown in Table 4.5.

According to Table 4.5, in term of how to contact to the MEA before using the call center, most respondents use telephone; it is 54.5%. The next is Contact direct by themselves, 14%. Contact direct by others is 5%. The Others (mail), Fax machine and Internet are not popular to use; they are only 3%, 2%, and 1%.

Table 4.5. The Percentages of the Call Center Service Factors of the Respondents (N=55).

Personal Factors	Number of items	Percentages (%)
1. How to contact to MEA before knowing call center services?		
Telephone	30	54.5
Fax machine	2	3.6
Internet	1	1.8
Direct by myself	14	25.5
Direct by others	5	9.1
Others	3	5.5
2. Time to call the MEA call center		
MEA office-hour	31	56.4
Others	24	43.6
3. Kind of the call center service		
Bill information	27	49.1
Outage information	16	29.1
Problems of MEA service	7	12.7
Electricity user information	1	1.8
Asking for advise for saving energy	2	3.6
Giving suggestion	2	3.6
4. How many times of using the call center?		
Mean		4.01818
Std. Deviation		3.015337
Minimum		1
Maximum		20

In terms of time to call the MEA call center, the respondents call the call center during office hours up to 56.4%. The others, 43.6%, contact to the call center out of range of office hour 07.30a.m. to 3.30p.m.

In terms of kind of the call center service, most of respondents use the service of bill information; it is 49.1%. The next is outage information; it is 29.1%. The problem of service is 12.7%. The asking for advise for saving energy is equal to giving suggestion at 3.6%. The minimum is electricity user information; it is only 1.8%.

The statistics of using the call center shows that the mean is 4.02 times. The maximum is 20 times, and the minimum is 1 time. The standard deviation is 3.02.

#### 4.2 The Factors on the Customer Satisfaction

In this part, the customer satisfaction is analyzed by the statistic method. The questionnaires in part 4 are analyzed by SPSS. The sample size is 55 because the researcher wants to focus to the respondents who have used the service of the MEA call center. The questions of evaluation the customer satisfaction are analyzed with the mean and standard deviation. The scales of satisfaction are described in Table 4.6.

Table 4.6. Scale of Satisfaction.

Range of Mean	The Level of Satisfaction
1.00-1.49	Very Low
1.50-2.49	Low
2.50-3.49	Medium
3.50-4.49	High
4.50-5.00	Very High

Table 4.7. The Customer Satisfaction on the Service of the MEA Call Center (N=55).

The customer satisfaction on each element of the call center service	Mean	S.D.	The Level of Satisfaction
1. Service system			
<b>Reliability</b>			
Accuracy of information.	3.418	0.6293	Medium
Clear answering from agents.	3.200	0.5578	Medium
Speed of service.	3.018	0.5608	Medium
<b>Modern and Development</b>			
Before call center established.	3.000	0.4714	Medium
After call center established.	3.473	0.6041	Medium
New development of service.	3.527	0.5039	High
<b>Public Relation</b>			
Public Relation of call center service.	3.291	0.5668	Medium
Total of Service System	3.275	0.3228	Medium
2. Service Process			
<b>Convenient of use</b>			
More convenient and faster.	3.691	0.5045	High
More channels to contact to MEA.	3.782	0.4168	High
<b>Easy to use</b>			
Easy to dial to call center.	3.291	0.5668	Medium
Waiting time for answering.	3.055	0.5584	Medium
Total of Service Process	3.455	0.3505	Medium
3. Agents			
<b>Responsibility</b>			
Talk gently.	3.673	0.5462	High
Understand your questions clearly.	3.618	0.5267	High
<b>Skill in career</b>			
Willing to explain the answer.	3.527	0.5394	High
Searching data and advice skillfully.	3.418	0.5673	Medium
Total of Agent service	3.559	0.4461	High
<b>Total of Call Center Service</b>	<b>3.399</b>	<b>0.2593</b>	<b>Medium</b>

According to Table 4.6, the customer satisfaction on the service of the MEA call center is in Medium level (mean = 3.399, S.D. = 0.2593). Then analyzing into three categories; the service system, service process, and Agent.

The service system, the customer satisfaction is in Medium Level (mean = 3.275, S.D. = 0.3228).

The service process, the customer satisfaction is in Medium Level (mean = 3.455, S.D. = 0.3506).

The service system, the customer satisfaction is in High Level (mean = 3.559, S.D. = 0.4461).

Table 4.8. Comparison of the Customer Satisfaction on the Service of the MEA Call Center by Each Factor.

