

# Quality Control in Service Industry: A Telephone Service Center at a Bank

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## Abstract

Quality control initially focused on manufacturing organizations and service organizations were largely ignored. However, service industry has become a crucial player in the global economy in the past few decades. This requires a shift in quality control research which represented a challenge to TQM practitioners in the 80's and 90's. Service organizations must consistently deliver service levels that meet or exceed customers' needs and expectations. In order to enhance their competitiveness, service firms need to develop and implement a quality system that ensures continual quality and productivity improvement. Also, a service organization that is seeking to maintain or improve its competitiveness must focus on its customers and emphasize customers as the driven force behind quality outcomes. In this paper, a telephone service center at a major bank in the United States is evaluated. The bank telephone service center employs 60 full-time and part-time representatives. Each representative is responsible for answering customers' inquiries. This study is conducted in four stages as follows: understanding the process, surveying representatives, analyzing data, and providing recommendations for improvement. The objective of this study is to improve the efficiency and effectiveness of the telephone center and to reduce the total cost of operations. Recommendations to improve call handling process, quality control measurement, and representatives' performance are provided.

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## 1.0 Introduction

The service industry has played a critical role in the global economy in the last few decades. For instance, the service industry employs an estimated 60% to 70% of the work force in United States (Scanlon and Hagan, 1993) which implies that the U.S. is more a service economy than an industrial economy. Hence, service industry has grown in the past few decades which resulted in more service related jobs. This trend in the service sector also applies to other countries beside the U.S. The service organizations have been classified by the U.S. government's Standard Industrial Classification system as those organizations that are "primarily engaged in providing a wide variety of services for individuals, business and government establishments, and other organizations. Hotels and other lodging places, establishments providing personal, business, repair, and amusement services; health, legal, engineering, and other professional services; educational institutions, membership organizations, and other miscellaneous services are included" (Sasser, et al., 1978). Hence, the service organizations include establishments such as hotels, telecommunication firms, legal firms, restaurants, health care providers, real estate, educational institutions, public utilities, etc. In addition, some manufacturing organizations provide services as well as products to their customers in terms of repairs, service after sales, etc. Therefore, a large majority of working people in the world are employed to provide services to others.

However, service organizations differ from manufacturing organizations in several ways. First, manufacturing firms produce tangible and durable products while the output of service organizations is intangible. Second, manufacturing produces goods that can be inventoried which enables manufacturing firms to cope with future demand. On the other hand, service organizations provide the service as it is needed and is often consumed upon generation rather than held for future use. Third, most customers for service organizations have a high participation in the service delivery process. However, customers of manufacturing firms have little or no contact with the producers of the products. For example, a patient has a high contact with the service providers (doctors, nurses). On the contrary, we have no contact with the individuals who made the cars we drive. Fourth, in service firms, customers need the required service within few minutes of their arrival. In manufacturing firm, customers are more willing to wait few days.

weeks, or months for product delivery. Fifth, service firms are labor intensive and manufacturing firms are capital intensive.

These differences and expansion of the service sector have important implications for the field of quality control. Quality control initially focused on manufacturing organizations and service organizations were largely ignored. The quality of manufacturing output can be accomplished by designing the products to meet customers' requirements and specifications. Also, manufacturing organizations obtain quality into their outcomes through improving the production system in three major areas as follows: product development, the production process, and product use. On the contrary, quality control implementation in service organizations is a very difficult task. The reason is that service organizations rely on individuals who provide the service. Also, customers' needs and performance standard are difficult to identify and customers usually require a higher degree of customization than of manufacturing goods. Moreover, service quality depends on the customers' judgement by comparing service they received with the service they required. Berry, et al. (1990) have identified five principal dimensions that customers use to judge a company's service. These service elements are as follows:

- Tangibles:* the appearance of physical facilities, equipment, personnel and communications materials.
- Reliability:* the ability to perform the promised service dependably and accurately.
- Responsiveness:* the willingness to help customers and to provide prompt service.
- Assurance:* the knowledge and courtesy of employees and their ability to convey trust and confidence.
- Empathy:* the provision of caring, individualized attention to customers.

Service organizations must know their customers' expectations and needs and meet these expectations and needs. Therefore, service firms need to improve the quality of their outputs and outcomes to obtain competitive advantages in the global market. They must consistently deliver service levels that meet or exceed customers' needs, wants, and desires. In order to enhance their competitiveness, service firms need to develop and implement a quality system that ensures continual

quality and productivity improvement. In addition, a service organization that is seeking to maintain or improve its competitiveness must focus on its customers (external and internal) and emphasize customers as the driven force behind quality outcomes. Therefore, service organizations should develop procedures for identifying both short and long-term requirements and expectations of customers. Then, these requirements and expectations are translated into technical specifications that determine the service process design. Hence, the ultimate objective of any service organization should be customer satisfaction. However, service organizations are different in their orientation which requires a clear understanding of the customers needs for a particular service organization. This implies that customers' quality characteristics are different from service organization to another. For instance, customers of a bank have different quality characteristics from customers of a hospital.

In the past, most of the studies in the field of quality control and total quality management are focused on manufacturing organizations. However, due to the importance of service industry, there has been a shift in these studies. In this paper, the quality measurements and the implementation of quality control in a telephone service center at a bank will be discussed. This paper is based on a research that has been conducted by the author in a major bank in the United States. Due to confidentiality, the bank's name will not be revealed.

The organization of the paper is as follows. Section 2 provides an overview of quality control and management. Section 3 presents a brief discussion of quality in service industry. Section 4 presents the bank case that is under study. Section 5 discusses the research method. Section 6 provides recommendations for improvement. Finally, Section 7 presents conclusion.

## **2.0 Quality Control and Management**

"Total quality management (TQM) is an integrative management concept for continuously improving the quality of goods and services delivered through the participation of all levels and functions of the organization" (Evens and Lindsay, 1993). For the past few decades, TQM has become a major ingredient for successful organizations that are seeking to acquire competitive advantages in a global market. TQM

incorporates several areas of management that are related to each other. The Malcolm Baldrige National Quality award identifies the following seven areas of management as follows: leadership, information and analysis, strategic quality planning, human resource management, management of process quality, quality and operational results, and customer focus and satisfaction. Therefore, a company that is pursuing effectiveness and efficiency in its operations and seeking to maintain or improve its competitiveness must excel in these areas.

The management of process quality is a critical area of management that could facilitate or hinder the success of TQM implementation. It examines the systematic approaches that are used by a company for assuring quality. This systematic examination is based on effective tools and methods that are used to achieve optimum efficiency, productivity, and effectiveness to provide a competitive products and services. One of the tools and methods is the statistical process control (SPC) methods.

The statistical process control (SPC) is a collection of methods and management concepts that are used throughout the organization to improve the quality of outcomes. SPC involves the use of basic statistical techniques to determine the source of variation which is classified into common causes of variation and special causes of variation. The common causes of variation are system factors that affect the system performance. In order to reduce the negative effect of common causes on the system, the organization must change the technology it uses or redesign the process (reengineering). On the other hand, the special causes are attributable to external factors such as tool wear out, suppliers, individual performance, etc. Both causes of variations can be identified, controlled, and eliminated using SPC tools and methods. Dr. Deming believed that 85 percent of the factors contributing to the process variation are system factors (common causes) and only 15 percent are attributable to the special causes (Deming, 1986). Therefore, the primary objectives of the use of SPC tools are as follows: determination of the variation, determination of the causes of variation, cost reduction by eliminating scraps and reworks, attaining consistency of products and services, and helping management to make decisions based on hard facts.

