AWARENESS AND PERCEPTIONS OF MANAGERS IN A MANUFACTURING ORGANIZATION REGARDING TOTAL QUALITY MANAGEMENT (TQM)

by

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Dedicated to my

Beloved Parents

(Maktiar Singh & Dalip Kaur)

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
CSF	-	Critical Success Factors
EDP	-	Electronic Data Processing
EFQM	-	European Foundation of Quality Management
GDP	-	Gross Domestic Product
QA	-	Quality Assurance
QC	-	Quality Control
QFD	-	Quality Function Deployment
QWL	-	Quality of Working Life
SPC	-	Statistical Process Control
SRC	-	Sharp-Roxy Corporation (M) Sdn. Bhd.
TQ	-	Total Quality
TQC	-	Total Quality Control
TQM	-	Total Quality Management

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ABSTRACT

A survey concerning managers' awareness and perception of TQM was carried out in a manufacturing organization to examine: the awareness of managers regarding TQM; the perception of managers regarding the Critical Success Factors; and the difficulties perceived by managers in getting commitment to TQM. The awareness and perception of TQM are based on two models - Model for TQM implementation and Critical Hierarchy Model.

The sample comprised of 261 top, middle and lower managers from 13 departments (Personnel and General Affairs, Cost Control, Accounts, Purchasing, Shipping, Electronic Data Processing, Value Engineering, Engineering, Production/ Operations, Production Control, Production Engineering, Quality Control, and Parts Control).

The alternative hypotheses developed for this research are: Awareness of managers regarding TQM differ according to level of management and departments; Perception of managers regarding the critical success factors differ according to level of management and departments; and The difficulties perceived by managers in getting commitment to TQM differ according to level of management and departments.

Findings revealed that no statistical significant differences exists for: managers' awareness regarding TQM among levels of management; managers' perception regarding the CSF among levels of management; and managers' perception of difficulties/barriers among levels of management and departments. Findings revealed that statistically significant differences exists for: managers' awareness regarding TQM among departments and managers' perception regarding CSF among departments. Satisfying external customers/clients is what TQM means to most managers. Managers considered necessary management behaviors as the most critical factor in TQM implementation. Results reflect that TQM is partially practiced in the organization. Findings of this study were discussed in relation to previous research and literature on TQM.

CHAPTER ONE

INTRODUCTION

1.1 The Research Problem

A new approach to quality - total quality management (TQM) - will be a major input focus and trend in the 1990s. The philosophy, concepts and potential benefits of TQM are becoming well known. Many organizations in US, Europe and UK are introducing TQM where TQ is a strategy and the only way to survive in the 1990s and beyond. Even several colleges and universities have begun using the principles and practices of TQM to manage how they educate and generate knowledge. Developing a TQM and supporting its implementation is a demanding task which requires a period of years, a complex blend of technical, inter-personal and political skills, and the right organizational cultural environment. It also demands characteristics of tenacity and persuasiveness. Leaders or managers need to have the broad range of professional skills necessary to support TQM.

Many corporate entities have found the key to competitive success in the implementation of a TQM program and philosophy. Many leading industrial companies credit TQM as a key to their success. TQM holds a significant

place in Japanese management practice and is claimed by its proponents to be the fundamental reason for Japan's success.

Companies known for quality have higher productivity and better profit margins and capture larger market shares (Scott, 1989; Tenner and DeToro, 1992; Palmer and Saunders, 1992; Horst, 1992; Jones, 1992a; Hohner, 1993). Quality leaders like Hewlett-Packard, IBM, Procter and Gamble, Johnson & Johnson, Maytag, Dana Corporation, Intel, Texas Instruments, 3M, Caterpillar, Delta, Marriott, McDonald's, Dow Chemical, Xerox, and General Electric are among the consistently productive firms that provide quality products and rank among the top in their respective industries (Shetty, 1989; Shetty, 1991/92; Schneider, 1992). They all implement TQM.

TQM plays a vital role in Banc One Corporation's quest of: "Striving to be the 'best of the best"'. As a result of its efforts in adopting TQM, Banc One has increased the skills, knowledge, and capabilities of its 23,000 employees. In addition to learning through formal training programs, the bank's personnel gain vital information through customer and employee surveys. (Tenner and DeToro, 1992).

TQM is the key business improvement strategy and the key management issue of the future because it is essential for efficiency and competitiveness (Hakes, 1991). TQM is not an option but rather a reality for companies doing business in a capitalist society. The discipline of competition arising from the free market requires the elements found in TQM: customer-driven quality, strong uality leadership, continous impovement, full employee participation, management by fact, companywide application, quality and operational results, and systematic quality strategies, methods and practices. Hence, TQM is the only source of sustainable competitive advantage (Spitzer, 1993). There is a widespread consensus that.TQM is a way of managing organizations to improve their overall effectiveness (Porter and Parker, 1993). It is a strategy to become the best, which means TQM is not only applicable to companies doing business in a capitalist society, but also equally applicable to profit and non-profit organizations in all types of societies.

1.2 Study Context

Quality is no longer an option. The search for quality has leapt from focusing exclusively on the production function to embrace all the activities of the firm, and from being mainly concerned with decisions at the operative level to constitute one of the main objectives of strategic policy, involving management at all levels. The quest for competitive advantage has prompted numerous firms to initiate TQM and the roster of companies taking on a

customer-driven focus is growing daily. TQM recognises management plays the key role (Fisher, 1992) and to be able to achieve holistic TQM, the first and primary element is leadership (Wilkinson and Witcher, 1993). An effective implementation strategy can only be developed when the necessary management behaviours have been adopted (refer Figure 2.3).

According to the Economic Report 1992/93 (1992), it was estimated that the contribution of the manufacturing sector to real GDP in 1992 would be 29.3 percent and has been projected to increase further to 30.9 percent in 1993. Manufactured exports accounted for 65 percent of total merchandise export earnings in 1991 and was expected to rise and amount for 68.7 percent of total mechandise export earnings in 1992. It is very clear that the manufacturing sector plays a very important role in the Malaysian Economy and is the vehicle in realising Malaysia's 2020 vision. Consequently, Malaysian firms in an attempt to gain world recognition for quality and acquire a competitive edge, plus penetrate new markets, cannot escape from implementing Total Quality Management.

In view of the criticality of quality in the Malaysian environment, be it the manufacturing or service sector, and the dire need for more research on TQM, this study is undertaken to investigate the awareness and perceptions of

managers towards TQM. The manufacturing sector is choosen to be studied due to its increasing contribution to the national economic growth and realization of Malaysia's vision 2020.

1.3 Objective of Study

The main objective of this study is to investigate the awareness and perceptions of managers regarding Total Quality Management in a manufacturing firm located in Sungei Petani, Kedah.

The specific objectives of this study are to investigate:

1. the awareness of managers regarding TQM;
2. the perception of managers regarding the critical success factors of TQM;
3. the difficulties perceived by managers in getting commitment to TQM.

1.4 Definition of Awareness and Perception

In this study, **awareness** of managers refers to the understanding of managers regarding the importance of TQM factors. It reflects on what TQM means to them and what is involved in TQM (Ishikawa, 1985; Moskal, 1991; Hunt,

1992; Schonberger, 1992,; Johnson, 1993a; Hohner, 1993; Moreno-Luzon, 1993; Wiele, Dale, Timmers, Bertsch and Williams, 1993).

Perception refers to the way managers perceive TQM; what they think and feel about TQM; how they view TQM (Crosby. 1989; Lascelles and Dale, 1989; Charlton, 1990a; Charlton, 1990b; Dale, Lascelles and Plunkett, 1990; Benson, 1991; Benson, 1993a; Kukalis, Chong and Mortagy, 1993; Reeves and Bednar, 1993).

1.5 Plan of Study

Below is presented an overview of the research process for this study.

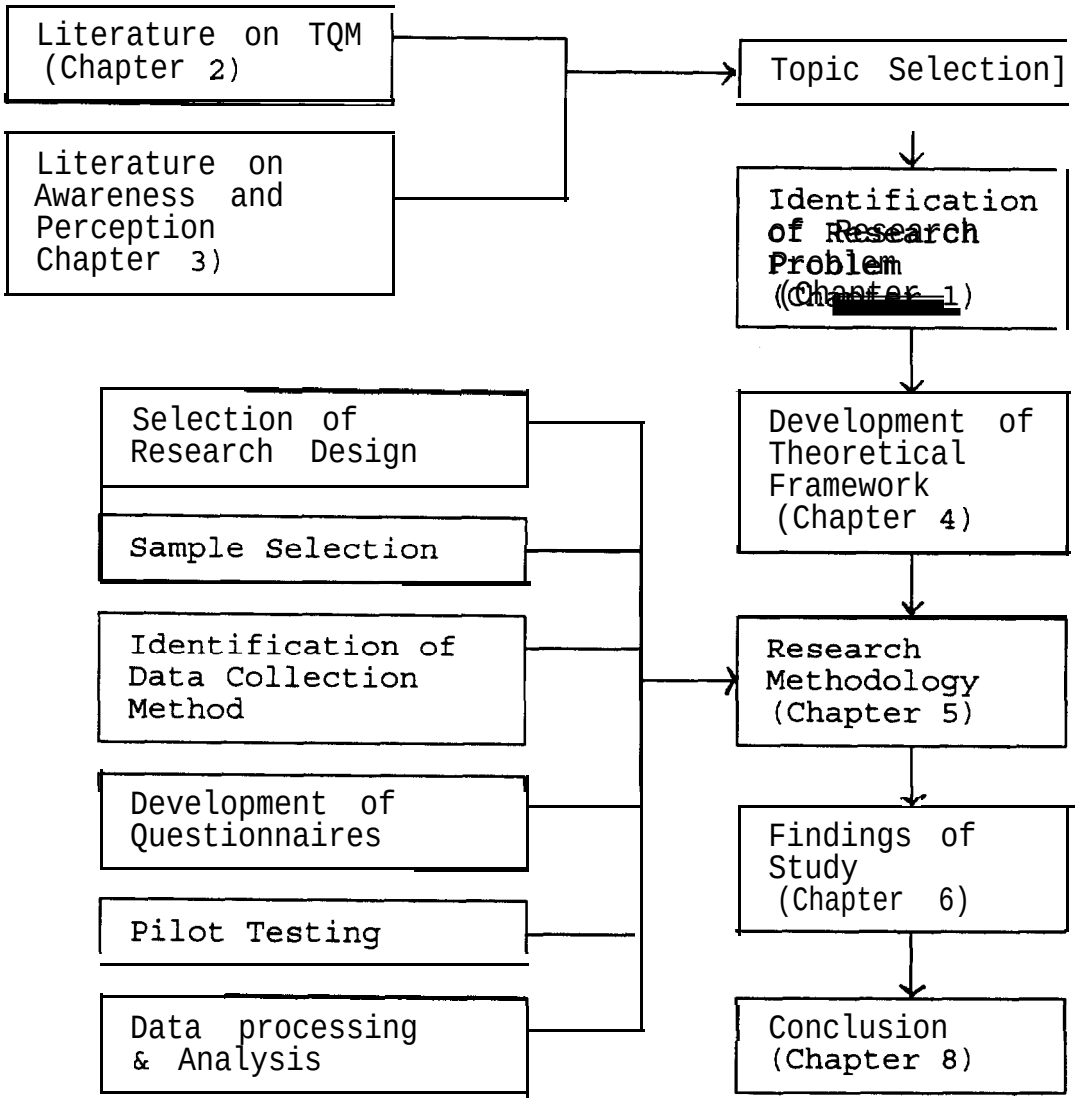


Figure 1.1: Overview of the Research Process

1.6 Significance of the Study

It is hoped that this research will throw some-light regarding the level of managers' awareness and their perception towards TQM in a manufacturing organization. Feedback from this survey can be used by the organization concern to implement total quality management by taking further action where necessary. Findings of this research can also be used as a guideline for similar organizations with similar environment.

It is hoped that this research will contribute to the knowledge of TQM in Malaysia.

CHAPTER TWO

TOTAL QUALITY MANAGEMENT (TQM)

2.0 Introduction

This chapter will briefly discuss the background of Total Quality Management Quality (TQM) and its evolution. Popular concepts of the Quality world will be highlighted, followed by a detail discussion on TQM - principles and elements of TQM, critical success factors of TQM, and the difficulties or barriers encountered in implementing TQM.

2.1 Background

TQM can be seen as a development - conscious or unconscious - from both Scientific and Human Relations. From Scientific Management perspective it has taken the focus on optimizing processes. From Human Relations perpective, it has adopted the consultative approach to management. To these it has added a combined focus on quality improvement and an approach based in statistical techniques. From the perspective of organization theory, TQM enables the statistical manipulation of data, now made available through computer technology,

to be incorporated into bureaucratic control structures. The acceptablilty of such structures for the organization member is enhanced by the establishment of teams and quality circles which encourage all workers to include the inspection, monitoring and improvement functions within their work roles, thus expanding their responsibility and authority at a local level while ensuring global consistency of direction through the control structures.