The factors	Mean	Number	S.D.	The Level of Satisfaction
<b>1. Gender</b>				
Male	3.440	40	0.2812	Medium
Female	3.289	15	0.1462	Medium
<b>2. Age</b>				
less than 21	3.333	2	0.0943	Medium
21-30	3.343	28	0.2300	Medium
31-40	3.492	16	0.3228	High
41-50	3.450	8	0.2189	Medium
51-60	3.200	1	0.0000	Medium
<b>3. Marital Status</b>				
Single	3.338	30	0.2207	Medium
Married	3.483	24	0.2871	Medium
Widow	3.200	1	0.0000	Medium
Separated	-	-	-	

Table 4.8. Comparison of the Customer Satisfaction on the Service of the MEA Call Center by Each Factor. (Continued)

The factors	Mean	Number	S.D.	The Level of Satisfaction
<b>4. Occupation</b>				
Government officer	3.500	2	0.1414	High
State enterprise officer	3.183	4	0.1478	Medium
Private employee	3.441	37	0.2755	Medium
Own Business	3.367	4	0.2582	Medium
Housewife/ Retirement	3.444	3	0.2143	Medium
Others	-	-	-	
<b>5. Highest Education</b>				
Primary school	3.2667	1	0.0000	Medium
Junior high school	-	-	-	
High school	3.6933	5	0.4044	High
Diploma	3.3259	18	0.2132	Medium
Bachelor degree	3.3978	31	0.2351	Medium
Higher degree	-	-	-	
<b>6. MEA area supported</b>				
Bangkok	3.4222	45	.25624	Medium
Nonta Buri	3.4222	6	.20512	Medium
Samut Prakarn	3.1000	4	.22111	Medium
<b>7. Kind of customer's place</b>				
Single house	3.4000	18	.20580	Medium
Commercial building	3.4909	11	.38096	High
Condominium	3.3175	21	.23181	Medium
Rental	3.5333	5	.12472	Medium
Home Office	-	-	-	
Others	-	-	-	

According to information in Table 4.7, the customer satisfaction can be described in each factor as below:

(1) Gender

Both "Male" and "Female" factors are not different on the service satisfaction of the call center. The satisfaction levels are Medium.

(2) Age

The range of 31-40 years is high level of the satisfaction on the call center service. The rest are medium level.

(3) Marital Status

The Marital status factor doesn't effect differently on the customer satisfaction on the service of the call center. There are no separated respondents who have ever used the service of the MEA call center in this survey. The customer satisfaction is medium by the Marital status factor.

(4) Occupation

The Government officer is high level of the satisfaction on the call center service. The State enterprise officer, Private employee, Own Business, and Housewife/ Retirement are medium level of the satisfaction on the call center service.

(5) Highest Education

The High school is high level of the satisfaction on the call center service. The Primary school, Diploma, and Bachelor degree are medium level of the satisfaction on the call center service. There are no Junior high school and Higher degree that have ever used the service of the MEA call center in this survey.



(6) MEA area supported

The MEA area factor doesn't affect differently on the customer satisfaction on the service of the call center. The customer satisfaction is medium in every area.

(7) Kind of customer's place

The Commercial building is high level of the satisfaction on the call center service. The Single House/Town House, Condominium/ Flat, Rental, Home Office are medium level of the satisfaction on the call center service.

#### 4.3 The Regression Analysis

The general equation for multiple regression is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_nX_n$$

Where

$Y$  = dependent variable

$a$  = estimated constant

$b_1, \dots, b_n$  = coefficients associated with the independent variables so that a change of one unit in  $X$  will cause a change of  $b_1$  units in  $Y$ ; the values for the coefficients are estimated from the regression analysis

$X_1, \dots, X_n$  = independent variables that influence the dependent variable

The regression method is used to make the analysis have visible effect of each indirect variable on the MEA call center customer satisfaction. There are three types of explanation for area variations on the customer satisfaction; Personal data, Utility Service, and Call center service. The Personal data is calculated to the equation first. The Personal data consists of Gender, Age, Status, Occupation, and Education. The next factor is Utility Service to be calculated by the second level of hierarchical

regression method. Then the Call center service is calculated. Because of the personal data has closer relation to the respondents than others.

#### 4.3.1 Adjusted Variable

According to the regression and correlation techniques, the independent and dependent variables are discussed to find the relationship. In this research, the most of the independent variables are ordinal. Thus the independent variables have to be adjusted to be dummy variables with nominal type, "0" and "1". The adjusted independent variables are divided into three factor groups: the personal factor, utility service, and call center service as show in Table E.1 in Appendix E. The researcher applied the SPSS option regression analysis to analyze the adjusted data.

#### 4.3.2 The Result

According to the result in Table 4.9, the result of Model 1 show that the personal factors have effect on the satisfaction. The Coefficient of Determination: R square, of the personal factors is 0.178. The R square of the utility service is 0.205, and the R square of the call center service is 0.353.

Table 4.9 shows the models for a multiple regression to explain the variation in the satisfaction level on the MEA call center. All variables were entered stepwise, with a 'probability index' value of 0.05. The first model with only the personal factors explains 17.8 percentage of the variation in the satisfaction. This increases to 20.5 percentage after adding utility service factors (model 2) and to 35.3 percentage after adding the call center service factors (model 3).

Table 4.9. Analysis of Variance Table at Reliability alpha = 0.05.