The essential techniques in SPC include the use of the "seven quality control tools" for quality improvement. The seven

quality control tools are as follows: *flowcharts, check sheets, pareto diagrams, cause-and-effect diagrams, control charts, histograms, scatter plots.* Flowcharts are used to understand the process by showing the sequence of steps of the process from start to finish with each step is clearly indicated. Check sheets are data collection tools used to gather useful data. These sheets could be tabular or columnar forms. The pareto diagram is a histogram that is used to display the problem's causes in the order of their frequency. It orders the bar graph from the largest to the smallest which helps prioritize the problem solving. The cause-and-effect diagram (usually called fishbone diagrams) helps in identifying the possible causes of a problem. The control charts are graphical methods used to identify the variation in the process. Histograms are bar graph that show how frequently something happened. The scatter plots are used to determine the type of relationship between two variables.

### **3.0 Quality in the Service Industry**

In the early days of TQM revolution, TQM was implemented only in the manufacturing sector and the service sector was neglected. The philosophical elements and the generic tools of TQM have proven their influence on the success and survival of manufacturing organizations. Thus, TQM was implemented to improve the production system components which enable manufacturing organizations to compete in the global market.

During the 80's and 90's, TQM practitioners faced with the challenge of implementing the philosophical elements and generic tools of TQM into a wide variety of service organizations.

The service organizations are competing in an environment that is characterized by a high global competition, customer awareness, and a high customer expectation. Therefore, a service organization that is seeking to improve efficiency, effectiveness, and profitability of its operation, must adopt the philosophies of the total quality management into its organization.

Despite the success of TQM implementation in the manufacturing sector, the top managements in the service sector were reluctant to implement the philosophies of TQM. In addition, top management in the service sector doubted the success of TQM in service sector and thought that it couldn't be applied to service operations. It is true that improving the quality of services is more difficult than improving the quality of products

because of the temporary nature of a service. For instance, a defective product can be replaced or repaired. However, service is given fundamentally by the personal contact between a service provider and a customer with no chance for test or rework. Hence, service must be consistently delivered throughout the organization by all employees.

Therefore, the first thing that has to be done to implement TQM in a service organization is to sell TQM's philosophies to top management. This can be accomplished by pointing out the benefits of TQM to the organization. The benefits of TQM consist of the following: 1- improves the company's image, 2- enhances the quality of services, 3- improves customer satisfaction, 4- improves productivity, 5- reduces costs and expenses, 6- improves employees' satisfaction, and 7- improves company's profits. In order to achieve these benefits and more, a company must adopt a TQM management style and commit its resources to assure the success of its implementation.

A company that is attempting to implement TQM, must determine the characteristics and attributes of service quality. Some of the frequently cited service characteristics and attributes are as follows (Evens and Lindsay, 1993):

*Time:* how long a customer expects and willing to wait for a service?

*Courtesy:* a customer judges the quality of service by judging the responsiveness of the first person they come in contact with.

*Consistency:* services should be delivered consistently throughout the organization.

*Accuracy:* services must be performed right the first time because there is no chance for test to rework.

*Location:* the service facilities should be accessible and convenient to customers.

*Responsiveness:* service providers should be able to response quickly and accurately to unexpected problems.

*Complaint handling:* management must pay a great deal of attention to customers' complaints and resolve these complaints quickly and satisfactory.

In order to obtain these quality characteristics and attributes, an organization must adopt the philosophical elements of TQM. The philosophical elements of TQM consist of the following: customer-driven quality, employee participation

and development, quick response, management by fact, continuous improvement, leadership.

**Customer-driven quality.** An organization that is seeking to maintain or improve its competitiveness must focus on its customers (external and internal) and emphasize customers as the driven force behind quality of output. The service quality has been defined in terms of customer satisfaction as the degree of alignment between customers' expectations and the perception of the service received. Hence, a competitive organization is the one that identifies customers' expectations and needs sooner and satisfies them faster than competitors. Therefore, organizations should develop procedures for identifying both long and short-term requirements and expectations of customers. Then those requirements and expectations should be translated into technical specifications that determine the design of service process. Thus, the primary objective of a service organization has to be attracting and retaining customers. However, it has been found that it costs more to attract a new customer than it does to retain one. Therefore, front-line employees should be trained and provided with the knowledge and skills needed to perform their jobs accurately. Also, they should be given the authority to respond to customers' requests and complaints quickly and efficiently. Hence, front-line employees in a service sector can shape or create a customer's perception of a company.

**Employee participation and development.** Employees in an organization must participate to improve the quality of service outcomes and must be trained to participate effectively and efficiently. Companies implementing TQM should facilitate employee participation and remove fear from employees. In addition, the development and training of employees must be essential part of the organization's quality strategy. Employee, specially front-line employees in the service sector, must be trained and provided with the proper tools, knowledge, and skills to improve service quality and productivity.

**Quick response.** A service organization should respond to customer complaints very quickly and efficiently. Dissatisfied customers tell more people about their bad experiences than do satisfied customers. Therefore, front-line employees should be able to understand customers' complaints and please them quickly.

**Management by fact.** Management decisions must be



based on reliable data and information which support the quality offers of management. Thus, data and information must be valid and adequate. In addition, they must be accurate, on time, and useful for management to be able to make decisions on facts.

**Continuous improvement.** Management should continuously improve the service process through small, frequent, and incremental improvements over a long time. Management should review the process frequently using Deming cycle which is composed of plan-do-check-act (PDCA) as a methodology for improvement.

**Leadership.** Top management should be involved in leading the company toward TQM implementation by motivating and coaching employees. The manager and supervisor's task is to coach and assist employees to perform their jobs accurately. Also, managers and supervisor should be trained to identify areas for improvements.

#### **4.0 The Bank Case**

This study is concerned with evaluating the customer service department at a bank's telephone service center. The bank under study is located in the north eastern region of the United States. This bank's phone center employs 60 full time and part time customer service representatives and 20 sales representatives. Each customer service representative is responsible for answering any incoming call if he or she is idle. Representatives answer to the following customers' inquiries: transfer funds from an account to another, balance an account for a customer, information on different accounts, interest rates on different loans, information on mortgages, calls concerning payments on loans, placing a stop on a credit card account, information on home equity, interest rates on saving accounts, etc. In addition, they are responsible for handling customers' complaints such as statement errors, placing a deposit in the wrong account, insufficient fund fees, transferring an inaccurate amount of fund, etc. Hence, this job requires knowledge of the banking industry and different types of products and services that are offered by the bank.

The bank is trying to improve the call handling process, representatives' performance, and reduce the total cost of calls.

The average call length to handle a customer call varies among representatives and it ranges from 377 seconds to 75 seconds with an average of 170.02 seconds (2.83 minutes). The call

length depends on experience and knowledge which have a major influence on the representatives' performance. In other words, a representative who has been with the bank for over a year will be on the phone with a customer for a short period of time in comparison to a representative who has been there for less than six months. The reason is that new (inexperienced) representatives usually need assistance from another person to respond to customers' inquiries and complaints due to the lack of knowledge. Hence, a new representative with two weeks of training will not be able to perform some of customers' inquiries and complaints as fast as an experienced representative.