2.2 Evolution of Total Quality Management

Figure 2.1 shows one view of the evolution of total quality. Total quality can be considered partly technical - largely Just-In-Time combined with the right diagnostic tools from quality engineering; and partly cultural - largely drawn from the field of Organization Development, including adult education and management training and sociotechnical systems theory.

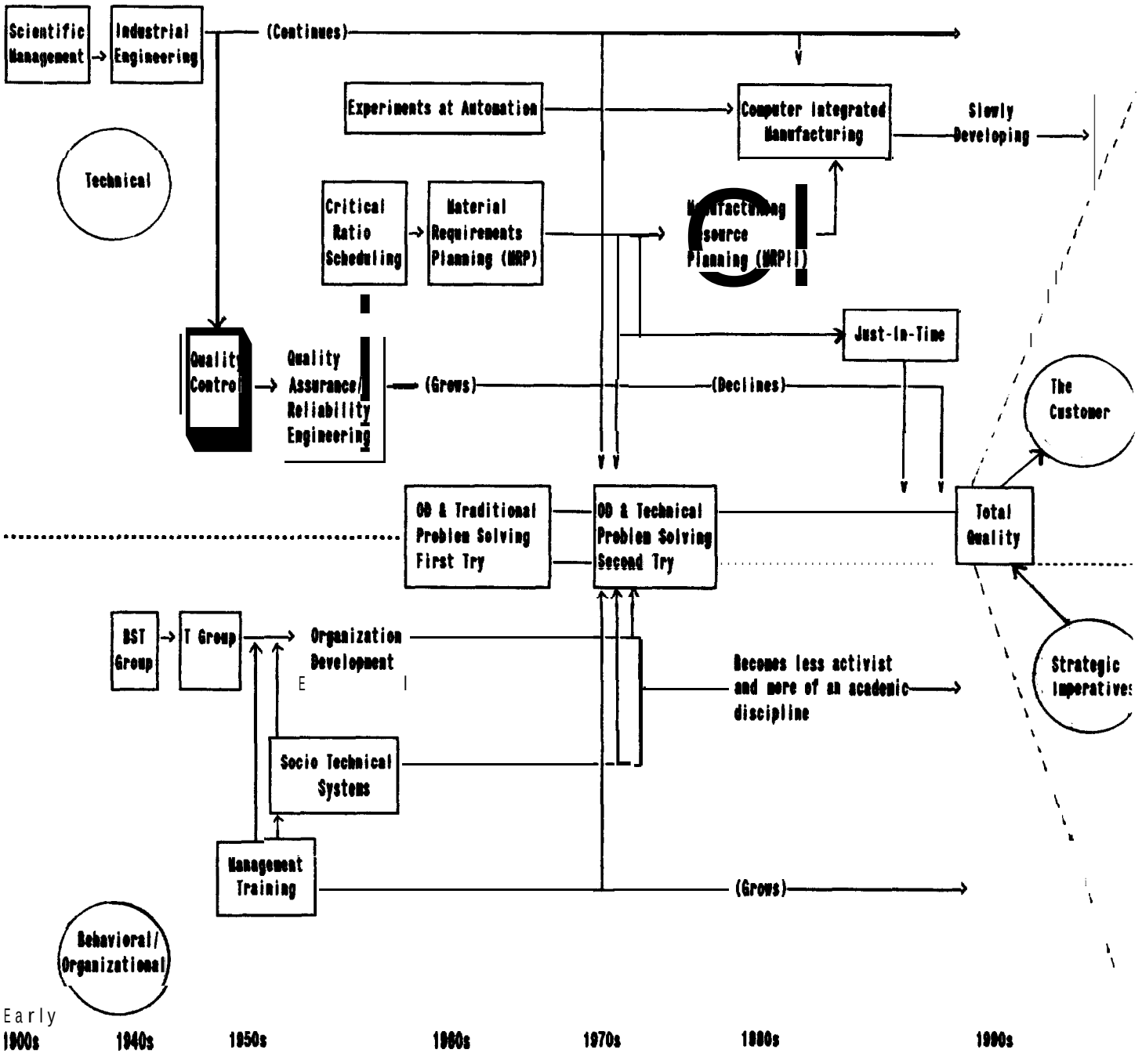


Figure 2.1: One View of the Evolution of Total Quality
(Ciampa, 1992; p. 38-39)

TQM has gone through a number of changes over the past two decades. During the 1970s, the quality focus was on effective sampling techniques for identifying and eliminating defective products. In the 1980s, the emphasis switched to statistical process control (SPC) and to catching defects at the source rather than picking them up later on ("doing it right the first time"). Statistical controls continue to play an important part in TQM. However, SPC has now been supplemented by customer considerations. In particular, TQM has moved from a set of numbers on a chart to answering the 'question: What does the customer really want? (Lee, Luthans and Hodgetts, 1992).

2.3 Concepts

In the quality world we here of quality, quality control, quality assurance, total quality and total quality management. What do the quality gurus and quality consultants say about them?

2.3.1 Quality

The term quality can have many different interpretations:

* Webster's Dictionary (Gove {ed.} 1991) Relative nature or kind or character', 'Degree of Excellence'.

* Crosby (1979): ‘Quality is free’, ‘Conformance to requirements’.

* Juran (1989): ‘Fitness for Use’.

* BS4778: 1987 (ISO8402: 1987, Quality Vocabulary Part 1, International Terms): ‘The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs’ (Hakes , 199 1).

* Ciampa (1992): ‘Quality is a function of expectations. ’ ‘Quality is that which meets the customer’s expectations. ’

Tenner and DeToro (1992) define quality “as a basic business strategy that provides goods and services that completely satisfy both internal and external customers by meeting their explicit and implicit expectations. " (p. 31)

Managing for quality is carried out through a trilogy of managerial processes: Quality Planning, Quality Control, and Quality Improvement. (Juran, 1988).

2.3.2 Quality Control

Quality control is the control of quality during an operational process and at the post-process stage. Its characteristics are containment and inspection (Wilkinson and Witcher, 1993). According to Japan Industrial Standard Z8101-1981, quality control is "a system of means to economically produce goods or services which satisfy customers' requirements" (Sullivan, 1988).

2.3.3 Quality Assurance (QA)

Quality assurance is the achievement of specified levels of quality by the removal of the root causes of poor quality. Its characteristics are problem solving and prevention (Wilkinson and Witcher, 1993). EOQC Glossary . Committee has defined QA as those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality (Kogure, 1992). Three fundamental functions of QA are securing quality, ascertaining quality and verifying quality. "In short, quality assurance means to assure quality in a product so that a customer can buy it with confidence and use it for a long period of time with confidence and satisfaction" (Ishikawa 1985, p. 75).

2.3.4 Total Quality

Total quality is the application of quality assurance to every company activity, so that zero defects are achieved (or aimed at). Its characteristics are the application of good practice quality management principles to the whole company, as popularized by the so-called quaity gurus, principally the ideas of Deming (1985), Juran (1989) and Crosby, (1979). Total Quality Control (TQC) is a management philosophy requiring total commitment from all levels in the company. TQC comprises three main objectives: continuous process improvement, universal participation, and focus on the customer (internal and external) (Dempsey and Hesketh, 1988). The basic objective of total quality control (TQC) consists of bringing about company reforms in the following areas: (1) distinguishing potential future development projects, (2) planning seriously for the future, (3) paying strict attention to processes, (4) prioritizing and focusing attention on problems, and (5) focusing attention on the corporate system (Mizuno, 1988).

2.3.5 Difference between Quality Control, Quality Assurance and TQM

Quality control places an emphasis on final inspection by a separate 'QC Department' and so removes the responsiblity for quality from the manager of the process. Quality Assurance maintains the responsibility with the manager, giving the 'QA' department more of a training and audit role. TQM takes the notion that the quality is an aspect of general management, further arguing that Quality Assurance is needed in all parts of the organization and not only in production (Palmer and Saunders, 1992). Total quality management is a continual process which is both proactive and reactive to the changing needs of the business and its customers. An organisation will never arrive at total quality management; it can only keep going further along the road (Dale and Plunkett, 1990).

2.4 Total Quality Mangement (TQM)

During the 1980s, consultants and writers began to talk about total quality management as something greater than just total quality. According to Wilkinson and Witcher (1993) there is still no universally recognized definition of TQM but authors write of TQM as a form of business management for the whole organization.

In some respects, TQM may be seen as an extension of the interest in excellence and the so-called Japanese management techniques in the 1980s. In fact, TQM is usually perceived to be Japanese, although one Japanese quality expert (Masaaki Imai) has indicated that it is basically "good management" rather than anything uniquely Japanese. Some even claim that it is common sense; yet it is not so common practice.

Total Quality Management is total quality control's organizationwide impact. Total qualtiy control's organizationwide impact involves the managerial and technical implementation of customer-oriented quality activities as a prime responsibility of general management and of the main-line operations of marketing, engineering, production, industrial relations, finance, and service as well as of the quality-control function itself (Feigenbaum, 1991; p. 13).

Total quality management is an approach to improving the effectiveness and flexibility of businesses as a whole. It is essentially a way of organizing and involving the whole organization; every department, every activity, every single person at every level. For an organization to be truly effective, each part of it must work properly together, recognizing that every person and every activity affects, and in turn is affected by, others (Oakland, 1989).

Scurr (1990) defines TQM as "Continously meeting agreed customer requirements at the lowest cost by releasing the potential of all employees". In this definition, three important themes are: the customer, cost, and employee role. This holistic approach includes the internal as well as the external customer, a sense of commercial reality through cost, awareness, and utilising people to the full potential.

Lee, Luthans and Hodgetts (1992) define TQM as "an organizational strategy and accompanying techniques that result in the delivery of high-quality products and/or services to customers" (p. 44).

The Institute of Management Services defines total quality management as:

> "a strategy for improving business performance through the commitment and involvement of all employees to fully satisfying agreed customer requirements at the optimum overall cost through the continous improvement of the products and services, business processes and the people involved".
>
> (Jones, 1992b, p. 18)

According to Fisher (1992), seven key principles of TQM are as follows. It

(1) is a **management philosophy**

(2) **seeks continuous improvement** in **all** processes, products and services

(3) requires the **understanding of variation**

(4) emphasizes the **importance of measurement**

(5) requires an understanding of **the role of the customer (and the supplier)**

(6) emphasizes **the involvement of employees at all levels**

(7) recognizes that **management plays the key role**

Wilkinson, Allen and Snape (1991,in Brown, 1992) describe TQM in terms of hard and soft components, where the former refers to statistical and other quantitatively based techniques of quality control, and the latter, employee participation and teamwork.

2.4.1 Differece between TQM and traditional management

TQM differs from traditional management in that:

1. traditional management's focus is on its own requirements, while TQM focuses on the customer,

2. TQM takes the view that profits follow quality, while traditional management views profits as its first responsibility,

3. TOM considers quality as multidimensional and customer-oriented, while traditional management defines quality in terms of a single dimension,

4. TQM encourages every employeee to find better ways to work, while, with traditional management, workers work and managers manage, and

5. TQM takes a long-term, process-oriented approach to improving process quality, while traditional management strives for short-term, results oriented gains (Tobin, 1990).

2.5 Principles and elements of Total Quality Management

Three fundamental **principles** of total quality are focus on the customers, internal and external; focus on improving work processes to produce consistent, acceptable outputs; and focus on utilizing the talents of those with whom we work. Six supporting **elements** are leadership, education and training, supportive structure, communications, reward and recognition and measurement.

2.5.1 Model for Implementing TQM

A number of approaches have been used to implement TQM. For implementing TQM, Tenner and DeToro (1992) have put forward a model as in figure 2.2, based on the above three quality principles and six supporting elements.