Model		Unstandardized Coefficients	Standardized Coefficients	
		B	Std. Error	Beta
1	(Constant)	3.367	.170	
	Gender	-.136	.078	-.236
	Age	.095	.098	.184
	Marital status	.083	.101	.161
	Occupation	.162	.118	.197
	Highest education	-.035	.071	-.067
2	(Constant)	3.481	.197	
	Gender	-.153	.082	-.266
	Age	.109	.102	.212
	Marital status	.075	.101	.145
	Occupation	.155	.118	.188
	Highest education	-.020	.072	-.039
	MEA area supported	-.048	.092	-.072
	Kind of place	-.040	.035	-.155
3	(Constant)	3.601	.216	
	Gender	-.064	.084	-.111
	Age	.030	.101	.057
	Marital status	.132	.099	.255
	Occupation	.166	.112	.202
	Highest education	-.009	.072	-.018
	MEA area supported	-.066	.089	-.099
	Kind of place	-.031	.034	-.121
	How do you know?	.182	.087	.283
	How many times have you used service?	-.040	.018	-.322
	What time did you call the call center?	-.084	.067	-.162
	What kind of service you use?	-.096	.093	-.155

Table 4.9. Analysis of Variance Table at Reliability alpha = 0.05. (Continued)

Note	Model 1	Model 2	Model 3
R square	0.178	0.205	0.353
R square Change	0.178	0.027	0.148
F	2.121	1.730	2.131
Sig.	0.79	0.125	0.038
Df	5	7	11

4.4 Hypothesis Test

- (1) The satisfaction of the MEA call center is in High level. The residential customers are satisfied on the service of the MEA call center.

Ho : The satisfaction score  $\geq 3.50$

H1 : The satisfaction score  $< 3.50$

According to mean of the satisfaction level is 3.3988, as shown in Table 4.6.

And the analysis, from T-test in Table 4.10 below, shows the Sig. (2-tailed) = 0.005 < 0.05. HO is refused means that the satisfaction on the MEA call center service is not High level.

Table 4.10. One-Sample T-Test.

	Test Value = 3.50					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Satisfaction	-2.895	54	.005	-.10121	-.1713	-.0311

- (2) The factors that affect the satisfaction of the MEA call center are the general factors, the utility service factors, and the call center factor.

Ho : There is no association between the general factors, the utility service factors, and the call center factor to the satisfaction.

H1 : There is an association between the general factors, the utility service factors, and the call center factor to the satisfaction.

In this part, the researcher uses the Analysis of Variance: ANOVA to analyze the factors of the customer satisfaction on the MEA call center. According to Table 4.9 show the ANOVA table at reliability  $\alpha = 0.05$ . The significant of the personal factors in model 1 analysis =  $0.079 > 0.05$  that means the personal factors don't affect the satisfaction on the MEA call center significantly. Consequently; the significant of the utility service factors entered in model 2 analysis =  $0.125 > 0.05$  that means the utility service factors don't affect the satisfaction on the MEA call center significantly. The significant of the call center service factors entered in model 3 analysis =  $0.038 < 0.05$  means the utility service factors affect the satisfaction on the MEA call center significantly.

#### 4.5 Discussion of the Research Findings

Following the discussion of the finding by using the SPSS program to analyze, the investigation focus on the three main factors that have the effect on the MEA call center service satisfaction.

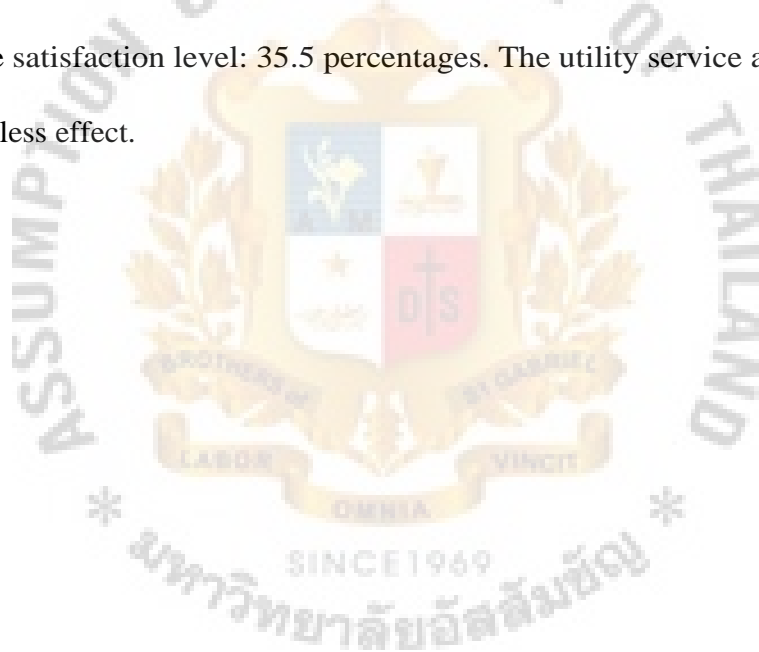
The satisfaction on the MEA call center service is studied by the hypothesis of the effect of the three main factors: the personal factor, the utility service, and the call center service. The satisfaction is divided into three categories: the service system, the service process, and the agent, to describe the relationship.