It seems very obvious that training and experience are essential in performing this job with a low average call length. A new representative is trained for two weeks as follows. In the first week, the representative is given in-class training through lectures on the banking industry, types of products and services that are offered by the bank, using the computer, and how to respond and handle customers' calls and complaints. In the second week, the new representatives are required to sit with experienced representatives and listen to customers' calls and how these calls are handled.

Table 1 shows statistical information on the number of calls for each day (Monday-Saturday). The table provides information on the average number of calls, maximum, minimum, standard deviation, range per day, and the total number of observations (N). In addition, the table provides statistical data for the week and weekdays (without Saturday). Also, Figure 1 depicts the distribution of number of calls for the week. In these 583 observations that are plotted in Figure 1, 98 observations come from Saturday. Thus, the number of incoming calls on Saturday is way below that of other days. Table 2 provides statistical data for the service times (call handling). The second column in Table 2 shows that 45.63% of the total calls exceed 180 seconds (three minutes). Also, it can be seen in the table that the average call length is 170.02 seconds (2.83 minutes).

Table 1: Statistical Data on Number of Calls

Days	Average	Max.	Min.	S.D.	Range	N
Monday	5034	7509	3415	813	4094	96
Tuesday	4580	8533	3032	946	5501	97
Wednesday	4355	8159	2923	749	5236	97
Thursday	4527	6656	2989	709	3667	97
Friday	4648	7778	2172	858	5606	98
Saturday	807	2835	275	339	2560	98
Weekday	4619.7	8533	2172	849.09	6361	485
Week	4000	8533	275	1612.81	8258	583

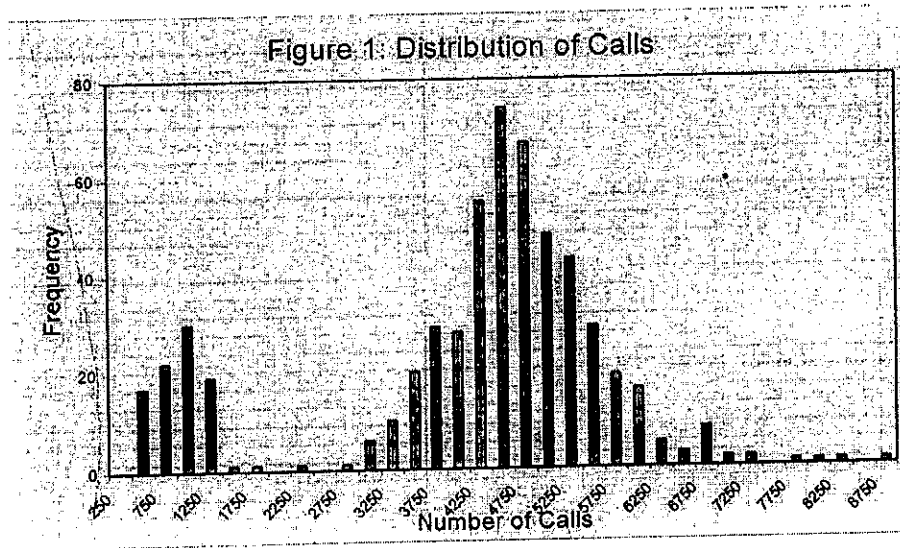


Table 2: Statistical Data for Service Time

Days	% of calls > 180 sec.	Max. (Sec.)	Min. (Sec.)	Average (sec.)	S.D.
Monday	57.41%	368	87	178.49	36.423
Tuesday	49.78	377	92	173.86	40.81
Wednesday	43.83	352	84	171	40.75
Thursday	43.79	290	75	167.37	37.95
Friday	43.69	317	85	168.84	38.01
Saturday	11.32	201	82	138.06	26.34
Week	45.63	377	75	170.02	39.263

Receiving an average of 4000 calls per day is very costly to the bank given a high average queuing time and a high average call length. For instance, assume that it costs \$0.5 per minute a customer stays on the line waiting or talking to a representative. Also, assume that a customer waits in average 2 minutes and it takes 2 minutes in average to handle a call by a representative. Hence, a customer stays on the line 4 minutes. Given the average number of calls is 4000 a day, then the average number of minutes that all customers stay on the line is 16,000 (4x4000) minutes or 267 hours per day. This costs the bank \$8,000 (16000x\$0.5) a day. Therefore, the annual cost is \$2,000,000 (\$8000x250 working days). It is obvious that the cost is very high and something has to be done to reduce it. The author was contacted by Mr. F. M. (A business analyst at the technical support services) to study the problem and suggest solutions that could reduce the waiting time and call handling length.

## 5.0 Research Method

This study is conducted in four stages as follows: understanding the process, surveying representatives, analyzing data, and providing recommendations. The objective of the first stage is to understand the process of answering customers' calls. This is accomplished via two steps as follows. In step one, an understanding of how representatives respond and handle customers' calls and complaints is established. In step

one, an understanding of how representatives respond and handle customers' calls and complaints is established. In step two, a flowchart of the call handling process is constructed which shows the call handling process from the start (a customer calls) till the end (a customer hangs off). In the second stage, a survey is conducted to determine the major reasons that cause a call to exceed two minutes. In the third stage, the data that is provided by the system is analyzed and control charts are constructed. The fourth stage provides recommendations to improve the phone center's performance by redesigning the call answering process and determining areas for improvement. In following subsections, a detail discussion of these stages and the problems that are found in the system will be provided.

### **5.1 Understanding the Process**

The first step that was taken by the author is to understand the process of answering a phone call from the start to the end by a representative. Also, how a call is handled by experienced, inexperienced, full-time, and part-time representatives has to be understood. In addition, a flowchart of the entire process is constructed which helps to understand the process much better and more objectively.

At the beginning, representatives were classified into four groups as shown in Figure 2. G1 denotes representatives who are experienced and full-time. G2 denotes representatives who are experienced and part-time. G3 denotes representatives who are inexperienced and full-time. Finally, G4 denotes representatives who are inexperienced and part-time. Then, the author sat down with one representative from each group daily for two weeks (i.e., 40 representatives during the two weeks). The objective is to understand how calls are handled by each group and what type of problem does each group face. It has been found that there are some questions that can be answered by all members of the four groups. However, there are other questions that can't be answered by inexperienced full-time and inexperienced part-time representatives.

Experienced Inexperienced	G1	G2
	G3	G4
	Full-time	Part-time
Figure 2: Representatives' Classification		

A representative has to answer to a wide variety of questions and requests that have been asked by customers (e.g., transfer funds from an account to another, visa statement, account statement, type of loans and mortgages, and so on). When an inexperienced representative faces a problem handling a customer's inquiries, he or she places the customer on hold to get an assistance from a supervisor or a specialist. As a result, the average call length for inexperienced full-time and part time representatives is higher than the average call length for experienced representatives.

Figure 3 shows a flowchart of the call handling process. The process starts by a customer initiating a call. Then, a VRU (Voice Response Unit) unit answers the call and determines the type of application that is needed by the customer. The VRU unit could handle most of customers' inquiries by providing customers information about their accounts, interest rates, etc. using a touch tone phone.