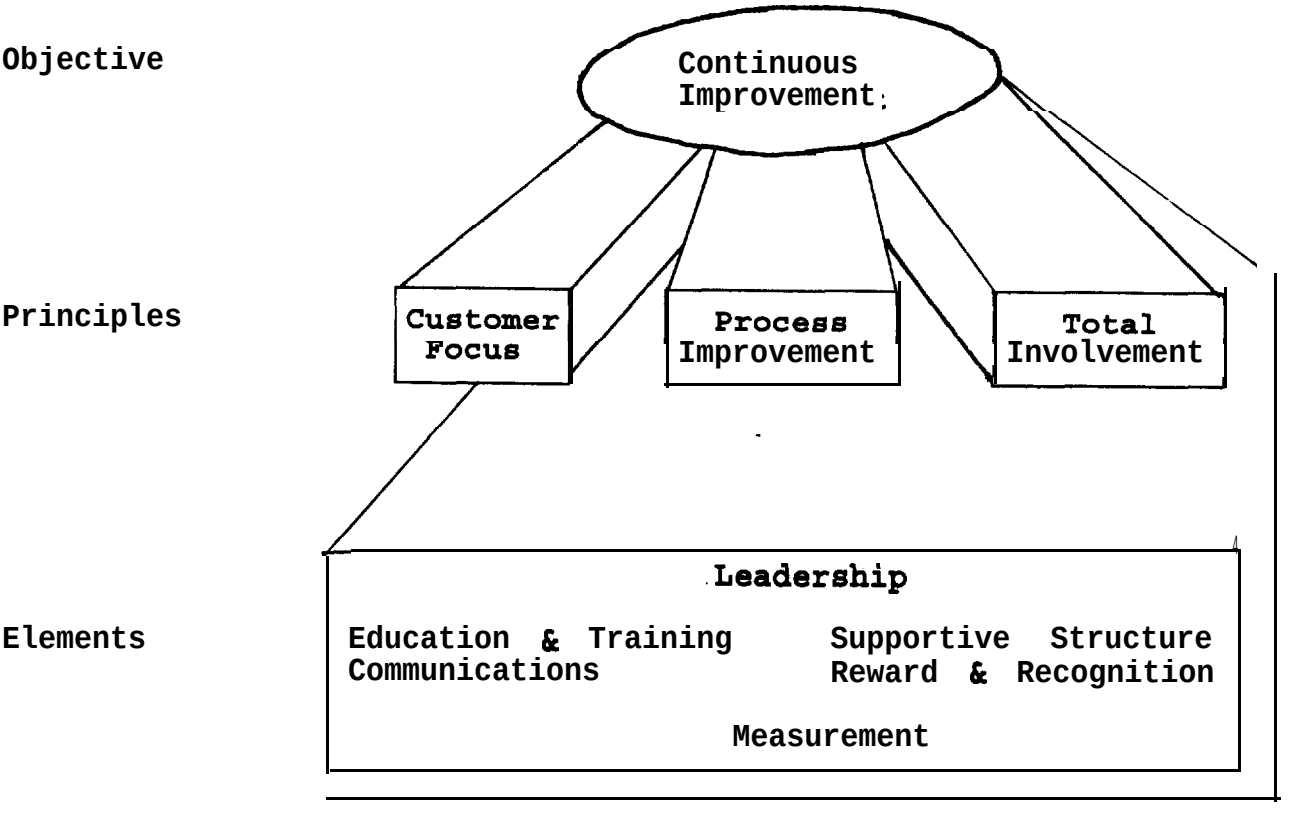


Figure 2.2: Implementing Concept8 (Tenner and DeToro, 1992; p.32).

2.5.2 Quality Principles

i) **Customer focus:** Quality is based on the concept that everyone has a customer and that requirements, needs, and expectations of that customer must be met every time if the organisation as a whole is going to meet the needs of the external customer. This concept requires a thorough collection and analysis of customer requirements, and when these requirements are understood and accepted, they must be met.

ii) **Process improvement:** The concept of continuous improvement is built on the premise that work is the result of a series of interrelated steps and activites that result in an output. Continuous attention to each of these steps in the work process is necessary to reduce the variability of the output and improve the reliability of the process. The first goal of continuous improvement is processes that are reliable in the sense that they produce the desired output each time with no variation. If variability has been minimized and the results are still unacceptable, the second goal of process improvement is to redesign the process to produce an output 'that is better able to meet the customer's requirement.

iii) **Total involvement:** This approach begins with the active leadership of senior management and includes efforts that utilize the talents of all employees in the organization to gain a competitive advantage in the marketplace. Employees at all levels are empowered to improve their outputs by coming together in new and flexible work structures to solve problems, improve processes, and satisfy customers. Suppliers are also included and, over time, become partners by working with empowered employees to the benefit of the organization.

2.5.3 Supporting Elements

i) **Leadership:** Leadership is about quality-committed senior management. It is this which must ensure that the principles of TQM are fully implemented, continually sought and improved in practice. Senior management must lead this effort by example, by applying the tools and language, by requiring the use of data, and by recognizing those who successfully apply the concepts of TQM. When installing TQM as the key management process, the importance of the role of senior managers as advocates, teachers, and leaders cannot be overstated.

The senior officer of any organization should fully appreciate the implications of managing in an international economy in which the world's best educated, most competent, and most successful managers may be employed by the competition. This hard reality will awaken senior managers to the fact that they must develop, in a participative manner, their mission and their vision as well as a management process that they can use to attain both. Business leaders must understand that total quality management is such process and is composed of principles and supporting elements that they must manage in order to achieve continuous quality improvement.

Leadership is the job of management. It is the responsibility of management to discover the barriers that prevent workers from taking pride in what they do. The job of the manager is to lead, to help people do their jobs better. In hiring people, management takes responsibility for their success or their failure. Dr Deming contends that most people who do not do well on the job are not malingerers, but have simply been misplaced. "…..or has very poor management" (Walton, 1989, p.70).

ii) **Education and training:** Quality is based on the skills of every employee and his understanding of what is required. Educating and training all employees provides the information they need on the mission, vision, direction, and strategy of the organization as well as the skills they need to secure quality improvement and resolve problems. This core training ensures that a common language and a common set of tools will be used throughout the firm. Additional training on benchmarking, statistical, and other techniques is also required to pursue and achieve complete customer satisfaction. "Training should, of course, be accompanied by general awareness education of the principles of TQM, which would ultimately cover the whole organisation" (Scurr, 1990).

iii) **Supportive structure:** Senior managers may require support to bring about the change necessary to implement a quality strategy. Such support may be provided by outside consultants, but it is clearly far superior for an organization to be self-sufficient, a small support staff can help the senior management team understand the concepts of quality, assist by networking with other quality managers in other parts

of the organization, and serve as a resource on the topic of quality for the senior management team.

iv) **Communications:** Communications in a quality environment may need to be addressed differently in order to communicate to all employees a sincere commitment to change. Managers should meet personally with employees to disseminate information, provide direction, and respond to questions from everyone. Success stories recognizing individuals, examples of the application of quality tools, and cases of improved customer satisfaction are all material for quality communications. Many sincere total quality management efforts are unsuccessul because organizations do not understand how to communicate quality. To make organizational change occur, an effective quality communication approach must try to influence individual behavioral change, but in such a way that the organizaton enjoys maximum benefit from the change (Quimby, Parker, and Weimerskirch, 1991).

v) **Reward and recognition:** Teams and individuals who sucessfully apply the quality process must be recognized and possibly rewarded, so that the rest of the

organization will know what is expected. Actions speak louder than words; so for example it's critical that people who contribute to quality improvement be recognized and rewarded (Strolle, 1991, p. 8). Failure to recognise someone who achieves success using the touted quality management process will convey the message that this is not the true path to job success, possible promotion, and overall personal success. In the early stages of any new fundamental change, especially a new management process, employees are looking for subtle signals as to management's true intention, its true motives. Recognizing successful quality practitioners provides role models for the rest of the organization.

vi) **Measurement:** The use of data becomes paramount in installing a quality management processs. Clearly, opinions must give way to data and everyone must understand that it's not what you think that's important, it's what you know! To set the stage for the use of data, external customer satisfaction must be measured to determine the extent to which customers perceive that their needs are being met. The collection of customer data provides an objective, realistic assessment of performance and is useful in motivating

everyone to address real problems. According to Strolle (1991, p.8), in reaching continuous improvement management, leadership has to decide what criteria (Key Measures) should be used in measuring progress toward the vision.

2.6 The Critical Success Factors

Porter and Parker (1993) and other researchers have identified the critical success factors necessary for the successful implementation of TQM as follows:

2.6.1 **Necessary management behaviors:** Clear leadership and vision is required and senior management must demonstrate a commitment to TQM and be actively involved in the TQM process. Management should set an example by managing quality as a key strategic issue and supporting continuous improvement (Juran, 1989; Atkinson, 1990; Lim, 1990; Mercer and Judkins, 1990; Chapman, Clarke and Sloan, 1991; Cieri, Samson and Sohal, 1991; Hakes, 1991; Bowen and Lawler 111, 1992; Ciampa, 1992; Hunt 1992; Benson, 1993a; Kukalis, Chong, and Mortagy, 1993; Porter and Parker, 1993).

2.6.2 **A strategy for TQM implementation: The** specific TQM objectives and requirements of the organization must be determined. The TQM activity must be incorporated into the organizations' business plans and the means for continuous improvement established (Atkinson and Naden, 1989; Cieri et. al., 1991; Hakes, 1991; Steele, 1993).

2.6.3 **Organization for TQM:** TQM requires an organizational structure which demands and harness the full potential of the workforce. A team structure provides the means for involvement and the power for quality improvement. The hierarchial structure with a facilitation role provides a clear line of authority for setting goals and reviewing progress (Benson, 1993a).

2.6.4 **Communication for TQM:** Communication provides the means of raising quality awareness and involvement and reinforcing the message. It is also critical as a means of publicizing achievements and recognizing contributions to quality improvement (Atkinson and Naden, 1989; Cieri et. at., 1991; Hunt, 1992).

2.6.5 **Training and education:** Education and training should cover all employees as part of an ongoing process, with the scope and depth tailored to suit each group's needs (Juran, 1988;

Atkinson and Naden, 1989; Juran, 1989; Shetty, 1989; Walton, 1989; Mercer and Judkins, 1990; Aguayo, 1991; Patten, Jr., 1991192; Brown, 1992; Benson, 1993a; Steele, 1993).

2.6.6 **Employee involvement:** Involvement in the TQM process is a key determinant of a successful programme. Until everyone is involved in the process of quality improvement, there is a major cost of lost opportunity being carried by the organization (Lim, 1990; Cieri et. al., 1991; Hakes, 1991; Hunt, 1992).

2.6.7 **Process management and systems: A** key part of any total quality strategy is the management of processes. A documented quality system, as part of a total quality strategy, contributes to this by managing the organization's processes in a consistent manner (Walton, 1989; Hunt, 1992; Benson, 1993a).

2.6.8 **Quality technologies:** Quality technologies, such as SPC, quality costing, benchmarking, etc., provide the techniques to identify opportunities and solve problems. They enable continuous improvements and reductions in variation to be achieved (Benson, 1993a).

2.6.9 Critical Factor Hierarchy Model

Porter and Parker (1993) have arranged these critical success factors in a hierarchial model as depicted in figure 2.3.

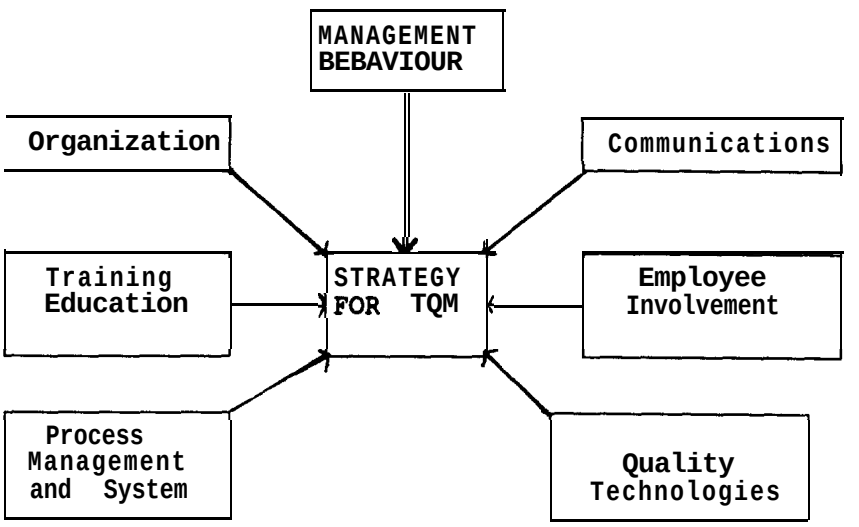


Figure 2.3: Critical factor hierarchy model
(Porter and Parker, 1993, p. 21)

This model relates the eight critical factors in a hierarchy. At the top of the model is necessary management behavior, which is a prerequiste for the development of a successful strategy for TQM. The strategy then decides how to address and incorporate the other factors in the TQM programme.

These factors can be compared with the critical factors determined by Saraph, Benson and Schroeder (1989 as cited in Porter and Parker, 1993) and those identified by the Malcom Baldrige National Quality Award (1992, cited in Porter and Parker, 1993). Table 2.1 shows a comparison of the critical success factors of TQM. There is no doubt that management/ leadership is the most critical factor in the implementation of TQM. In a TQM environment a manager is also a leader. TQM is a strategy driven by top management through leadership. 'A successful TQM drive forces senior managers to develop a culture and value system reflected in managerial behaviour to promote TQM through teamwork, leadership, training and communication' (Atkinson, 1990).