The sample size of this research is 400. The objective of the research is study the satisfaction on the service of call center. So that the questionnaires are designed to

screen the customers that have ever used the service of the call center. The results are only 55 respondents have used the service of the call center.

From the analysis by the SPSS program, the result of the research shows that all of three factors have the effect on the satisfaction of the call center service. The satisfaction on the service system and the service process are in Medium level. Except the satisfaction on the agent is in High level. So that the total satisfaction of the MEA call center service is in Medium level.

According to the regression analysis, the three main factors have relationship with the satisfaction level in the linear form. The call center service factors have significant effect on the satisfaction level: 35.5 percentages. The utility service and the personal factors have less effect.



## V. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

The MEA call center is a kind of service organization. The service of the MEA call center should be improved after establishing the systems. The SERVQUAL is the tool to measure service quality. The gap between expectation and actual service is measured along key service dimensions. These dimensions have been applied to service quality evaluations across many industries. In this survey the researcher informs the measurement of service quality debate by applying both SERVQUAL gap analysis and multinomial regression analysis for evaluating customer satisfaction and perceptions of the MEA call center service quality. The SERVQUAL dimensions are frequently used as the independent variables. As with most statistical methods, it determines the statistical significance of the relationship. Regression identifies the amount of variation in satisfaction that is accounted by the model and thereby offers a more objective, statistically driven approach.

This research studies the satisfaction on the MEA call center service by using the questionnaire as the instrument. The researcher uses the SPSS version 12 to analyze the result of the related factors on the satisfaction. There are many factors have effect on the satisfaction of the call center service. The descriptive statistics and the regression method are used to describe the relation between the Independent variables: the personal factors, utility service, and call center service factors, and the Dependent variables: the satisfaction on the call center service.

Following the discussion of the finding by using the SPSS program to analyze, the investigation focus on the three main factors that have the effect on the MEA call center service satisfaction.

The satisfaction on the MEA call center service is studied by the hypothesis of the effect of the three main factors: the personal factor, the utility service, and the call center service. The satisfaction is divided into three categories: the service system, the service process, and the agent, to describe the relationship.

The sample size of this research is 400. The objective of the research is to study the satisfaction on the service of call center. So that the questionnaires are designed to screen the customers that have ever used the service of the call center. The results are only 55 respondents have used the service of the call center.

The General Factor, there are more Males (54.5%) than Females (45.5%) in the sample group. In the group of the caller the range of age 21-30 years are the highest percentage at 50.9 %. The next higher is 29.1%, the range of 31-40 years. The range of 51-60 years is minimum at 1.8%. The marital status has no significant difference between single (54.5%) and married status (43.6%). Most of the caller respondents work for the private company, and has highest education at the bachelor degree (56.4%). The Utility Service Factor, the respondents at 81.8% live in Bangkok area and the condominium is the popular in the target group.

The Call Center Service Factor, the telephone channel is the popular way to contact for the service of the MEA. The respondents calling to the MEA call center service is not different between the office hours and out of the office hours. The bill information is used the most frequently, the next higher is outage information.

From the analysis by the SPSS program, the results of the research shows that all of three factors have effect on the satisfaction of the call center service. The satisfaction on the service system and the service process are in Medium level. Except the satisfaction on the agent is in High level. So that the total satisfaction of the MEA call center service is in Medium level.



## 5.2 Benefit from the Research Study

According to the result of the research, the satisfaction on the MEA call center service is in Medium level. This shows that the feedback from attitudes of the MEA customers want the MEA to improve the service. The research helps the MEA to focus on the factors that effect on the satisfaction. In addition, the data collecting of the questionnaires, the poor satisfaction on the MEA call center service should be developed in the items below:

- (1) Service system. The reliability and public relation should be improved because the satisfaction is in the medium level. The MEA should improve the public relation about the service of the call center. There are 75.25 percentages of all respondents who know about the service of the call center and only 13.75 percentage of all respondents have ever used the service of the call center.
- (2) Easy to use. In the view of service process, the easy to use is in medium level of satisfaction. This shows that customers want the MEA to improve waiting time and dial process.
- (3) From the part 5 of the questionnaire, the opened-end questions are asking for the suggestion of the service and the results are shown as below:
  - (a) Lack of wide public relations. Many customers don't know the use of the call center. The MEA should inform the customers about the use of the call center in more channels such as by Internet, newspaper, television, and radio more frequently.
  - (b) Long call waiting time. The MEA should increase the phone line.

- (c) The database of the service is not enough to support the questions of the customers. The MEA should develop the database to be update all the time and related to the customer needs.
- (d) The automatic answering system is too long to wait for. The customers have to wait for the agent to answer. The MEA should consider to the period of the automatic answering system.
- (e) There are many errors while using the automatic answering system.
- (f) The agent should give more advise in the related case to make clearer answer and should answer in slower speed.