However, if a customer wishes to talk to a representative (55% to 60% of the callers

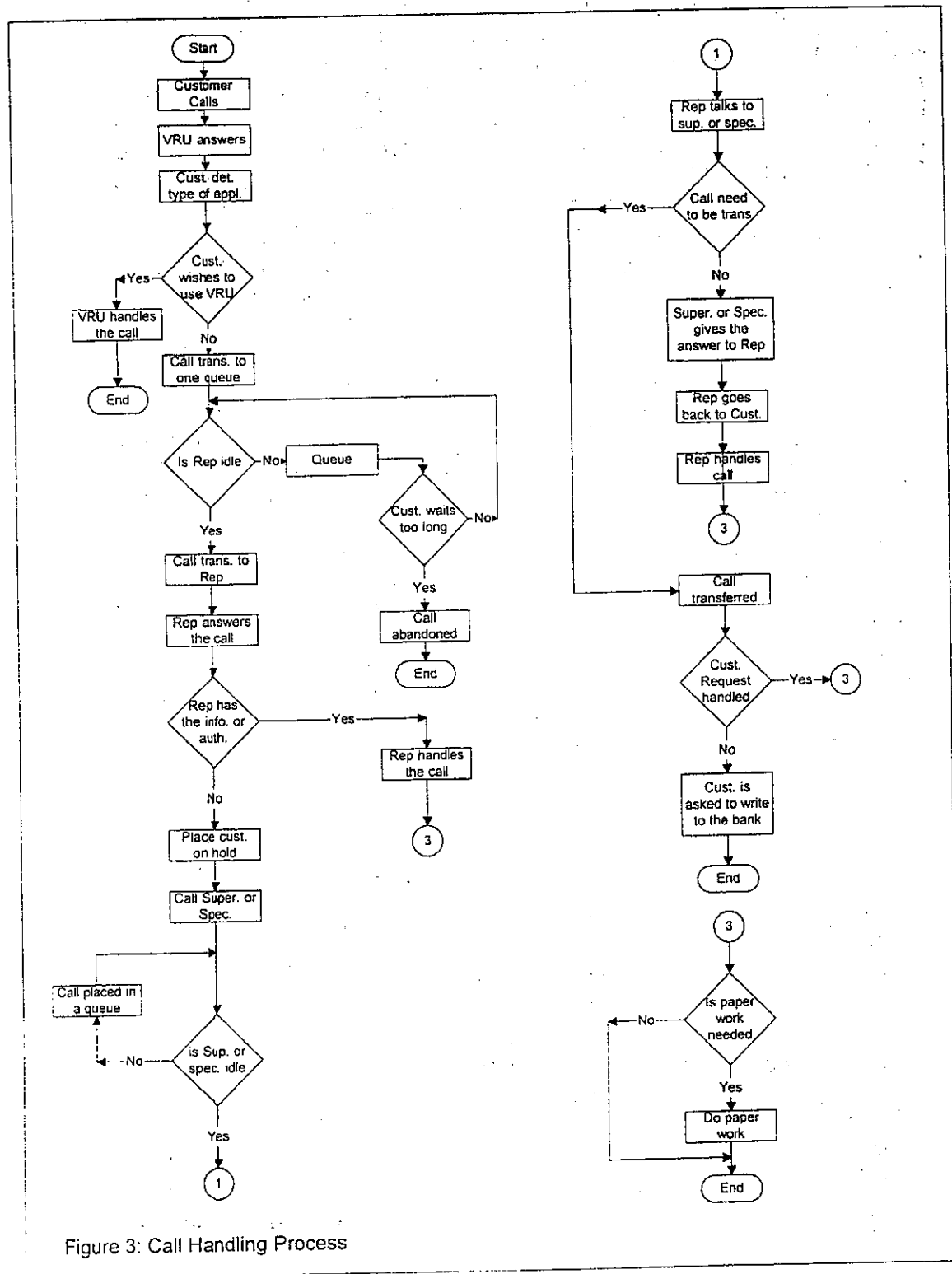


Figure 3: Call Handling Process

prefer to talk to human being) the call will be placed in a queue and served on the basis of FCFS (first come first served). The waiting time in the queue varies during the day. It is most likely that a customer will wait longer if he or she calls during the peak period which is between 9:00 A.M. and 2:00 P.M. (the customer service representatives are available from 8:00 A.M. until 8:00 P.M.). At this point, some customers abandon their calls if they wait for too long and call again in another time. However, if a representative is idle, then the call is transferred to him or her. The representative answers the call and performs the service needed if he or she has the information or the authority. Otherwise, the customer is placed on hold and the representative calls a supervisor or a specialist for assistance. The supervisor or specialist provides the answer to the representative who is in return goes back to the customer and provides the answer. This could go back and forth more than once for one phone call. Sometimes the call needs to be transferred to the supervisor or the specialist who handles the customer's call.

In addition, the flowchart shows unnecessarily work which is doing paper work. For example, if a customer wishes to transfer funds from a checking account to a saving account, he will be asked to provide the necessary information. Then, the provided information is inputted into the computer by the representative. After finishing the call with the customer, the representative is required to fill out a fund transfer form which will be send to another department. The time it takes to fill out the form is deducted from the time in which the representative is plugged in. This means that the department will be short handed until the representative fills out the form. As a result, customers will wait longer before the service is provided. Representatives unplug the phone approximately 30% of working time. This means that 2 hours and 24 minutes of a full-time (working 8 hours) representative time is unproductive time per day. During a year, with 250 weekdays, there are about 600 hours are unproductive time for one full-time representative.

It is obvious that doing paper work and calling or transferring a call to a supervisor or a specialist cause the waiting time and the call itself to be longer. Most calls that are transferred to supervisors or specialists are done by inexperienced representatives and it is hardly done by experienced representative. As a result, the number of calls that are handled by an inexperienced representative is far less than



the number of calls that are handled by experienced representative. This can be seen in Figure 4 which shows a comparison between an inexperienced representatives and experienced representative. The figure shows that the number of calls handled by an inexperienced representative is far below that of an experienced representative.

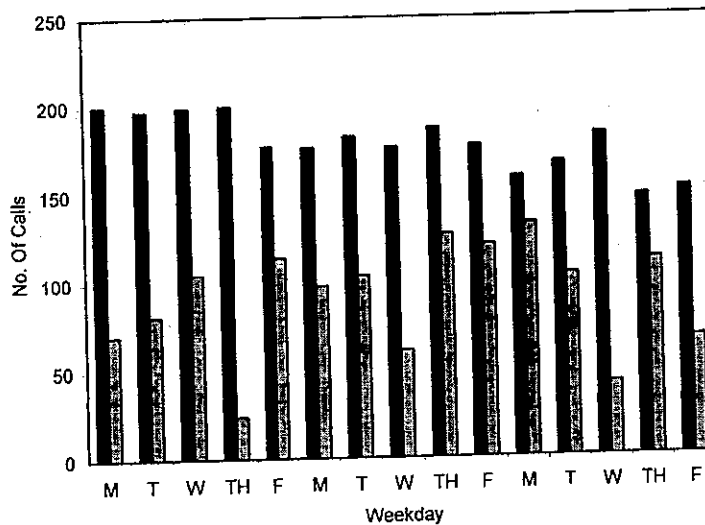


Figure 4: No. of Calls Handled by Two Representatives

## 5.2 Reasons for a Call to Exceed Two Minutes

The second stage of this research focuses on the reasons that cause a call length to exceed two minutes. It has been stated above that as the call length increases the total cost of the telephone service center increases as well. The bank has specified performance standards for the call length. These standards are  $148 \text{ seconds} \pm 27 \text{ seconds}$ . In other words, the average call length should be 148 second (about 2.5 minutes) and it should not exceed 175 second (less than 3 minutes) which represents the upper control limit for the call length. However, the actual length of calls varies from about 75 seconds (1.25 minutes) to about 377 seconds (6.28 minutes). Moreover, 45.63% of the calls last in excess of 3 minutes (these calls are out of control based on the bank's control limits) as it is shown in