Table 2.1: A comparison of the critical factors of TQM

Porter and Parker	Saraph et al	Malcolm Baldrige Award
Management behaviours	Role of top management and quality policy	Leadership
Strategy for TQM	Role of top management and quality policy	Strategic quality planning
Organization for TQM	Role of the quality department	
Communication for TQM		
Training for TQM	Training	Human resource development and management
Employee involvement	Employee relations	
Process management and systems	Process management/ operating procedures	Management of process quality
Management of process quality		
Quality technologies	Quality data and reporting product/service design Supplier quality management	Information and analysis
		Quality and operational results
		Customer focus and satisfaction

(Porter and Parker, 1993, p. 15)

2.7 Difficulties/Barriers in TQM Implementation

During the introduction of TQM, or several years into its implementation, various problems or difficulties may arise. Based on the review of literature, the difficulties and barriers have been classified as below:

2.7.1 Management behaviors

negative management attitudes (Ching, 1988; Hull, 1989; Mortiboys, 1990); reluctant middle managers (Wilkinson and Witcher, 1991 in Wilkinson and Witcher, 1993).

lack of management commitment (including top management) (Lascelles and Dale, 1988; Dempsey and Hesketh, 1988; Ching, 1988; Oakland, 1989; Charlton, 1990a; Charlton, 1990b; Cieri, Samson and Sohal, 1991; Demouy, 1991; Coulson-Thomas, 1992; Dale, 1991 in Watson, McKenna and McLean, 1992; May and Pearson, 1993; Moreno-Luzon, 1993; Reeves and Bednar, 1993; Wiele, Dale, Timmers, Bertsch and Williams, 1993).

management failure to authorise sufficient manpower for quality improvement (Charlton, 1990a).

- changing behavior and attitudes (Lascelles and Dale, 1988; Mortiboys, 1990; Milakovich, 1991; Charlton, 1990b; Steers and Porter, 1987 in Schuler and Harris, 1992; Dale, 1991 in Watson, et. al., 1992; Moreno-Luzon, 1993; Wiele et. al. 1993; Whyte and Witcher, 1992 in Wilkinson and Witcher, 1993; May and Pearson, 1993).

  fear (Johnson, 1993b; Walton, 1989; Longenecker and Scazzero, 1993; Wiele et. al., 1993).

- lack of top management support (Reeves and Bednar, 1993).

- managers are not sure what is required of them (Dempsey and Hesketh, 1988; Wiele et. al., 1993).

lack of resources (Ching, 1988; Juran, 1988; Instone and Dale, 1989; Charlton, 1990b; Aguayo, 1991; Cieri et. al., 1991; Demouy, 1991; Comen, 1989 in Watson et. al., 1992; Moreno-Luzon, 1993; Reeves and Bednar, 1993; Wiele et. al., 1993).

emphasis on short-term gains/objectives (Oakland, 1989; Instone and Dale, 1989; Walton, 1989; Charlton 1990a; Charlton, 1990b; Wilkinson and Witcher, 1991 in Wilkinson and Witcher, 1993; Moreno-Luzon, 1993; Wiele et. al., 1993).

lack of organizational focus on quality (Oakland, 1989;).

no formal strategy (Oakland, 1989; Wiele et. al., 1993); lack of objectives and strategies (Moreno-Luzon, 1993; Wiele et. al., 1993); lack of clear goals and objectives (Aguayo, 1991; Cieri et. al., 1991).

competition in priorities (Juran, 1989); multiple and competing goals (Juran, 1989); short-term objectives conflict with long-term (Aguayo, 1991).

lack of direction (Aguayo, 1991; Chapman, Clarke and Sloan, 1991); uncertainty about what to do next (Wiele et al., 1993).

2.7.3 Organisation for TQM

climate for implementation (Ching, 1988;).

failure to provide incentives by recognition (Oakland, 1989); insufficient rewards (Reeves and Bednar, 1993).

lack of cooperation or barriers between departments (Charlton, 1990b; Moreno-Luzon, 1993; Wiele et. al., 1993; Wilkinson and Witcher, 1991, cited in Wilkinson and Witcher, 1993).

quality improvement is the concern of the quality department (Crosby, 1979; Ishikawa, 1985; Mortiboys, 1990; Moreno-Luzon, 1993).

quality improvement is the concern of production (Crosby, 1979; Moreno-Luzon, 1993; Wiele et. al., 1993).

2.7.4 Communications

lack of effective communication (Oakland, 1989; Reeves and Bednar, 1993); lack of communication (Dempsey and Hesketh, 1988; Charlton, 1990b; Aguayo, 1991; Wiele et. al., 1993).

failure to communicate management's commitment (Davies, 1988 in May and Pearson; 1993).

conflict between production and quality departments (Wiele et. al., 1993).

2.7.5 Training and education

narrowly based training (Oakland, 1989); poor training (Aguayo, 1991); inadequate or insufficient training (Reeves and Bednar, 1993).

unawareness (Juran, 1989); lack of management understanding regarding quality (Charlton, 1990a; Moskal, 1991); lack of understanding of TQM (Ishikawa, 1985; Lascelles and Dale, 1988; Cieri et. al., 1991; Demouy, 1991, Reeves and Bednar, 1993); lack adequate knowledge on quality or TQM (Aschner and Pataki, 1988; Demouy, 1991; Reeves and Bednar, 1993).

- badly educated and poorly trained workforce (Charlton, 1990b); low level of education (Chapman, Clarke and Sloan, 1991); lack of training and education (Demouy , 1991; Wiele et al., 1993); lack of intellectual thought given to the subject (Moskal, 1991; Wiele et. al., 1993).

- lack of leadership skills (Ishikawa, 1985; Chapman et. al., 1991).

- lack of expertise in quality management (Dale and Plunkett, 1990; Moreno-Luzon, 1993; Wiele et. al., 1993).

2.7.6 **Employee involvement**

underestimating the potential of people (Davies, 1988 in May and Pearson, 1993).

employees are not sure what is required of them (Aguayo, 1991; Chapman, Clarke and Sloan, 1991; Wiele et. al., 1993).

2.7.7 **Process management and Systems**

suboptimization (Juran, 1989).

deficiencies in the control process (Juran, 1989).

weak quality management structure (Morrison, 1990).

a tendency to cure symptoms of a problem (Wiele et. al., 1993).

production schedules and costs are treated as main priorities (Ishikawa, 1985; Wiele et. al., 1993).

quality system based on detection not prevention (Moreno-Luzon, 1993; Wiele et. al., 1993).

2.7.8 Quality technologies

quality management tools/techniques are seen as an end in themselves (Dale, Lascelles and Plunkett, 1990; Wiele et. al., 1993).

a single technique is thought to be capable of solving all quality problems and curing all ills (Dale et. al., 1990); statistical process control (SPC) is the answer to all the problems (Wiele et. al., 1993).

over reliance on the quality manual (Morero-Luzon; 1993; Wiele et. al., 1993).

2.8 Conclusion

Before implementing TQM, it is pertinent for an organization, firstly to establish a framework of total quality management by promoting quality awareness throughout the organization to avoid misconceptions and misunderstanding that become barriers to progress. For quality management to be total, managers from all levels and departments, have a crucial role in the implementation and success of TQM. Hence, to know

the awareness and perception of managers from all levels and departments regarding TQM, is the first step in launching Total Quality Management in an organization.

CHAPTER THREE

AWARENESS AND PERCEPTION

3.0 Introduction

In the previous chapter, TQM and related concepts were put forward. Presently, awareness and perception from the psychological perspective and organizational perseptive of TQM will be presented. Importance of managers' awareness and perception of TQM for an organization will also be discussed.

3.1 Awareness

Stratton and Hayes (1988) define awareness as 'A subjective state of being alert or conscious: cognisant of information received from the immediate environment'.

Drever (1952) says that awareness is the 'mere experience of an object or idea; sometimes equivalent to consciousness'.

The Dictionary of Behavioral Science (Wolman (ed), 1973) define awareness as 'being conscious of something; the state of perceiving and taking account of some event, occasion, experience or object'.

Johnson (1993a) says there are four specific steps that can identify an organization's progress on the TQM journey. The first step is **Awareness.** 'All employees in the organization must be aware of where they currently stand, where they are going, why they are going there, how they are going to get there, and who is leading the charge'. (p. 75)

According to Hunt (1992), 'Building awareness - understanding what "Quality First" is and why it is important to you and your organization - is one of the first and perhaps most important steps in implementing "Quality First". Every person in the organization must become aware of the need to improve, of the promise offered by "Quality First", of the various "Quality First" methodologies, and of the tools and techniques available for improvement efforts. Awareness is the key that opens the door to the potential of "Quality First" ' (p. 186).

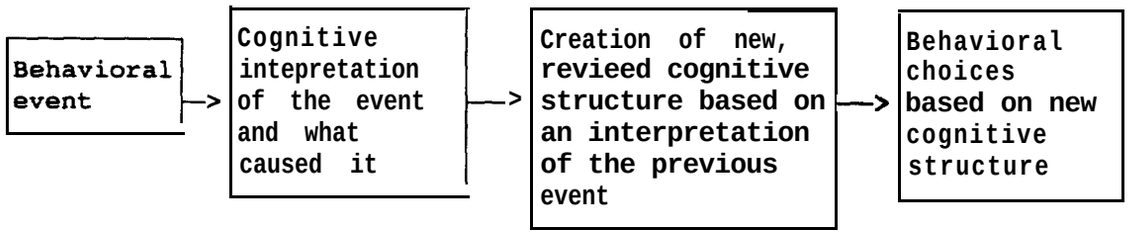
3.2 Perception

People are constantly being subjected to stimuli or cues from their environment, all of which compete for their attention. In the work place, these stimuli include supervisors' instructions, co-workers' comments, machine noises, people walking by, and posted signs and notices. Given the very large number of stimuli, individuals are faced with the problem of how to make sense out of so many variables, how to organize and interpret the more relevant stimuli, and how to respond to them. The process by which this is done is **perception.**

Perception is a process by which sensations, bits of information arising from the sense organs, are converted into organized and meaningful wholes (i.e. perceptual objects). It is necessary in order for us to experience order instead of chaos (Bruno, 1986).

By **perception** we mean the process by which an individual screens, selects, organizes, and interprets stimuli so that they have meaning to the individual. It is a process of making sense out of one's environment so an appropriate behavioral response can be made. **Attribution theory** explains the relationship between behaviors and perception; and help us to understand how perception can affect our attitudes and behavior at work. The underlying assumption of attribution theory is that people are motivated to understand their environment and the **causes** of particular events. If individuals can understand the causes of events, they will then be in a better position to influence or control the sequence of future events. This process is **diagrammed** in figure 3.1.

Process:



Example:

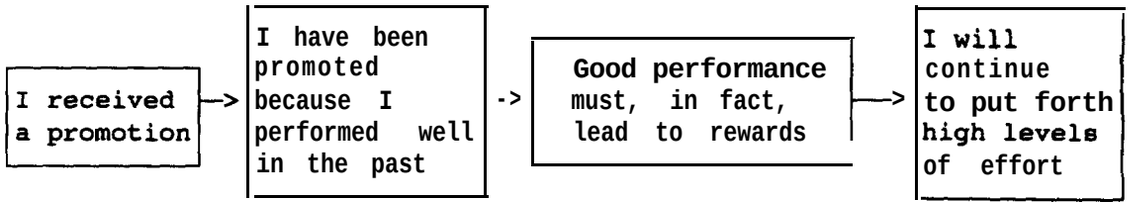


Fig.3.1: Schematic representation of the attribution process (Steers, 1988; p. 106)

Factors that influence **perceptual selectivity** (refers to the process by which certain objects in the environment are selected by individuals for attention) consists of external influences and personal influences. External influences include physical properties (size, intensity, contrast, novelty or familiarity) and dynamic properties (motion, repetition, ordering). Personal influences include response salience; response disposition; and attitudes and feelings toward object or person. These factors influence the extent to which attention is given to a particular stimuli or object in the environment.

Perceptual organization is the process whereby when meaning has been attached to an object, individuals are in a position to determine an appropriate response or reaction to it.

Social perception is the perception of social phenomena which includes persons and groups; perception of the behaviors of another which reveal his feelings, intentions, and attitudes (Dictionary of Behavioral Science, Wolman (ed), 1973).

Social perception consists of those processes by which we perceive other people. Major influences on social perception in organizations are:

1. Characteristics of the person perceived - physical appearance, verbal communication, nonverbal communication, ascribed attributes.

2. Characteristics of the situation - social context, organizational role, location of event. Two contexts that influence our perceptions are the organizaitonal culture and the organizaitonal structure. (Cherrington, 1989).

3. Characteristics of the perceiver - self-concept, cognitive structure, response salience, previous experience with individual.

3.3 Organizational structure

What we are prepared to see is influenced by the organizational level or department where the event occurs (Cherrington, 1989). Steers (1988) and Robbins (1991) call it selective perception - the process by which we systematically screen out information we don't wish to hear, focusing instead on more salient information. Saliency here is obviously a function of our own experiences, needs, and orientations (Steers, 1988). People selectively interpret what they see based on their interests, background, experience, and attitudes (Robbins, 1991). This process was illustrated by a study of managers from various departments done by Dearbon and Simon (1958, cited in Steers, 1988; Cherrington, 1989; and Robbins, 1991). The results showed that the executives' perceptions of the most significant problems were influenced by the departments in which they worked. Production managers focused on production problems to the exclusion of other problems. Accountants, personnel specialists, and sales managers were similarly exclusive. Everyone saw his or her speciality as more

important in the company than other specialties. The researchers raised the question that if functional executives continue to examine problems from their own rather narrow vantage points, who then will consider the problem from **an organizaitonal** perspective?