### 5.3 Recommendations

This research uses the questionnaire as the research instrument. The limited research affected the reliability of the research. The questionnaires were distributed by random. So only 55 respondents from the sample size of 400 respondents are the real respondents that the researcher focuses. The objectives of the research are to survey the residential customer satisfaction on the Mea call center but the respondents that have ever used the service is 13.75 percentages. This causes the survey less reliability.

For the better result of the study, the survey of the MEA call center should focus on the respondents that use the service. The data collection should be made by distributing to the people who call to the call center at the head office of the MEA. By this method of the distributing questionnaire, the sample size will be at reasonable quantity. Anyway, the result of this research can show the effect of the factors on the satisfaction of the MEA call center significantly.

The result of the general factor can be described the target group of the call center service. The new generations are the target group because the phone call is one of the new technologies. The old generations are familiar with a kind of old counter service.

They like to contact to the officer by using the technology to help the faster and more convenient service.

According to the result of the research, the better way to increase the quantities of the cell center customers is to give more information to the old generation. The service should be improved in the perspective of service process: waiting time, the procedure to contact to the call center service.

#### **5.4 Future Study**

The results of this study show that the service of the MEA call center should be improved in many areas, the next thing the MEA should do is the survey how to improve its service. The MEA should study how to increase the satisfaction on each poor factor to get the correct improvement with the efficiency and effectively investment. The technology of call center change very fast nowadays. And the circumstance in any business forces the company to try to keep their customers to maintain their position on the market.

The utility business is one of other that has to change the organization management to compete in the modern business. In the near future, the utility business will have a big change. The Oligopoly business will be changed to be Power Pool business. The MEA should build its image of the beginner and the leader in the market. The survey is the important tool to measure the service quality that is the core of the business.



## APPENDIX A

### QUESTIONNAIRE (ENGLISH VERSION)

## Questionnaire

### Residential Customer Satisfaction Survey on Call Center of Metropolitan Electricity Authority, MEA

Note:

1. The research is a part of studying Master Degree of Computer Engineering Management, Assumption University.
2. The objective of this questionnaire is to study the factors that influence on customer satisfaction on call center service of MEA for the purpose of improving service.
3. The Questionnaire consists of 5 parts:

Part I	Personal Information
	Total 7 questions
Part II	Information of knowing call center services
	* Total 4 questions *
Part III	Information of making use of call center services
	Total 4 questions
Part IV	Customer Satisfaction on the call center
	Total 15 questions
Part V	Opinion and Suggestion about call center service.
	Total 3 questions
3. Please answer all questions in reality.

Please mark intoll and fill in your actual status in the blank.

- 70

Part II Information of knowing call center services

1. Do you know the MEA call center 1130 ? (If the answer is 'No' please go to question no.4, and terminate the questionnaire. Thank you for your attention.)

- ☐ Yes
- ☐ No

2. How do you know information of call center services?

- ☐ Advice from other people
- ☐ Advice from MEA employees
- ☐ Poster
- ☐ Handbill
- ☐ Advertisement media, the press, radio, television
- ☐ Others(specify) .....

3. Have you dialed the call center? (If the answer is 'No' please go to question no.4, and terminate the questionnaire. Thank you for your attention.)

- ☐ Yes
- ☐ No

4. Any suggestion for improving public relation of the call center?

Part III Information of making use of call center services

1. How did you contact to MEA before you knew call center services?

- ☐ Telephone
- ☐ Fax machine
- ☐ Internet
- ☐ Direct contact by myself
- ☐ Direct contact by other person.....
- ☐ Others(specify) .....

2. How many times have you dialed to the call center? ..... times  
(from January 2003 to now)

3. What time did you call the call center?

- ☐ MEA office-hour ( 07.30am. — 03.30pm.)
- ☐ Others(specify) .....

4. What kind of service that you use from call center mostly?

- ☐ Bill Information and Power Charge Rate
- ☐ Outage Information
- ☐ Problems of MEA services
- ☐ Electricity User Information
- ☐ Asking for advice of using save and efficiency electricity
- ☐ Asking for complete electricity services
- ☐ Listening to other opinions on MEA service and giving suggestion
- ☐ Giving public information
- ☐ Others(specify) .....



Part IV Customer Satisfaction on the call center

Please read the statement below and circle the number that you choose.

No	Topics	Very Satisfied	Satisfied	Neither Satisfied nor Dissatisfied	Dissatisfied	Very Dissatisfied
1. Service system						
	Accuracy of information					
	Clear answering from agents					
	Speed of service					
	Before call center established, are you satisfied on MEA service? If not, please specify .....					
	After call center established, are you satisfied on MEA service? If not, please specify .....					
	Are you satisfied on new development of service under concept of call center?					
	Public Relation of call center service					
2. Service Process						
	Using call center service is more convenient and faster than direct contact			*		
	More channels to contact to MEA.					
	Easy to dial to call center.					
	Reasonable waiting time for answering phone line.					
3. Agents						
	Agents talk gently.					
	Agents understand your questions clearly.					
	Agents explain your questions willingly.					
	Agents search data and give you advice skillfully.					