Table 2. On a regular weekday there are typically 4620 calls in average, of which about 2108 ( $4620 \times 0.456$ ) last beyond 3 minutes. During a year, with 250 weekdays, there are thus about 527,000 such lengthy calls. If these calls could be shortened by 0.5 minute, on average, more than 263,500 minutes would be saved, or roughly 4391 person-hours, or 2.2 full-time positions. Saving in salaries, indirect labor costs, and cost of capital provisions would readily exceed \$100,000. In addition, saving in calling cost will be realized.

In order to attempt such reduction in average length of long calls, the reasons for their length need to be studied in details. There might be good reasons for the calls to be lengthy, but it might also be that more focused training or more careful screening of applicants, on some relevant characteristics might lead to shorter calls.

To identify the causes a detailed survey of actual telephone representatives is warranted. They, after all, know best what causes the wide variation, and have insights to offer which management can disregard only at its cost and peril. An additional advantage is that, by studying the reasons why lengthy calls are lengthy, we may also be able to point the way to making average-length calls shorter as well. In view of the sensitivity of such interviews, they must be carefully staged in an unthreatening fashion. The representatives should be clear that it is not THEY who are the subjects of the study. A clear indication on intent, a guarantee of confidentiality, and an interview to elicit relevant and focused questions in a pleasant and relaxing environment is called for.

We have conducted a survey of the representatives and asked them to state all possible reasons that cause a call to exceed two minutes. In response, a total of forty (40) reasons (Appendix A gives a list of these reasons) have been stated. Then, we conducted another round of the survey to rank these reasons based on their frequency. For example, each representative is given the forty reasons and is being asked to rank them as follows: number one is most frequent and number forty is the least frequent. In addition, to avoid duplication, two supervisors, a specialist, and three experienced representatives were asked to narrow these reasons down to a reasonable number of reasons. As a result, a check sheet that has twelve (12) major reasons indicating for calls exceeding two minutes in length is determined. Figure 5 shows this check sheet.

Moreover, the check sheet is distributed to representative

to count the number of occurrences of each reason. Representatives were cooperative in the survey and provided good results. The outcome of this survey was plotted using a Pareto chart to determine the vital problem that cause the call to be long. Figure 6 shows the Pareto chart of the twelve reasons.

This chart clearly shows the relative magnitude of the causes. Hence, it can be seen that the first reason occurs 25% of the time, which implies that improvement

Major reasons indicating for calls exceeding two minutes in length	
Causes	Count
Cause-1: Customer requesting detailed information (all checks, balances, NSF items)	245
Cause-2 Customers are not prepared	103
Cause-3 On hold to transfer to specialist or supervisor, or another department.	118
Cause-4 Account problems are difficult to explain (HELOC, VISA, LOAN)	131
Cause-5 Too much paper work	49
Cause-6 Customer lack of banking knowledge	89
Cause-7 Transfer of funds from one account to another	91
Cause-8 Difficulty in communication (language, difficulty in hearing, etc.)	29
Cause-9 Block ATM card, VISA card, or VISA debit	28
Cause-10 Stop Payment	48
Cause-11 Placing HELOC holds	11
Cause-12 Hard holds on checking and savings	29

\* During a recent survey, the above causes were indicated to be major reasons why calls exceed two minutes in length. Based on the results, we would like to determine the number of these calls.

\* Please count the number of calls falling into each category by placing marks in the count box (ex. \_). Place the check sheet into the box when completed. Thank you.

Figure 5: Check Sheet Indicating the Vital Reasons.

which results in eliminating this reason will reduce the total problem by 25%. In addition, cause-1, cause-4, cause-3, and cause-2 account for 62% of all causes. In order to solve the problem of call length, the bank should focus its attention on these four causes first which would result in 62% reduction of reasons for a call to exceed 2 minutes.

### 5.3 Data Analysis and Control Charts

The third stage of the research is to investigate the data that is provided by the system as a daily report.

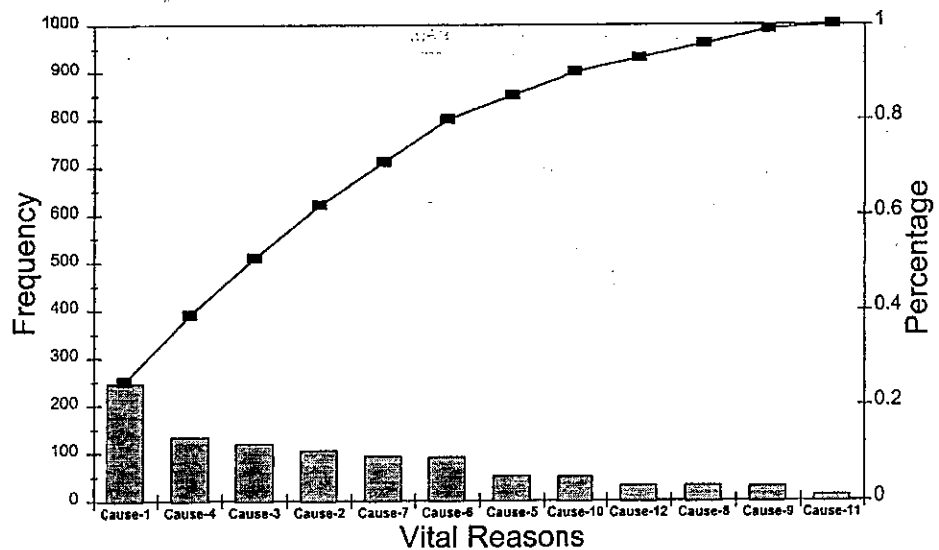


Figure 6: Vital Reasons for a Call to Exceed Two Minutes

The bank has state of the art technology called "ASPECT Management Report" which provides management with daily call arrival analysis for each region, application, representative activities report, and so on. The daily call arrival analysis graphically and numerically provides cumulative data on calls for half hour increments for each application (i.e., Home Equity, Credit Cards, etc.). This analysis includes the number of calls offered (arrived), the number of calls handled, number of calls abandoned, average queuing time, longest waiting time, service level, and average waiting time before abandoning a call. In

addition, the representative activity report provides summary information on representatives' performance. This report can assist in identifying high performers and low performers to determine the need for training. Also, the report includes data on the number of calls handled, average call length, working time duration, and so on for each representative. This report assists management to analyze 100% of the representative's time.

## **6.0 Recommendations for Improvement**

There are several problems that have been found in the current system. As a result of these problems, the system is ineffective, insufficient, and very costly. In the following discussion, recommendations to improve the system's operations will be provided.