Another example of selective perception in groups and organizations is provided by Miner (1973, cited in Steers, 1988). Miner summarizes a series of experiments dealing with groups competing with one another on problem-solving exercises. Consistently, the groups tended to evaluate their own solutions as better than the solutions proposed by others. Such findings resemble the not-invented-here syndrome found in many research organizations. There is a frequent tendency for scientists to view ideas or products originating outside their organization or department as inferior, and to judge other researchers as less competent and creative than themselves. Similar patterns of behavior can be found among managers, service workers, and secretaries.

3.4 Importance of perception to managers

People behave based on how they see the environment, and views of the world differ considerably among individuals. Since perception influence an individual's behaviour, it is pertinent for managers to understand the perception process so that they can elicit the right response or behavior from their employees in order to fulfill organizational goals and objectives.

Perceptual processes also play an important role in the decisions managers make, such as employee selection, placement and promotion. Perception also plays a large part in the performance appraisal process. A knowledge of perception can also help managers communicate better and effectively.

Perception helps managers to understand themselves and others better. It helps them to make changes, when and how to do them. If employees are not receptive nor prepared to receive changes, managers can take certain actions like giving education and training in order to bring about the necessary changes. Therefore, it is vital that management have an undestanding of the factors that influence an individual's perception and behaviour.

3.5 Importance of Managers' Awareness and Perception Towards TQM for an Organization

According to Juran (1989) lack of upper-management understanding has contributed to the failure of some well-intentioned efforts to institute annual quality improvement. The people who are most in need of 'profound knowledge' are the managers, particularly top managers (Aguayo, 1991). Crosby's Quality Management Maturity Grid comments that management understanding and attitude are important (Crosby, 1979). "Nothing is more important than true understanding, and nothing

is harder to come. by. " (Crosby, 1979, p. 125). Hence, the importance of managers' awareness and perception of TQM.

In management, the first concern of the company is the happiness of people who are connected with it (Ishikawa, 1985). People peform well when they are happy. By eliciting their views on organizational activities, is a step forward to making them feel happy and important. An organization can do this by taking the trouble to gauge managers' awareness and perception of Total Quality Management. Since they have a central role in TQM implementation and the success of TQM largely depends on them, it is important that they are truly aware and perceive TQM correctly.

"Awareness and commitment at the point of production or operation is just as vital as at the very senior level. If it is absent from the latter, the TQM programme will not begin; if it is absent from the shop-floor, total quality will not be implemented." (Oakland, 1989, p. 272). The preliminary stages of understanding and commitment are vital first steps which also form the foundation of the whole TQM structure. Too many organizations skip these phases, believing that they have the right attitude and awareness, when in fact there are some fundamental gaps in their 'quality credibility'. These will soon lead to insurmountable difficulties and collapse of TQM. Hence, it is important for an organization to know the awareness and perceptions of managers regarding TQM.

Since management behavior has been identified by researchers as the most important critical success factor in the implementation of TQM, it is vital for an organization to know the awareness and perceptions of managers towards TQM. If they think certain TQM factors are less important, then they will pay less attention to them. If managers have different perceptions towards TQM, then they will behave differently from each other. "It is the employee's perception of a situation that becomes the basis on which he or she behaves. Evidence suggests that what individuals perceive from their work situation will infludence their productivity more than will the situation itself". (Robbins, 1991, p. 146). If the perceptions are in error, the actions will likely be in error as well. Therefore, once an organization can understand management's perception, it can also influence its behaviour towards implementing TQM.

A plan for quality improvement begins with the understanding of TQM. The prime remedy for awareness is education to provide information (Juran, 1989). How can managers lead by example and provide the dynamic leadership a TQM environment needs if they lack understanding and are not prepared psychologically to implement TQM? To have the correct perception of TQM is therefore a prerequiste to launch into a quality improvement program that involves the whole organization. To implement TQM successfully, it requires total involvement, support and commitment from all levels of an organization, more so from top management. Involvement begins with awareness and perception. To get

managers fully and whole heartedly involved, it is important to know what they think and feel about TQM.

Managers too need education and training regarding TQM. TQM is concerned chiefly with changing attitudes and skills (Oakland, 1989). The essence of changing attitudes to quality is to gain acceptance for the need to change, and for this to happen it is essential to provide relevant information, convey good practices, and generate interest, ideas and awareness. As one marketing analyst at Cleveland-based BP Chemicals, a division of British Petroleum said the biggest problem with the Quality drive in her organization was that "people who are already doing a 'good' job can't see why they need to change the way they work" (Benson, 1993b, p.43). With the right knowledge and skills for implementing TQM, resistance to change can be reduced, besides resulting in the necessary management behavior required for the implementation of a successful TQM. Knowledge is a key ingredient of quality. Education and training that begins at the top gradually cascades to the bottom in a TQM environment.

3.6 Conclusion

For perceptions to form, learning is required (the position taken by William James and many theoreticians) and the role of learning is to improve perception (argued by Gestalt Psychologists) (Bruno, 1986). Therefore, it is important for an organization to know the type of learning

that is required by managers so that they have the right perceptions and attitudes needed for implementing TQM successfully.

To survive and grow, an organization has to adapt and respond according to its changing environment. TQM provides an organization with a powerful tool to rise above these changes, to be competitive and excellent, provided the art of TQM is well understood and played by the organization. This means managers need to be aware of TQM and possess 'positive' perceptions of TQM so that they can lead their organizations into the future.

CHAPTER FOUR

THEORETICAL FRAMEWORK

4.0 Introduction

Based on the review of literature (Crosby, 1979; Ishikawa, 1985; Demsey and Hesketh, 1988; Hull, 1989; Oakland, 1989; Morrison, 1990; Mortiboys, 1990; Moskal, 1991; Strom, 1992) it has been identified that levels of management and types of departments that managers work in does affect or influence their awareness and perception towards Total Quality Management. Difficulties perceived by managers (Crosby, 1979; Dempsey and Hesketh, 1988; Cherrington, 1989; Moskal, 1991; Robbins, 1991; Reeves and Bednar, 1993) in implementing TQM also differ according to levels of management and in the types of departments they are working.

4.1 Dependent Variables

The dependent variables for this study are awareness and perception of managers towards TQM.

Awareness (Ishiiwa, 1985; Moskal, 1991; Hunt, 1992; Schonberger, 1992; Johnson, 1993a; Hohner, 1993; Moreno-Luzon, 1993; Wiele et. al., 1993) in this research refers to the understanding of managers regarding the importance of TQM factors. It reflects on what TQM means to them and what is involved in TQM.

Perception (Crosby, 1989; Lascelles and Dale, 1989; Charlton, 1990a; Charlton, 1990b; Dale, Lascelles and Plunkett, 1990; Benson 1991; Benson, 1993a; Kukalis, Chong and Mortagy , 1993; Reeves and Bedner, 1993) refers to the way managers perceive TQM; what they think and feel about TQM; how they see TQM.

4.2 Independent Variables

Independent variables that were indentified for this research were levels of management and types of departments. **Levels of management** consists of lower, middle and top management.

In this study:

Top management consists of managing director, directors, factory managers, senior managers, and managers.

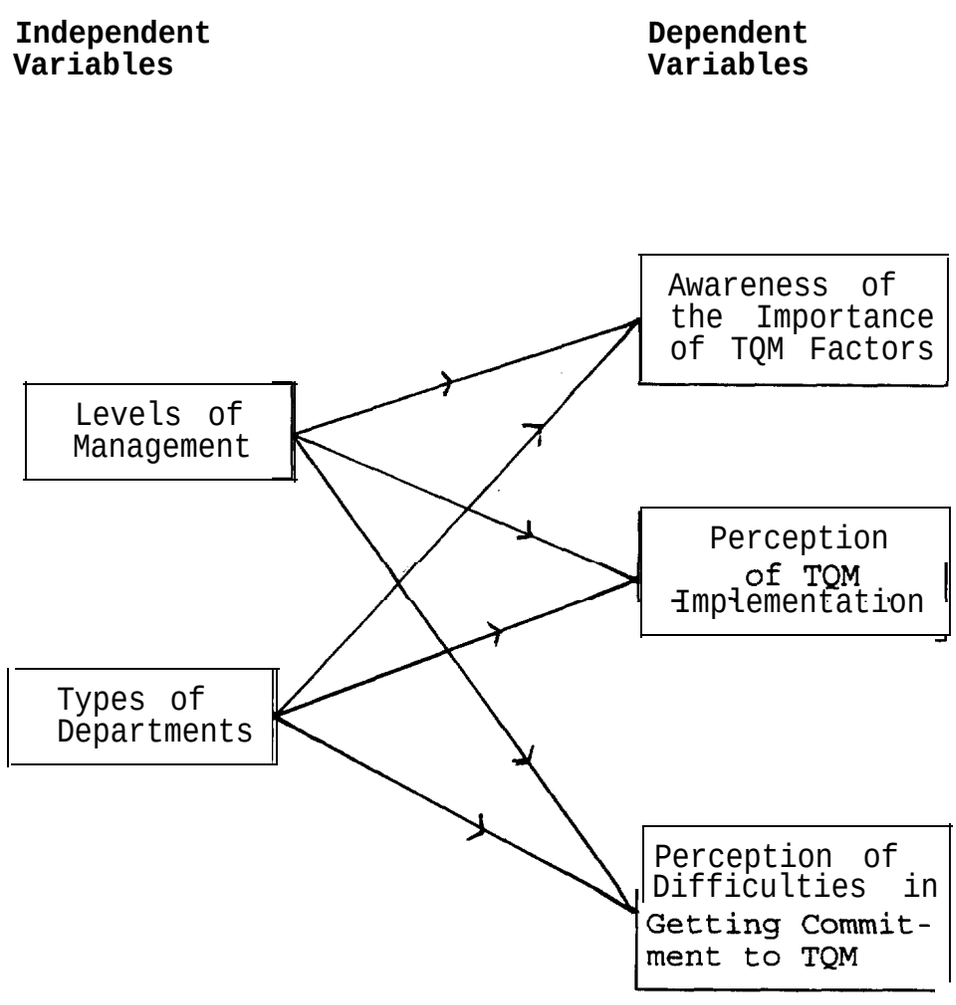
Middle management consists of assistant managers, executives, senior engineers and engineers.

Lower management consists of officers (supervisors) and assistant engineers.

Types of departments in the organisation to be studied are: Personnel and General Affairs, Cost Control, Accounts, Purchasing, Shipping, Electronic Data Processing, Value Engineering, Engineering, Production/Operations, Production Control, Production Engineering, Quality Control, and Parts Control.

Figure 4.1 shows the relationship between the independent and dependent variables.

Fig. 4.1: **Diagram of the Relationship Between the Independent Variables and Dependent Variables (Awareness of TQM, Perception of TQM Implementation and Perception of Difficulties)**



4.3 Operational Definitions

Based on the review of literature, the concepts of awareness and perception are operationally defined as shown in figures 4.2, 4.3 and 4.4.

4.3.1 Awareness of TQM

Managers' **awareness of TQM** is measured based on their understanding of the importance of TQM factors. Based on review of literature, these TQM factors are operationally defined as Customer Focus, Process Improvement and Total Involvement as in Tenner and DeToro's model (refer Figure 2.2). These are measured by their respective elements (Wiele, Dale, Timmers, Bertsch and Williams, 1993) as shown in Figure 4.2.

The dimension **customer focus** (Dempsey and Hesketh, 1988; Tobin, 1990; Tenner and DeToro, 1992; Hunt, 1993; Wiele et. al., 1993) consists of the elements:

* satisfying external customers/clients (Ishiiawa, 1985; Dempsey and Hesketh, 1988; Sullivan, 1988; Scurr, 1990; Ciampa, 1992; Jeffries, Evans and Reynolds, 1992; Jones, 1992b; Lee,

Luthans and Hodgetts, 1992; Tenner and DeToro, 1992; Hunt, 1993; Wiele et. al., 1993).

* partnership between organization and customers (Tenner and DeToro, 1992; Wiele et. al., 1993).

* satisfying internal customers (Dempsey and Hesketh, 1988; Scurr, 1990; Spenley, 1992; Tenner and DeToro, 1992; Wiele et. al., 1993).

* policy deployment (Wiele et. al., 1992).

The dimension **process improvement** (Tenner and DeToro, 1992; Wiele et. al., 1993) consists of the elements:

* reducing costs (Scurr, 1990; Spenley, 1992; Hunt, 1993; Wiele et. al., 1993).