Part V Opinion and Suggestion about call center service.

1. Which benefits or services make you most satisfied?

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2. Which benefits or services make you most unsatisfied?

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3. Any suggestion for improving call center services?

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## APPENDIX B

### QUESTIONNAIRE (THAI VERSION)

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APPENDIX C  
RELIABILITY TEST

RELIABILITY TEST

Method 1 (space saver) will be used for this analysis. That is, the covariance matrix is not calculated or used in the analysis. Reliability Analysis — Scale (Alpha)

(1) Reliability Coefficients for pre-test

N of Cases = 30

N of Items = 15

Alpha = 0.744

Table C.1. Scale Statistics for reliability pre-test.

Mean	Variance	Std. Deviation	N of Items
50.400	12.938	3.5969	15

(2) Reliability Coefficients for the actual sample

N of Cases = 400

N of Items = 15

Alpha = 0.757

Table C.2. Scale Statistics for reliability pre-test.

Mean	Variance	Std. Deviation	N of Items
50.982	15.129	3.8896	15

Table C.3. Case Processing Summary.

		N	%
Cases	Valid	55	13.8
	Excluded(a)	345	86.3
	Total	400	100.0

(a) Listwise deletion based on all variables in the procedure.



## APPENDIX D

### DATA ANALYSIS BY SPSS

DATA ANALYSIS BY SPSS

(1) Personal General Factors

Table D.1. Personal General Factors "Gender".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	218	54.5	54.5	54.5
Female	182	45.5	45.5	100.0
Total	400	100.0	100.0	

Table D.2. Personal General Factors "Age".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid less than 21	9	2.3	2.3	2.3
21-30	187	46.8	46.8	49.0
31-40	131	32.8	32.8	81.8
41-50	65	16.3	16.3	98.0
51-60	8	2.0	2.0	100.0
Total	400	100.0	100.0	

Table D.3. Personal General Factors "Marital status".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Single	219	54.8	54.8	54.8
Married	156	39.0	39.0	93.8
Widow	9	2.3	2.3	96.0
Separated	16	4.0	4.0	100.0
Total	400	100.0	100.0	

Table D.4. Personal General Factors "Occupation".

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government officer	33	8.3	8.3	8.3
	State enterprise officer	47	11.8	11.8	20.0
	Private employee	231	57.8	57.8	77.8
	Own Business	47	11.8	11.8	89.5
	Housewife/ Retirement	13	3.3	3.3	92.8
	Others	29	7.3	7.3	100.0
Total		400	100.0	100.0	

Table D.5. Personal General Factors "Highest education".

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary school	4	1.0	1.0	1.0
	Junior high school	24	6.0	6.0	7.0
	High school	55	13.8	13.8	20.8
	Diploma	109	27.3	27.3	48.0
	Bachelor degree	199	49.8	49.8	97.8
	Higher	9	2.3	2.3	100.0
Total		400	100.0	100.0	

(2) Utility Service Factors

Table D.6. Utility Service Factors "Area of the MEA Service".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid <b>Bangkok</b>	284	71.0	71.0	71.0
Nonta buri	60	15.0	15.0	86.0
Samut Prakarn	56	14.0	14.0	100.0
<b>Total</b>	400	100.0	100.0	

Table D.7. Personal General Factors "Kind of place".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Single house	144	36.0	36.0	36.0
Commercial building	73	18.3	18.3	54.3
Condominium	125	31.3	31.3	85.5
Rental	41	10.3	10.3	95.8
Home office	11	2.8	2.8	98.5
Others	6	1.5	1.5	100.0
<b>Total</b>	400	100.0	100.0	

(3) Call Center Service Factors.

Table D.8. Call Center Service Factors "Know the Service of the MEA Call Center?".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	301	75.3	75.3	75.3
No	99	24.8	24.8	<b>100.0</b>
<b>Total</b>	400	100.0	100.0	

Table D.9. Call Center Service Factors "Ever use the Service of the MEA Call Center?".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid    Yes	55	13.8	18.3	18.3
No	246	61.5	81.7	100.0
Total	301	75.3	100.0	
Missing   System	99	24.8		
Total	400	100.0		

Table D.10. Call Center Service Factors "the media the respondents know the Service?".

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid    Advise from others	107	26.8	35.5	35.5
Advise from MEA	134	33.5	44.5	80.1
Poster	11	2.8	3.7	83.7
Handbill	27	6.8	9.0	92.7
Advertisement	20	5.0	6.6	99.3
Others	2	.5	.7	100.0
Total	301	75.3	100.0	
Missing   System	99	24.8		
Total	400	100.0		



Table D.11. Call Center Service Factors "how to contact to MEA before knowing the Call Center?".