### **6.1 Improving the Call Handling Process**

The call handling process that is shown in Figure 3 consists of several procedures such as answering a call, placing a customer on hold, doing paper work, etc. Some of these procedures can be improved or eliminated which would result in improving the call handling process. The major problems in the call handling process are doing paper work and placing a customer on hold to call a supervisor or a specialist for assistance. It has been suggested by the author that paper work should be eliminated and the frequency of placing a customer on hold should be reduced. In the following discussion both of these suggestions to improve the call handling process will be described in details.

First, the elimination of paper work procedure is accomplished as follow. The bank must install printers at the Record Department and connect these printers to representatives' computers. Representatives ask customers for the necessary information and then input this information into the computer to response to their inquiries. In some applications, the representatives are required to fill out forms which will be send to the Record Department for verification and documentation. The time it takes to fill out these forms is deducted from the time in which the representatives are plugged in. However, by connecting representatives' computers to printers at the Record Department, representatives will only be

required to push a printing key at the keyboard which will take a negligible time. As a result, the bank will realize several benefits by installing these printers. These benefits are: 1)-the 30% of representatives' working time in which they unplug their phones to do paper work will be saved; 2)- the time saved could be used to handle customers' calls that are waiting which would result in shorter queuing time and costs saving, and 3)- the bank would realize a saving in direct labor cost by eliminating a full-time and a part-time positions of the two individuals who collect the forms in the pervious call handling process.

Second, the reduction in the frequency of placing a customer on hold to call a supervisor or a specialist is described in the following discussion. It has been found that most of the calls from representatives to supervisors or specialists are done by inexperienced representatives. Also, the number of calls that are handled by inexperienced representative is far less than that of experienced representatives. The reason is that inexperienced representatives are required to answer any incoming call regardless of their skills and knowledge. They could handle some calls with no problems, however; there are some calls in which they need assistance. Having one queue and distributing calls based on availability of representatives increase the frequency of placing customers on hold. This results in a longer call handling time and waiting time.

Figure 7 shows an improved flowchart of the call handling process. The new call handling process consists of three queues by classifying customers' calls into hard, moderate, and easy questions. Then, the system could direct these calls to three separate queues. This is accomplished by setting the VRU unit to determine the type of application requested by customers by giving them several options to choose from using a touch tone

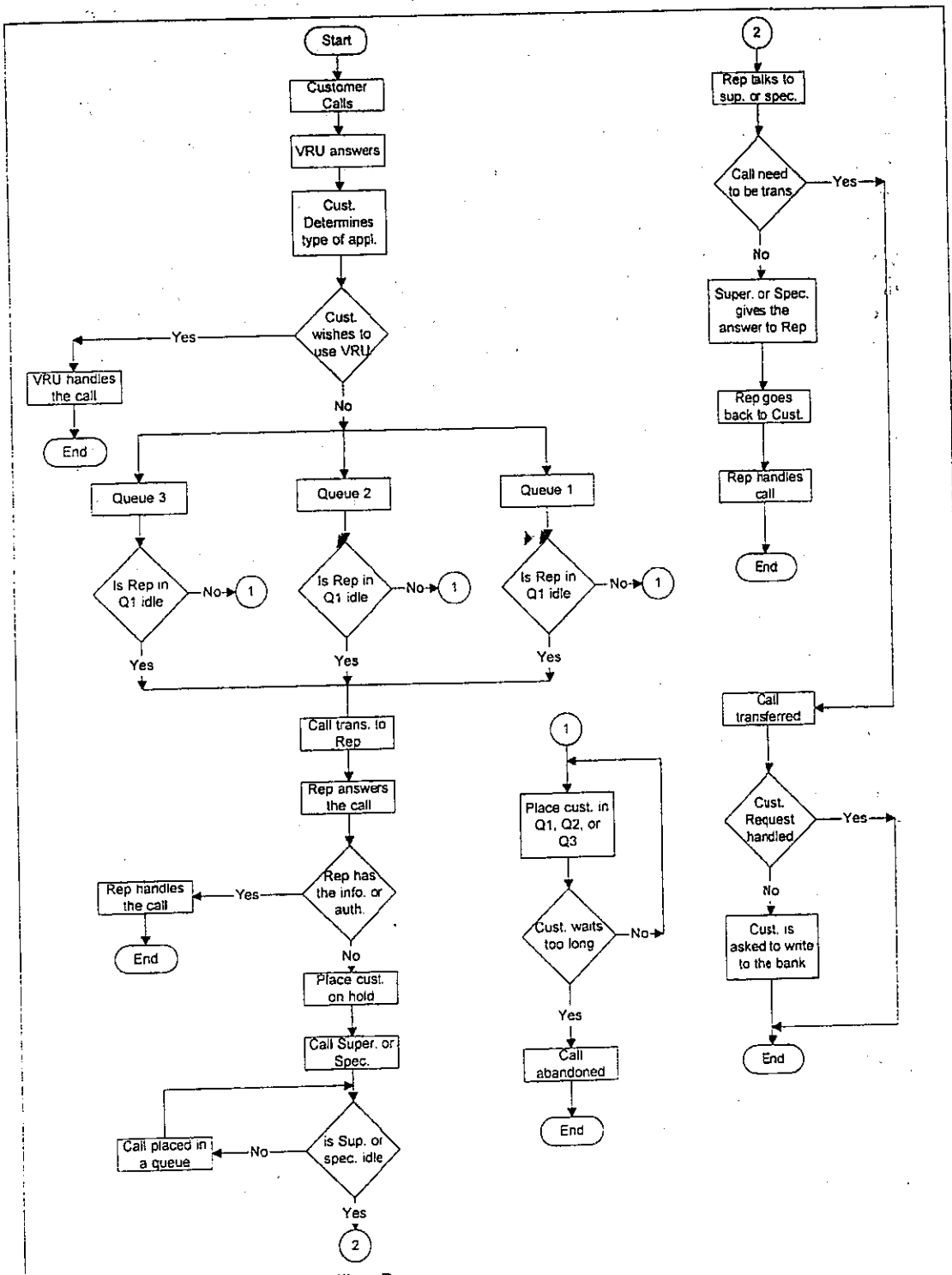


Figure 7: An Improved Call Handling Process

phone. Then, calls are directed to separate queues and served on the basis of FCFS. In addition, representatives are classified into three groups based on experience and performance. The most experienced representatives (more than a year) and high performers represent the first group (Q1). This group is required to answer calls that are sophisticated and require knowledge of banking industry. Also, this group could answer calls that are directed to the second and third queues. In other words, the first group gives priority to calls in first queue and they can answer calls that waiting in the second queue if there are no calls in the first queue, etc. The second group (more than six months and less than a year) (Q2) is responsible for answering calls that are moderate and easy. However, this group gives priority to calls that are waiting in the second queue. The last group (less than six months) (Q3) are responsible for answering calls that are waiting only in the third queue. Separating customers' calls would result in reducing the frequency of placing customers on hold to get assistance from supervisors or specialists by inexperienced representatives. As a result, the call handling time and waiting time would be reduced.