* continuous process improvement (Dempsey and Hesketh, 1988; Dale and Plunkett, 1990; Strolle, 1991; Fisher, 1992; Jeffries et. al., 1992; Jones, 1992b; Spenley, 1992; Tenner and DeToro, 1992; Hunt, 1993; Wiele et. al., 1993).

* process management and systems (Walton, 1989; Hunt, 1992; Benson, 1993a; Tenner and DeToro, 1992; Porter and Parker, 1993; Wiele et. al., 1993).

The dimension **total involvement** (Crosby, 1979; Deming, 1985; Dempsey and Hesketh, 1988; Juran, 1989; Palmer and Saunders, 1992; Tenner and DeToro, 1992; Hunt, 1993; Wiele et. al., 1993) consists of the elements:

* employee involvement and development (Lii, 1991; Scurr, 1990; Cieri et. al., 1991; Hakes, 1991; Fisher, 1992; Hunt, 1992; Jones, 1992b; Tenner and DeToro, 1992; Porter and Parker, 1993; Wiele et. al., 1993).

* teamwork (Atkinson, 1990; Tenner and DeToro, 1992; Hunt, 1993; Wiele et. al., 1993).

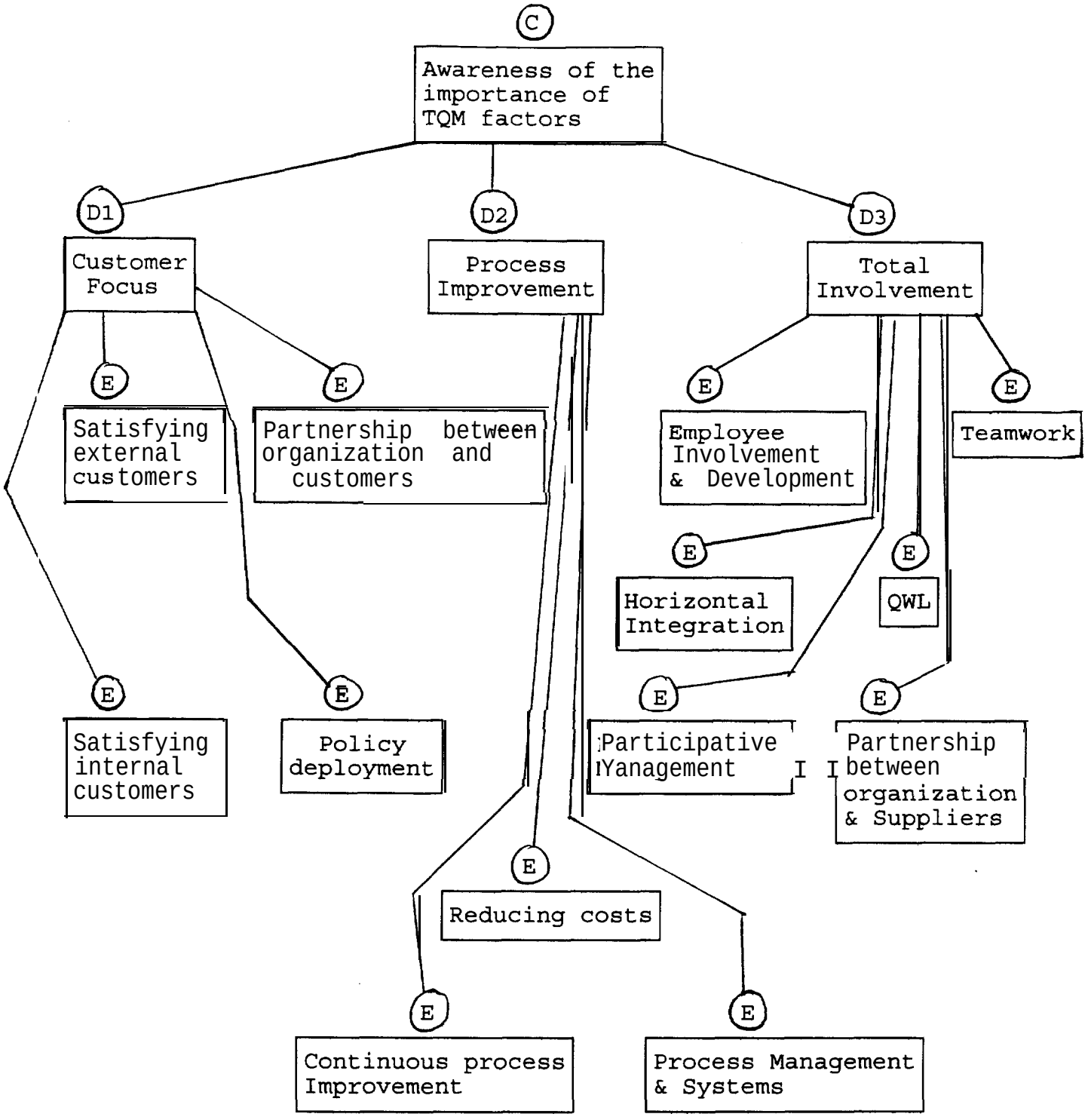
* quality of working life (QWL) (Wiele et. al., 1993).

* participative management (Wiele et. al., 1993).

* partnership between organization and suppliers (Spenley, 1992; Tenner and DeToro, 1992; Wiele et. al., 1993).

* horizontal integration (Wiele et. al., 1993).

Figure 4.2: Dimensions (D) and elements (E) of the concept (C) Awareness of the importance of TQM factors



4.3.2 Perception of TQM implementation (critical success factors)

Based on Porter and Parker's (1993) critical factor hierarchy model (refer figure 2.3 and Table 2.1) managers' perception of TQM implementation is operationally defined by the dimension of the critical success factors for TQM strategy (implementation). Elements of the critical success factors are as shown in Figure 4.3.

* necessary management behaviors -

  e. g . leadership, management involvement, commitment, support, etc. (Juran, 1989; Atkinson, 1990; Lim, 1990; Mercer and Judkins, 1990; Chapman, Clarke and Sloan, 1991; Cieri, Samson and Sohal, 1991; Hakes, 1991; Bowen and Lawler 111, 1992; Ciampa, 1992; Hunt 1992; Benson, 1993a; Kukalis, Chong, and Mortagy, 1993; Porter and Parker, 1993).

* strategy for TQM implementation -

  TQM objectives, requirements of the organisation, and means for continuous improvement are established (Atkinson and Naden, 1989; Cieri et. al., 1991; Hakes, 1991; Steele, 1993).

* organization for TQM -

an organizational structure that demands and harness the full potential of the work force (Benson, 1993a).

* communication for TQM -

means of raising quality awareness, reinforce the message, publicize achievements, and recognise contributions to quality improvement (Atkinson and Naden, 1989; Cieri et. al., 1991; Hunt, 1992).

* training and education -

for all employees as part of an ongoing process (Juran, 1988; Atkinson and Naden, 1989; Juran, 1989; Shetty, 1989; Walton, 1989; Mercer and Judkins, 1990; Aguayo, 1991; Patten, Jr., 1991/92; Brown, 1992; Benson, 1993a; Steele, 1993).

* employee involvement -

(Lim, 1990; Cieri et. al., 1991; Hakes, 1991; Hunt, 1992).

* process management and systems -

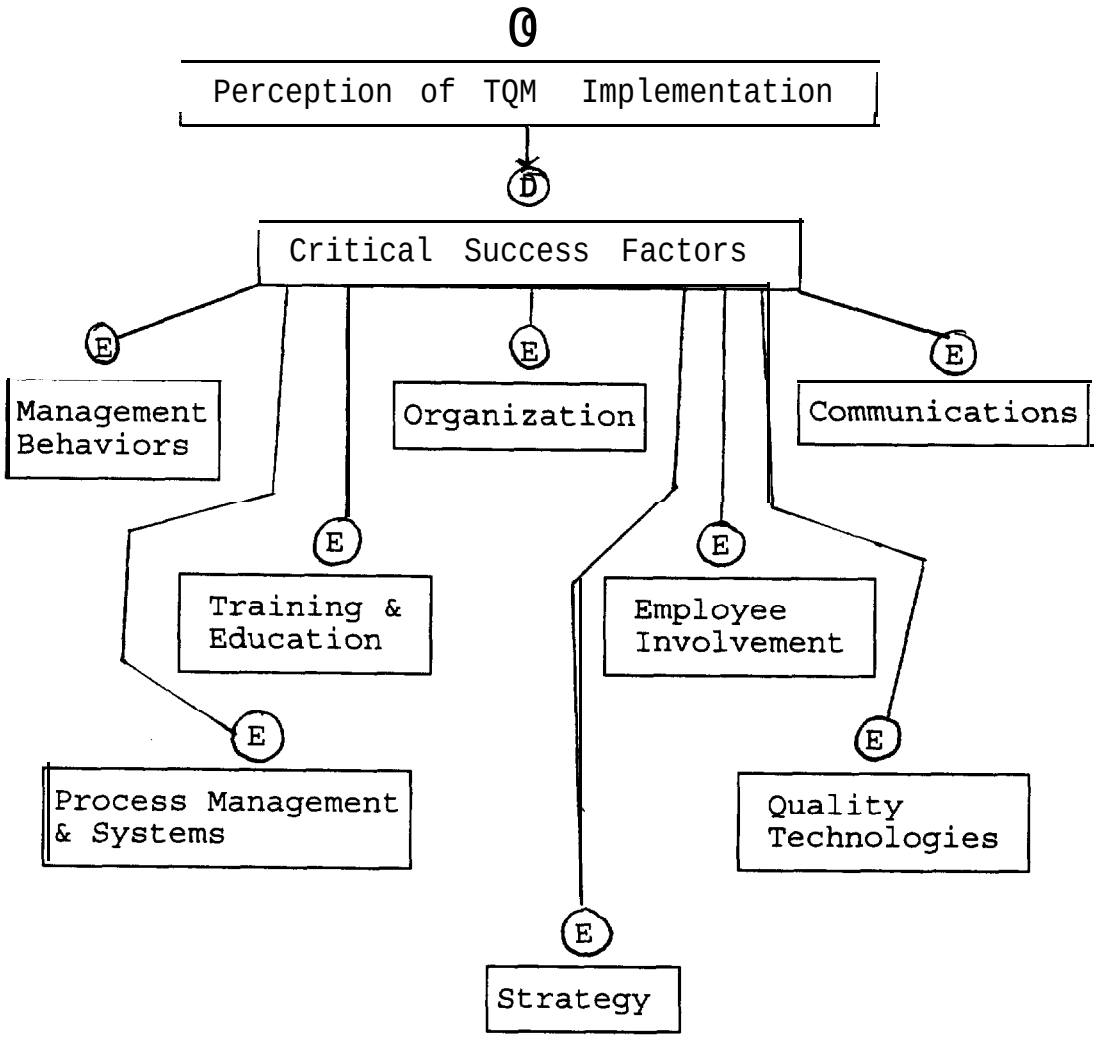
integration of people, materials, methods, and machines; includes ownership, planning, control, measurement,

improvement, and optimization (Walton, 1989; Hunt, 1992; Benson, 1993a).

* quality technologies -

e.g. statistical process control, quality costing, benchmarking, quality function deployment, charts analysis, etc. (Benson, 1993a).

Figure 4.3: Dimensions (D) and Elements (E) of the concept (C) Perception of TQM Implementation (Ciritical success Factors)



4.3.3 Perception of difficulties in getting commitment to TQM

The difficulties/barriers in getting commitment to TQM were identified based on review of literature. They were then classified according to the critical success factors put forward by Porter and Parker (1993).

Managers' perception of difficulties in getting commitment to TQM has been operationalised in the following dimensions, as shown in Figure 4.4.

management behaviors
strategy for TQM implementation
organization for TQM
communications
training and education
employee involvement
process management and systems
quality technologies

Elements for the above dimensions consists of:

Management behaviors:

* changing behaviors and attitudes (Lascelles and Dale, 1988; Mortiboys, 1990; Milakovich, 1991; Charlton, 1990b; Steers and Porter, 1987 in Schuler and Harris, 1992; Dale, 1991 in Watson, et. al., 1992; Moreno-Luzon, 1993; Wiele et. al., 1993; Whyte and Witcher, 1992 in Wilkinson and Witcher, 1993; May and Pearson, 1993).

* managers are not sure what is required of them (Dempsey and Hesketh, 1988; Wiele et. al., 1993).

* fear (e.g. asking questions; making mistakes) (Johnson, 1993b; Walton, 1989; Longenecker & Scazzero, 1993; Wiele et. al., 1993).

* a lack of top management commitment (Ching, 1988; Dempsey and Hesketh, 1988; Lascelles and Dale, 1988; Oakland, 1989; Charlton, 1990a; Charlton, 1990b; Cieri, Samson and Sohal, 1991; Demouy, 1991; Coulson-Thomas, 1992; Dale, 1991 in Watson, McKenna and McLean, 1992; May and Pearsn, 1993; Moreno-Luzon, 1993; Reeves and Bednar, 1993; Wiele, Dale, Timmers, Bertsch and Williams, 1993).