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Telephone	30	7.5	54.5	54.5
	Fax machine	2	.5	3.6	58.2
	Internet	1	.3	1.8	60.0
	Direct by myself	14	3.5	25.5	85.5
	Direct by others	5	1.3	9.1	94.5
	Others	3	.8	5.5	100.0
Total		55	13.8	100.0	
Missing	System	345	86.3		
Total		400	100.0		

Table D.12. Call Center Service Factors "Time to call the MEA Call Center".

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MEA office-hour	31	7.8	56.4	56.4
	Others	24	6.0	43.6	100.0
Total		55	13.8	100.0	
Missing	System	345	86.3		
Total		400	100.0		

Table D.13. Call Center Service Factors "How many times of using the Call Center?".

N	Valid	55
	Missing	345
Mean		4.01818
Std. Deviation		3.015337
Minimum		1.000
Maximum		20.000

Table D.14. Call Center Service Factors "Kind of the Call Center Service".

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bill information	27	6.8	49.1	49.1
	Outage information	16	4.0	29.1	78.2
	Problems of MEA Service	7	1.8	12.7	90.9
	Electricity user information	1	.3	1.8	92.7
	Asking for advise for saving energy	2	.5	3.6	96.4
	Giving suggestion	2	.5	3.6	100.0
	Total	55	13.8	100.0	
Missing	System	345	86.3		
Total		400	100.0		

Model	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson
			R Square Change	7:3	7:3	7:3	
1	.717	.24682	.717	.717	.717	.717	
2	.717	.24682	.717	.717	.717	.717	
3	.717	.24682	.717	.717	.717	.717	

Model	Sum of Squares	Adjusted R Square	Std. Error of the Estimate	R Square Change	7:3	7:3	7:3	Durbin-Watson
1	1.000	.717	.24682	.717	.717	.717	.717	
2	1.000	.717	.24682	.717	.717	.717	.717	
3	1.000	.717	.24682	.717	.717	.717	.717	



Unstandardized Coefficients			Standardized Coefficients		Correlations		Collinearity		
B		Std. Error	Beta	t	Partial	Zero-order	Partial	Tolerance	VIF
Constant	10.000	1.000		10.000					
Age	0.500	0.100	0.500	5.000	0.500	0.500	0.500	0.500	2.000
Gender	0.200	0.100	0.200	2.000	0.200	0.200	0.200	0.200	1.500
Marital Status	0.100	0.100	0.100	1.000	0.100	0.100	0.100	0.100	1.100
Income	0.300	0.100	0.300	3.000	0.300	0.300	0.300	0.300	1.300
Education	0.400	0.100	0.400	4.000	0.400	0.400	0.400	0.400	1.400
Occupation	0.200	0.100	0.200	2.000	0.200	0.200	0.200	0.200	1.200
Health	0.100	0.100	0.100	1.000	0.100	0.100	0.100	0.100	1.100
Religion	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Political Affiliation	0.100	0.100	0.100	1.000	0.100	0.100	0.100	0.100	1.100



## APPENDIX E

### ADJUSTED VARIABLE

Table E.1. The Adjusted Variables.

Variables		Value	Description
Independent	Gender	0	Male
		1	Female
	Age	0	Less than 31
		1	31 and above
	Marital status	0	Single
		1	Others
	Occupation	0	Government officer/ State enterprise officer
		1	Others
	Highest education	0	Lower than Bachelor Degree
		1	Bachelor or Higher Degree
	MEA area supported	0	Bangkok
		1	Others
	Kind of place	0	Single House/Town House, Condominium/ Flat
		1	Commercial Building, Rental, Others
	How do you know?	0	Advise by person
		1	Not person
	How many times have you used service?	Scale	
	What time did you call the call center?	0	During 07.30am. — 3.30pm.
		1	Others
	What kind of service you use?	0	Bill Information and Power Charge Rate /Outage Information
		1	Others
Dependent	Satisfaction	Scale	Total satisfaction on the MEA call center service

## BIBLIOGRAPHY

1. Andaleeb. S. (1998), " Determinants of customer satisfaction with hospitals: a managerial model". *International Journal of Health Care Quality Assurance*, Vol. 11, No.6, pp. 181-187.
2. Angur, M., Nataraaj an, R. and Jahera, J.S. (1999), "Service quality in the banking industry: an assessment in a developing economy", *The International Journal of Bank Marketing*, Vol. 17, No. 3, pp. 116-125
3. Avkiran, N.K. (1999), "Quality customer service demands human contact", *The International Journal of Bank Marketing*, Vol. 17, No. 2, pp. 61-74.
4. Bebeko, C. P. (2000), "Service intangibility and its impact on consumer expectations of service quality", *Journal of Services Marketing*, Vol.14, No. 1, pp.9-26.
5. Bojanic, D. C. and Rosen, L. D. (1993), "Measuring service quality in restaurants: An application of SERVQUAL Instrument", *Hospitality Research Journal*, Vol. 18, pp. 3-14.
6. Bolton, R. N. and Drew, J. H. (1994), "Linking customer satisfaction to service operations and outcomes", in Rust R. T. and Oliver, R. L. (Eds.) *Service Quality: New Directions in Theory and Practice*, Sage, California, pp. 173-200.
7. Bouman, M. and van der Wiele, T. (1993), "Measuring service quality in the car service industry: building and testing an instrument", *International Journal of Service Industry Management*, Vol. 3, No. 4, pp. 4-16.
8. Buttle, F. (1996), *SERVQUAL: review, critique, research agenda*", *European Journal of Marketing*, Vol. 30, No. 1, pp. 8-32.
9. Camtan, J. M.(1990), "Customer perceptions of service quality: an assessment of the SERVQUAL dimensions", *Journal of Retailing*, Vol. 66, pp. 35-55.
10. Caruana, A., Money, A. H. and Berthon, P.R. (2000), " Service quality and satisfaction — the moderating role of value", *European Journal of Marketing*, Vol.34, No. 11/12, pp. 1338-53.
11. Chang, D. and Lim, S. B. (2002), "Measuring airline's service quality: SERVQUAL or SERVPERF?", *Decision Sciences Institute 2002 Annual Meeting Proceedings*, pp. 2137-42.
12. Chu, R. (2002), "Stated-importance versus derives-importance customer satisfaction measurement", *Journal of Services Marketing*, Vol. 16, No. 4, pp. 285-301