## **6.2 Improving QC Measurement**

The bank measures representatives' performance using the following three measures: DCP (direct call processing), OCCP (occupational measurement), and productivity. Specification limits have been determined by management for all three measurements. These specification limits are classified into average specification limits and range specification limits. Table 3 shows these measurements. The problems with these specifications are 1)- they do not distinguish between inexperienced and experienced representatives, 2)- they do not consider the time a representative is working (e.g., working from 8:00 A.M. till 2:00 P.M. is different from working from 2:00 P.M. till 8:00 P.M.), 3)- they do not provide information on call handling, and 4)- they do not take into consideration the seasonal effect of call arrivals. The number of calls that the bank receives, varies from day to day and from month to month.

However, considering a month to be a performance standard for the year is unfair to the representatives without taking into consideration the call volume variation.



Table 3: The Bank's Performance Standards

Measurements	Average					Range		
	Avg.	3		2		Avg.	UCL <sub>R</sub>	LCL <sub>R</sub>
		UCL <sub>x</sub>	LCL <sub>x</sub>	UCL <sub>x</sub>	LCL <sub>x</sub>			
DCP	148	175	121	168	128	175	270	80
OCCP	86%	92%	81%	91%	82%	36%	55%	16%
Productivity	76.9%	93.6%	60.2%	88.1%	65.8%	61.2%	94.3%	28.1%

The DCP measures the call length. The average specification limits that have been determined by management for DCP measurement are as follows: the overall average is 148 second, the upper control limit (UCL<sub>x</sub>) is 175 seconds, and lower control limit (LCL<sub>x</sub>) is 121 second. The range specification limits for the DCP measurement are as follow: the range average is 175, UCL<sub>R</sub> is 270, and the LCL<sub>R</sub> is 80 seconds.

However, the implementation of this measurement by the bank is unfair to inexperienced representatives. Call length depends on several factors such as experience, training, customers, etc. These factors are considered to be common factors that are attributable to the system and representatives have absolutely no control over these factors. Therefore, representatives should be given the same tools (skills, knowledge, etc.) before they are compared to each other. This can be seen in Figure 8 which shows the average call lengths for two representatives. The figure shows the bank's DCP control limits and the average call lengths for inexperienced and experienced representatives. Nevertheless, the improved call handling process will provide a fair DCP measurement by measuring representatives' performance within the groups. For example, experienced representatives' performance could be measured within group Q1.

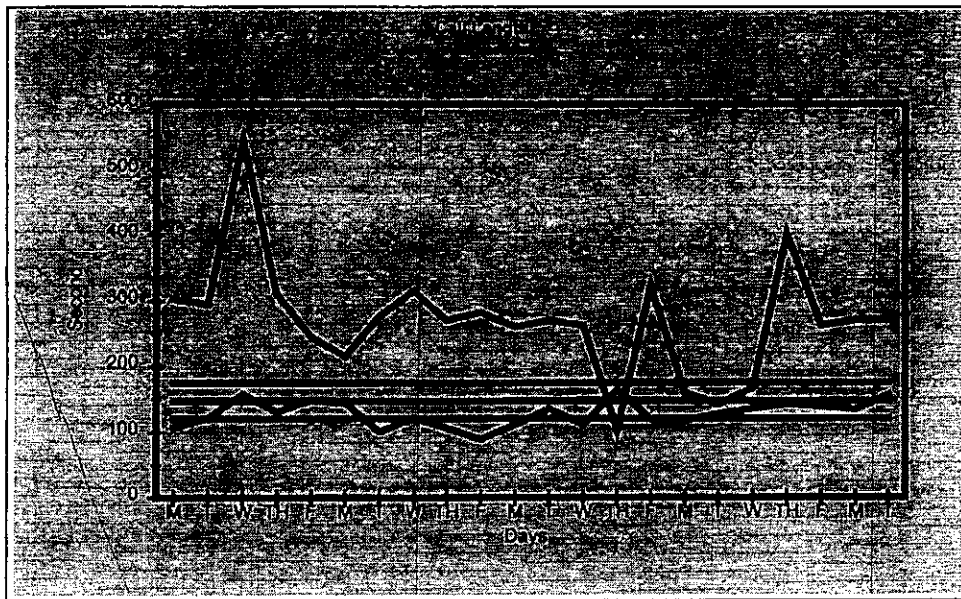


Figure 8: DCP Control Limits

In addition, the occupational (OCCP) measurement measures the total time a representative spends on the phone as a proportion to the total time working time. Management has determined performance specification for the average as follows: the overall proportion average is 86%,  $UCL_x$  is 92%, and  $LCL_x$  is 81%. The range specification limits for OCCP measurement are as follows: the average range is 36%,  $UCL_R$  is 55%, and  $LCL_R$  is 16%. The problem with this measurement is that it does not take into consideration the time a representative is working. As it has been shown in the previous section that the number of calls varies during the day. For example, a representative who is working from 8:00 A.M. till 2:00 P.M. most likely will be busier than a representative who is working from 2:00 P.M. till 8:00 P.M. Therefore, it has been suggested by the author that this measurement is unfair and should be discarded.

Finally, the productivity measurement measures total time a representative is plugged in as a proportion to the total working time. The average specification limits are as follows: the overall average is 76.9%,  $UCL_x$  is 93.6%, and  $LCL_x$  is 60.2%. The range specification limits are as follows: the average range is 61.2%,  $UCL_R$  is 94.3%, and  $LCL_R$  is 28.1%. This measurement is a good measurement especially after eliminating paper work.

It measures the time in which a representative's phone is connected.

In addition to these measurements, there are two performance measurements that have been suggested to measure representatives performance. The first measurement is the number of calls per hour (CPH). CPH measures the number of calls a representative handles by dividing the total number of calls handled by the representative during the day over the total hours that he has been working for that day. The second measurement considers the number of calls each representative handles for a specified time period (e.g., one hour) as a proportion to the total calls that are handled by all representatives for the same time period.

### 6.3 Improving System's Performance

Figure 6 shows the vital reasons for a call to exceed two minutes. Also, it shows that 62% of the problem is irrebuttable to cause-1, cause-2, cause-3, and cause-4. In addition, by analyzing the 12 causes we found that nine (causes 1, 3, 4, 7, 8, 9, 10, 11, and 12 ) of the causes are attributable to representatives' knowledge of banking industry and how to deal with customers. Therefore, the system's performance could be improved by training and retaining representatives. These nine causes represent 75.2% of the reasons for a call to exceed two minutes. Hence, training and retaining representatives will improve 75.2% of the problem. The bank should adopt a training program to train all representatives during the year. Full-time representatives work for 8 hours a day and are divided into two groups. The first group works from 8:00 a.m. till 4:00 p.m. and the second group works from noon till 8:00 p.m. In addition, part-time representatives are scheduled to work in three shifts as follow: first shift from 8:00 a.m. till noon, the second shift from noon till 4:00 p.m., and the third shift from 4:00 p.m. till 8:00 p.m.

The busiest working time is from 9:00 a.m. till 2:00 p.m. Therefore, the bank should have 2 one-hour training sessions to train representatives. One training session should be from 8:00 a.m. till 9:00 a.m. and the second training session is from 3:00 p.m. till 4:00 p.m. Also, the bank should establish a training schedule based on representatives' needs and performance.