Strategy for TQM implementation:

* emphasis on short term objectives (Oakland, 1989; Instone and Dale, 1989; Walton, 1989; Charlton 1990a; Charlton, 1990b; Wilkinson and Witcher, 1991 in Wilkinson and Witcher, 1993; Moreno-Luzon, 1993; Wiele et. al., 1993).

* lack of objectives and strategies (Moreno-Luzon, 1993; Wiele et. al., 1993).

* a lack of resources (Ching, 1988; Juran, 1988; Instone and Dale, 1989; Charlton, 1990b; Aguayo, 1991; Cieri et. al., 1991; Demouy, 1991; Comen, 1989 in Watson et. al., 1992; Moreno-Luzon, 1993; Reeves and Bednar, 1993; Wiele et. al., 1993).

* uncertainty about what to do next (Wiele et. al., 1993).

Organization for TQM:

* barriers between departments (Charlton, 1990b; Moreno-Luzon, 1993; Wiele et. al., 1993; Wilkinson and Witcher, 1991 cited in Wilkinson and Witcher, 1993).

* quality improvement is the concern of the quality department (Crosby, 1979; Ishikawa, 1985; Mortiboys, 1990; Moreno-Luzon, 1993).

* quality improvement is the concern of production (Crosby, 1979; Moreno-Luzon, 1993; Wiele et. al., 1993).

Communication for TQM:

* conflict between production and quality departments (Wiele et. al., 1993).

* lack of communication (Dempsey and Hesketh, 1988; Oakland, 1989; Charlton, 1990b; Aguayo, 1991; Reeves and Bednar, 1993; Wiele et. al, 1993).

Training and education:

* lack of expertise in quality management (Dale and Plunkett, 1990; Moreno-Luzon, 1993; Wiele et. al., 1993).

* lack of intellectual thought given to the subject (Moskal, 1991; Wiele et. al., 1993).

* lack of training and education for all employees (Charlton, 1990b; Chapman et. al., 1991; Demouy, 1991; Wiele et. at., 1993).

Employee involvement:

* employees are not sure of what is required of them (Aguayo, 1991; Chapman, Clarke and Sloan, 1991; Wiele et. al., 1993).

Process management and systems:

* a tendency to cure symptoms of a problem and not the root cause (Wiele et. al., 1993).

* production schedules and costs are treated as main priorities (Ishikawa, 1985; Wiele et. al., 1993).

* quality system based on detection not prevention (Moreno-Luzon, 1993; Wiele et. al., 1993).

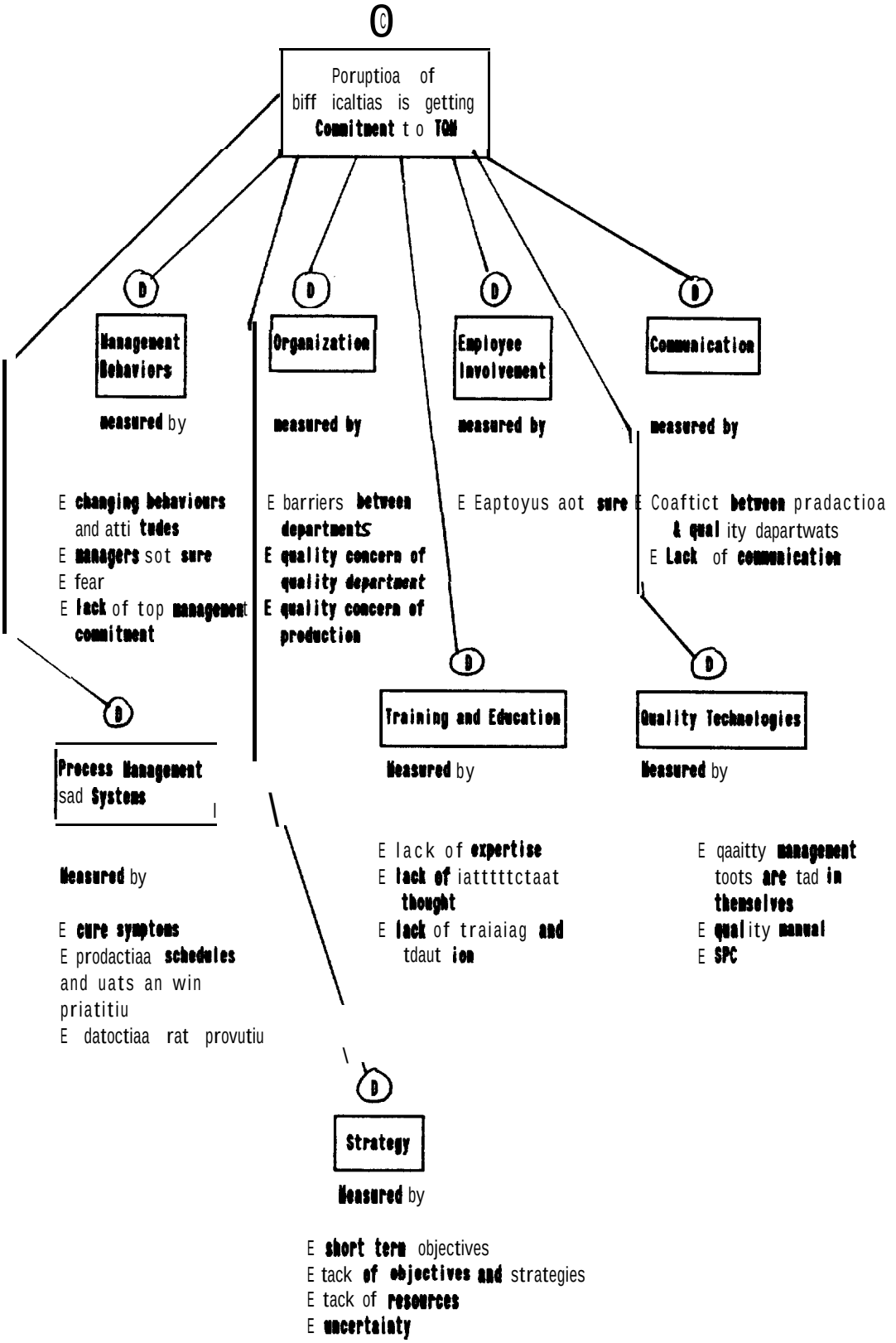
Quality technologies:

* quality management tools are seen as an end in themselves (Dale, Lascelles and Plunkett, 1990; Wiele et. al., 1993).

* over reliance on the quality manual, (Moreno-Luzon, 1993; Wiele et. al., 1993).

* stastical process control (SPC) is the answer to all the problems (Wiele et. al., 1993).

Fig. 4.4: Dimensions (D) and Elements (E) of the concept (C) of Perception of Difficulties



4.4 Hypotheses

Based on the literature review and the above theoretical framework, the following hypotheses were developed for this research.

Awareness of the importance of TQM factors

Ho: Awareness of managers regarding TQM do not differ according to level management.

HA: Awareness of managers regarding TQM differ according to level of management.

Ho: Awareness of managers regarding TQM do not differ according to departments.

HA: Awareness of managers regarding TQM differ according to departments.

Perception of TQM implementation (CSF)

Ho: Perception of managers regarding the critical success factors do not differ according to level of management.

HA: Perception of managers regarding the critical success factors differ according to level of management.

Ho: Perception of managers regarding the critical success factors do not differ according to departments.

HA: Perception of managers regarding the critical success factors differ according to departments.

Perception of difficulties in getting commitment to TQM

Ho: The difficulties perceived by managers in getting commitment to TQM do not differ according to level of management.

HA: The difficulties perceived by managers in getting commitment to TQM differ according to level of management.

Ho: The difficulties perceived by managers in getting commitment to TQM do not differ according to departments.

HA: The diffkulties perceived by managers in getting commitment to TQM differ according to departments.

4.5 Conclusion

Based on literature review, a theoretical framework was developed for this study. Independent variables identified were levels of management and types of department whilst dependent variables identified were awareness and perception of managers towards TQM. For purposes of measurement, these variables were operationally defined. The resultant hypotheses would be tested and results presented in the following chapters.

CHAPTER FIVE

RESEARCH METHODOLOGY

5.0 Introduction

In the previous chapter, the thoretical framework for this study was established. This chapter will put forward the research design, sample selection, respondents' characteristics, data collection method, pilot testing, reliability, implementation of the survey and data processing and analysis.

5.1 Research Design

51.1 Type of study

This is a combination study using the case method approach. This study contains elements found in the descriptive and correlational studies. The descriptive elements attempt to ascertain and describe the characteristics of the independent variables (levels of management and types of departments) whilst the correlational elements attempt to discover the relationships between the independent variables of management level, types of departments and the dependent

variables of managers' awareness and perception of TQM. This study also engages in hypotheses testing which tries to establish the differences among groups, that is, among levels of management and among types of departments. (Sekaran, 1992).

5.1.2 Nature of Study

Because this research attempted to analyze the relationships between the dependent and independent variables, this study was analytical in nature.

5.1.3 Study Setting

This is a field study which was conducted in the natural working environment - that is, in the noncontrived setting, where no variables were controlled or manipulated. No artificial setting was created for the research.

5.1.4 Time Horizon

In this study, data was collected from managers over a period of two weeks to investigate the research questions. Data with respect to this particular research have not been collected before from this organization, nor will they be

collected again. Thus, it is cross-sectional in nature or is a one-shot study.

5.1.5 Unit of Analysis

In this study the unit of analysis was the groups (level of management and type of department) in a manufacturing organization. Individual data from each manager was gathered into group data so as to see the differences among the various groups. Example, when comparing different departments in the organization, the data analysis was done at the department level - that is, the managers in the department were treated as one unit, and comparisons were made treating the department as the unit of analysis. Likewise, data from all managers at each level was collected and aggregated, and compared with the different levels of management.

5.2 Sample Selection

One firm in the manufacturing environment was chosen to be studied. All the managers (261) from all the levels of management (top, middle, lower), from all the departments (Personnel and General Affairs, Cost Control, Accounts, Purchasing, Shipping, Electronic Data Processing, Value Engineering, Engineering, Production/Operations, Production Control,

Production Engineering, Quality Control, and parts Control) were chosen as sample for this research. (Refer Appendix A-5).

5.3 Respondents' Characteristics

Majority (74.1%) of the managers fall in the age group between 26 - 35 years, 16.9% fall in the 36 - 45 years age group. Majority (88.6%) of the managers are male and the rest 11.4% are females. (See Appendixes C-l to C-4 for more details).

Majority of the managers, 54.8% are relatively new staff, working less than 5 years with the company. About 39.8% of the managers have been employed with the company for more than 5 years (Refer Appendixes C-5 and C-6).

The composition of managers according to levels of management and types of departments is as follows:

The lower and middle levels of management have 77 (46.4) managers each, whilst the top level have 12 (7.2%) managers, Majority of the managers are from the Engineering (29.5 % or 49) and Production/Operations (24.7 % or 41) departments. Quality Control and Parts Control each have 7.8 % (13) of the managers. The Personnel and General Affairs has 6 % (10) of the managers. Production Control and Production Engineering both have 4.8% (8) of the managers. These percentages and numbers of managers are rather consistent and representative of the actual number of managers

according to levels of management and types of departments. (Refer to Appendixes C-7 to C-9).

5.4 Data Collection Method

Questionnaire

Self-administered questionnaires were used to collect primary data from the respondents in the organization. The survey questionnaire employed in this study was designed by the researcher based on the review of literature. It consisted of four sections.

Section A requested basic demographic and background information on age, gender, length of employment with the organization, level of management, and attached to which department.

Section B consisted of TQM factors, which tried to measure respondents' awareness of TQM based on their understanding,

The Likert scale ranging from 1 (Not important at all) to 5 (Very important) was used to measure subjects'responses.

Section C consisted of critical factors in the TQM implementation process, which tried to measure respondents' perception of the critical success factors of TQM implementation.

The Likert scale, ranging from 1 (Not critical at all) to 5 (Very critical) was used to measure subjects' responses.

Section D consisted of difficulties/barriers in getting commitment to TQM. This section tried to measure the difficulties perceived by the respondents.

The Likert Scale, ranging from 1 (Not a problem) to 5 (A very serious problem) was used to measure subjects' responses.

Interviews

Face to face interviews were conducted with a few key personnel in the organization - the managing director, training executive, personnel manager, and quality executive - for qualitative information. The interviews were unstructured and these managers were given free reign to voice out their opinions concerning TQM in their organization.

Secondary sources of data for example, pamphlets and magazines were used to obtain information regarding the organization. (Refer Appendixes A-l to A-5).

5.5 Pilot testing

Pilot testing was conducted in two stages:

In the first stage, 15 sets of questionnaires were prepared and distributed to fellow course mates and lecturers. As a result of feedback from them a few items in the questionnaire were modified.