13. Coshall, J T. (1993), An illustration of ridge regression using agricultural data, Discussion Papers in Business Economics, 9, University of North London.
14. Cronin, J. J. and Taylor, S. A. (1992), " Measuring service quality: a reexamination and extension", Journal of Marketing, Vol. 56, pp. 55-68.
15. Cronin, J. J. and Taylor, S. A. (1994), "SERVPERF versus SERVQUAL: reconciling performance based and perception based expectation measurements of service quality", Journal of Marketing, Vol. 58, pp. 125-31.
16. Galiano, K. B. and Hathcote, J. (1994), " Customer expectations and perceptions of service quality in apparel retailing", Journal of Services Marketing, Vol. 8, No. 1, pp. 60-69.
17. Grapentine, T, (1998) , "The history and future of service quality assessment", Marketing Research: a magazine of management & applications, Vol. 10, No. 4, pp. 4-20.
18. Gronroos, C., Heionen, F., Isoniemi, K. and Lindholm, M. (2000). "The netoffer model: a case example from the virtual marketspace", Management Decision, Vol. 38, No. 4, pp. 243-52.
19. Hill, D. J. (1986), "Satisfaction and consumer services", Advances in Consumer Research, Vol. 13, pp. 311-15.
20. Hoerl, A. E. and Kennard, K. R. (1970), "Ridge regression: applications to nonorthogonal problems", Technometrics, Vol. 12, pp. 69-82.
21. Imrie, B. C., Cadogan, J. W. and McNaughton, R. (2002), "The service quality construct on a global stage", Managing Service Quality, Vol.12, No. 1, pp. 10-18.
22. Kaiser, H. F. (1974), "An index of factorial simplicity", Psychometrika, Vol. 39, pp. 31-6.
23. Lasser, W. M. C. Manolis, C. and Winsor R. (2000), "Service quality perspectives and satisfaction in private banking", Journal of Services Marketing, Volume 14, No. 3, pp. 244-71.
24. Liljander, V. and Strandvik, T. (1995), "The relation between service quality and intentions in managing service quality", in Kunst, P. and Lemmink, J. (Eds.), Managing Service Quality, Chapman Publishing, London, pp. 45-63.
25. Llosa, S., Chandon, J. and Orsingher, C. (1998), "An empirical study of SERVQUAL's dimensionality", The Service Industries Journal, Vol. 18, pp. 16-44.
26. Newman, K. (2001), "Interrogating SERVQUAL: a critical assessment of service quality measurement in a high street retail bank", The International Journal of Bank Marketing, Vol. 19, No. 3, pp. 126-39.

27. Parasuraman, A., Zeithaml, V. and Berry, L. (1985), "A conceptual model of service quality and its implications for future research", *Journal of Marketing*, Vol. 49, pp. 41-50.
28. Parasuraman, A., Zeithaml, V. and Berry, L. (1994a), "Reassessment of expectations as a comparison standard in measuring service quality: Implications for future research", *Journal of Marketing*, Vol. 58, pp. 111-24.
29. Parasuraman, A., Zeithaml, V. and Berry, L. (1994b), "Alternative scales for measuring service quality: a comparative assessment based on psychometric and diagnostic criteria", *Journal of Retailing*, Vol. 70, No. 3, pp. 201-30.
30. Robinson, S. (1999), "Measuring service quality: current thinking and future requirements", *Marketing Intelligence & Planning*, Vol. 17, No. 1, pp. 21-32.
31. Saleh, F. and Ryan, C. (1991), "Analyzing service quality in the hospitality industry using the SERVQUAL model", *The Service Industries Journal*, Vol. 11, pp. 324-43.
32. Terziovski, M. and Dean, A. (1998), "Best predictors of quality performance in Australian service organizations", *Managing Service Quality*, Vol. 8, No. 5, pp. 359-66.

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