Moreover, the improved call handling process that is shown in Figure 7 reduces the effect of all 10 causes on call

length. Having separate queues helps in reducing the effect of experience on representatives' performance which in return reduces call length. Also, eliminating paper work would result in eliminating cause-5 and reduction in waiting time. Therefore, training, retaining representatives, and improving the call handling process would result in improving 80.2% of all causes. The remaining causes (cause-2 and cause-6) are attributable to customers. Cause-2 states that customers are not prepared before they call. Normally, customers are required to provide account number, social security number, telephone number, and birth data. It was suggested that the bank prints these required information next to the bank's toll free number on the account statement to remind customers to be prepared before calling. Cause-6 which represents 9.2% of the problem can be reduced by mailing infrequent information along with account statements to improve customers' basic knowledge of banking industry.

## **7.0 Conclusion**

In the early days of TQM revolution, TQM was implemented only in the manufacturing sector and the service sector was neglected. The philosophical elements and the generic tools of TQM have proven their influence on the success and survival of manufacturing organizations. Thus, TQM was implemented to improve the production system components which enable manufacturing organizations to compete in the global market. However, in recent years, TQM practitioners faced with the challenge of implementing the philosophical elements and generic tools of TQM into a wide variety of service organizations. The service organizations are competing in an environment that is characterized by a high global competition, customer awareness, and a high customer expectation. Therefore, service organizations that are seeking to improve efficiency, effectiveness, and profitability of its operations, must adopt the philosophies of TQM into its organization. Service organizations must consistently deliver service levels that meet or exceed customers' expectations. Hence, in order to enhance their competitiveness, service firms need to develop and implement a quality system that ensures continual quality and productivity improvement. In addition, a service firm that is seeking to maintain or improve its competitiveness must focus on its customers and emphasize customers as the driven force behind quality outcomes.

In this paper, a telephone service center is evaluated and analyzed to improve its operation. The center employs 60 full time and part time customer service representatives. Each representative is responsible for answering customers' inquiries.

The objective of the first stage is to understand the process of answering customers' calls. This is accomplished via two steps as follows. In step one, an understanding of how representatives respond and handle customers' calls and complaints is established. In step two, a flowchart of the call handling process is constructed which shows the call handling process from the start (a customer calls) till the end (a customer hangs off). In the second stage, a survey is conducted to determine the major reasons that cause a call to exceed two minutes. In the third stage, the data that is provided by the system is analyzed and control charts are constructed. The fourth stage provides recommendations to improve the phone center's performance by redesigning the call answering process and determining areas for improvement. In following subsections, a detail discussion of these stages, and the problems that are found in the system will be provided. Recommendations to improve call handling process, quality control measurement, and representatives' performance are provided.

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## Appendix A

- 1- Customers are not prepared.
- 2- Wait to transfer a call.
- 3- Wait for a specialist, supervisor, or other department.
- 4- People are lonely and want to talk.
- 5- Customers are unorganized and repeat themselves.
- 6- An item may need to be explained in detailed.
- 7- Customers request a large amount of information.
- 8- Must call different department for information
- 9- Unorganized service representatives
- 10- Customers do not have the proper information.
- 11- Customers keep asking you to repeat yourself.
- 12- Customers may be doing more than one transfer.
- 13- Customers may be inquiring on more than one account.
- 14- VISA problems are difficult to explain.
- 15- Loan problems are difficult to explain.
- 16- HEQ problems are difficult to explain.
- 17- Transfer funds from one account to another.
- 18- Customers want you to balance their accounts.
- 19- Blocking ATM or VISA cards.
- 20- Stopping payment.
- 21- Change of address and/or information.
- 22- Customers with multiple questions.
- 23- Freezing a checking account.
- 24- Filling out forms.
- 25- Customers lack of banking knowledge.
- 26- Accessing more than one computer system (or screen).
- 27- CD rates for several different periods of time.
- 28- Difficulty in communication.
- 29- Customers using representatives as a switchboard (accessing a computer directory)
- 30- Lack of training on some of products or new products.
- 31- NES items and why they were returned.
- 32- Customers taking other incoming calls while they are on the line.
- 33- Accounts that are nor balancing (need all activities).
- 34- Changing type and linking accounts
- 35- Placing hold on HEQ.
- 36- Customers do not get right to the point.

- 37- Inaccessibility to flow patterns of research.
- 38- Inaccessibility to verbal answers.
- 39- It is hard to understand customers.
- 40- Placing a hold on HELOC for a branch.



## خلاصة

فى بداية ثورة إدارة الجودة الشاملة ، كانت إدارة الجودة الشاملة تطبق على القطاع الصناعى و كان قطاع الخدمات مهمل . لقد أثبتت العناصر الفلسفية والأدوات العامة لإدارة الجودة الشاملة تأثيرها على نجاح وبقاء المنظمات الصناعية . لهذا تم تطبيق إدارة الجودة الشاملة لتحسين أداء مكونات النظام الإنتاجى والتي مكنت المنظمات الصناعية من المنافسة فى السوق العالمى . ومع ذلك ، وفى السنوات الأخيرة ، واجه مستخدمو إدارة الجودة الشاملة تحدى فى تطبيق العناصر الفلسفية والأدوات العامة لإدارة الجودة الشاملة على المنظمات الخدمية المتعددة فالمنظمات الخدمية تتنافس فى بيئة تتصف بمنافسة عالمية عالية ، ووعى مستهلك ، وتوقعات عملاء عالية ، لهذا، فالمنظمات الخدمية والتي تسعى الى تحسين الكفاءة ، والفاعلية ، والربحية فى عملياتها ، يجب ان تتبنى فلسفات إدارة الجودة الشاملة فى منظماتها ، لهذا ، يتوجب على المنظمات الخدمية أن توصل وبشكل متناسق مستويات خدمة تحقق أو تتجاوز توقعات العملاء ، إذن ولكى تحسن وضعها التنافسى ، تحتاج المنظمات الخدمية لتطوير وتطبيق نظام جودة يضمن التحسين المستمر للجودة والإنتاجية . بالإضافة الى هذا ، يتوجب على المنظمات الخدمية والتي تسعى للحفاظ على أو تحسين وضعها التنافسى أن تركز على عملائها والتأكيد على أن العملاء هم القوة الدافعة وراء مخرجات الجودة .

فى هذه الورقة ، تم تقويم وتحليل مركز الخدمة الهاتفية فى بنك لتحسين عملياته . يعمل فى المركز 60 موظف لخدمة العملاء . كل موظف مسؤول عن، إجابة استفسارات العملاء . تتكون هذه الدراسة من اربع مراحل تهدف المرحلة الاولى الى فهم عملية الإجابة على مكالمات العملاء . يتحقق هذا الهدف بواسطة خطوتين كالتالى ، وفى الخطوة الأولى تم محاولة فهم كيف يجب و يتعامل موظفو البنك مع مكالمات وشكاوى العملاء ، وفى الخطوة الثانية تم رسم خريطة مسار لعملية الإجابة على المكالمات والتي توضح عملية الإجابة على المكالمات من البداية ( عندما يتصل العميل ) حتى النهاية ( عندما ينهى العميل المكالمة ) ، فى المرحلة الثانية تم عمل استبيان لتحديد الأسباب الرئيسية التي تؤدي الى أن تتجاوز المكالمة حد الدقيقتين . وفى المرحلة الثالثة ، تم تحليل البيانات التي يوفرها النظام وتم رسم خرائط المراقبة . وأخيرا ، تقدم المرحلة الرابعة توصيات لتحسين أداء مركز الخدمة الهاتفية وكذلك إعادة تصميم عملية الإجابة على المكالمات .