In the second stage, 15 sets of questionnaires were prepared again and distributed to 15 respondents from the organization concern. Results were analysed for reliability of the instrument based on the 14 sets of questionnaires that were returned.

5.6 Reliability

To check for the inter-item consistency reliablility of the independent and dependent variables, the Cronbach's alpha reliablility coefficient was used (Sekaran, 1992).

Results of the reliability test are as follows:

Reliability Coefficients	
Cronbach's Alpha	
Section B :	.8199
Section C :	.7356
Section D :	.8998

For **section B,** four items were found to be below .3 level. This means that they did not contribute much to the overall reliblility of section B. These items were:

Reducing costs;

Improving capabilities of the work process;

Each person is dedicated to continuous process improvement; and

Each person in the organization has a designated responsibility for product and service improvement.

Since reducing costs is an important factor in TQM, this item was not dropped. Instead, it was improved upon as below:

Reducing costs (costs decrease due to fewer mistakes, less rework, fewer delays, better use of people and resources).

The second item was dropped in view of the fact that there is another similar item - Process management and systems (integration of people, materials, methods, and machines involving ownership, planning, control, measurement, improvement, and optimization) - which can encompass it. It is noted that the dropping of the second item does not affect the content validity of the instrument.

The other two items were combined to produce the following item - Everyone in the organization is responsible for the continuous process improvement of products and services.

For **section** C, one item - Necessary management behaviors had a reliability level of less than 0.3 (that is, .2127). However, this item was not deleted because it was felt that based on literature review, management behavior is considered to be the most critical factor in TQM implementation process.

As for **section D,** four items were found to be below .3 level reliability. They are:

Employees are not sure of what is required of them; Fear;

Stastical process control (SPC) is the answer to all our problems; and

Lack of TQM knowledge.

The first and third items were retained based on the review of literature that they are common barriers or difficulties in implementing quality programs. The second item, was not dropped since to 'Drive out fear' is one of Deming's Fourteen Points (Walton, 1989) and is considered to be relevant in this study. It was thus modified as: Fear (e.g. asking questions; making mistakes). The last item was dropped from the questionnaire. Its droping does not affect the content validity of the instrument.

Cronbach's alpha reveal the following reliability for the 166 sets of qestionnaires used in the final study. It is noticed that Cronbach's Alpha levels increased for the three sections.

Cronbach's Alpha

Section B :	.8532
Section C :	.8771
Section D :	.9408

(Refer Appendixes E-l and E2)

5.7 Implementation of the survey

Questionnaires were delivered to the firm on 17th August, 1993 and collected two weeks later. A total of 261 questionnaires were delivered to the training executive who personally distributed them to the respondents. The questionnaires were collected back from the respondents by the training executive. The researcher collected the questionnaires from the training executive.

5.8 Data Processing and Analysis

Data was coded and processed using the statistical computer package SPSS/PC+ . Both descriptive and inferential statistics were obtained through computer programs.

5.8.1 Descriptive Statistics

Descriptive statistics were used in this research because they serve as a shorhand description of the entire data set (Sekaran, 1992).

Frequencies, percentages and histograms were obtained for nominal variables such as gender, age, levels of management, types of departments, length of employment and for variables measured at the interval level.

Descriptive statistics such as mean and standard deviation were also used to analyse the data, to be able to get an idea of the basic characteristics, or "a feel" for the data.

5.8.2 Inferential Statistics

The **Analysis of Variance (ANOVA)** is very flexible and widely used in social science research. ANOVA was used to see if there is a significant mean difference in a dependent variable between

multiple groups or categories (Sekaran, 1992; Healey, 1993). The ANOVA was chosen because the nominal scale was used to categorize levels of management and types of departments into different groups whilst the interval scale was used to measure the awareness and perception of managers. The ANOVA provides methods for comparing the means of more than two populations (Weiss and Hassett, 1991).

5.8.3 Alpha level

The alpha level chosen for this research is 0.1 or 90 percent confidence level. To improve precision, we need to decrease the length of the confidence interval. One way to decrease the length of the confidence interval is to lower the confidence level from 95 % to some lower level (Weiss and Hassett, 1991) .

5.9 Conclusion

This chapter described the research methodology that was conducted for this study. The hypotheses developed in chapter 4 were tested according to the research methodology as above. Findings of the survey will be presented in the next chapter.

CHAPTER SIX

RESULTS

6.0 Introduction

Out of the 261 questionnaires that were distributed to all the managers from all the departments of Sharp-Roxy Corporation (M) Sdn Bhd, 166 (63.6%) of them were returned. Data was analysed using the SPSS/PC + package. The hypotheses developed in Chapter 4, based on the thereotical framework were tested using the Analysis of Variance (ANOVA). Results obtained are presented below.

6.1 Descriptive Statistics

6.1.1 Awareness of TQM.

The overall mean score for managers' awareness of the importance of TQM factors is 4.0513. The highest possible mean score is 5.0. The factor with the highest mean score is *Satisfying external customers/clients* (4.66), followed by *Teamwork* (4.49), *Quality of working life* (4.38), *Everyone in*

the organization is responsible for the continous process improvement of products and services (4.33), ***Reducing costs*** (4.32), ***Process management and systems*** (4.27), ***Employee involvement and development*** (4.24), and ***Participative*** management (4.01). The factor with the lowest mean score is ***Having partnership between organization and customers (3.40). Policy deployment*** received a mean score of ***3.79, Each person satisfying their internal customers*** had a mean of 3.68, whilst ***Horizontal integration and Developing partnership between organization and suppliers*** received mean scores of 3.63 and 3.53 respectively. Figure 6.1 shows the mean 'scores of managers' awareness of the importance of TQM factors. Refer Appendix D-l for more details.

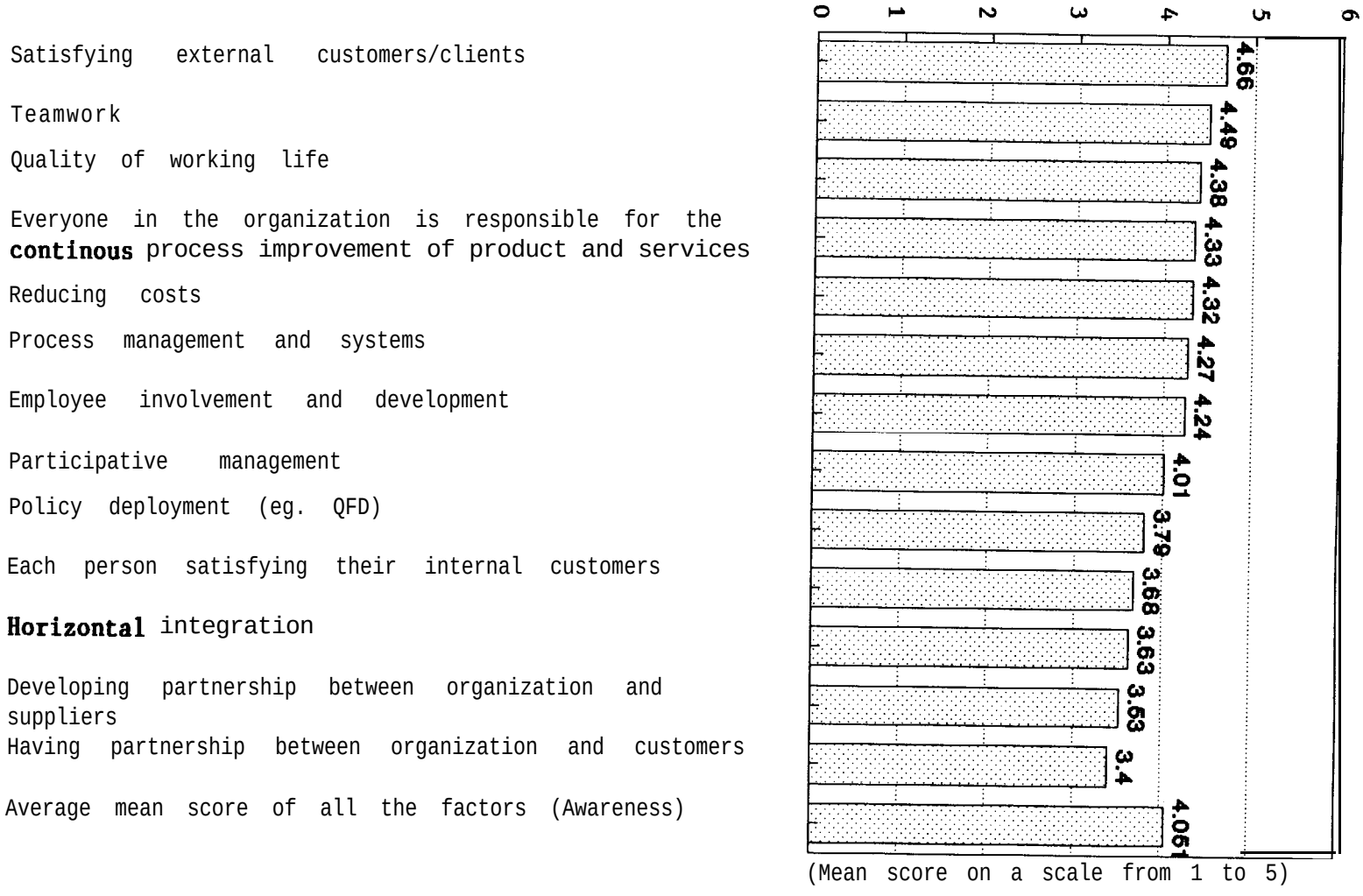


Fig 6.1: Managers' Awareness of the the Importance of TQM Factors

Based on their understanding majority of the managers (72.3 %) ranked ***Satisfying external customers/clients*** as a very important factor in Total Quality Management. One hundred managers (60.2%) ranked ***Teamwork*** as a very important factor in TQM. More than half of all the managers ranked all the TQM factors as important and very important except for ***Having partnership between organization and customers.*** (Refer Table 6.1). About 44.8 % of the managers ranked ***Developing partnership between organization and suppliers*** as not important at all to moderately important; ***48.4%*** ranked ***Horizontal integration as*** not important at all to moderately important; 41.3% ranked ***Each person satisfying their internal customers*** as not important at all to moderately important; and ***34%*** ranked ***Policy deployment*** as not important at all to moderately important. (For further details refer Appendix D-2).

Table 6.1: Managers' Awareness of the importance of TQM Factors

Factors In TQM	Not Important at all		Not Important		Moderately Im ant		Important		Very Important		Total	
	No	%	No	%	No	%	NO	%	No	%	NO	%
Satisfying external customers/clients			3	1.8	7	4.3	33	20.2	120	73.6	165	100
Reducing costs	1	.6		.6	18	11.0	68	41.5	76	46.3	164	100
Having partnership between organization and customers	6	3.7	23	14.0	60	36.6	50	30.5	25	15.2	164	100
Employee involvement and development	1	.6	3	1.8	21	12.7	m	42.4	m	42.4	165	loo
Each person satisfying their internal customers	2	1.3	16	10.0	48	30.0	59	36.9	35	21.9	160	100
Teamwork	2	1.2	2	1.2	9	5.5	52	31.5	100	60.6	165	100
Quality of working life			5	3.0	11	6.7	65	39.6	83	50.b	lb4	100
Developing partnership between organization and suppliers	5	3.0	21	12.1	48	29.1	64	38.8	21	16.4	165	100
Participative management			6	3.7	33	20.1	79	48.2	46	28.0	164	100
Process management and systems			3	1.9	19	II.7	72	44.4	68	42.0	lb2	100
Everyone in the organization is responsible for the continuous process improvement of products and service			2	1.2	17	10.3	m	42.4	76	46.1	165	100
Horizontal integration	1	.6	10	6.3	16	41.5	52	32.7	30	18.9	159	100
Policy deployment (eg. QFD)	3	1.9	6	3.7	46	28.4	14	45.7	33	20.4	162	100

Managers' Awareness of TQM According to Levels of Management

All the levels of management had means of more than 4 for their awareness of the importance of TQM factors: ***Satisfying external customers/clients*** (top - 4.6667, middle - 4.5867, lower - 4.7237); ***Reducing costs*** (top - 4.4545, middle - 4.3158, lower - 4.3117); ***Employee involvement and development*** (top - 4.2500, middle - 4.2632, lower - 4.2208); ***Teamwork*** (top - 4.5833, middle - 4.3947, lower - 4.5714); ***Quality*** of ***working life*** (top - 4.4167, middle - ***4.2800,*** lower - 4.4675); ***Process management and systems*** (top - 4.5000, middle - 4.2329, lower - 4.2597); and ***Everyone in the organization is responsible for thecontinous process improvement of products and services*** (top - 4.5833, middle - 4.2208, lower - 4.4079).

However all the levels of management had means of less than 4 for ***Having partnership between organization and customers***(top- 3.3333; middle - ***3.4342,*** lower - ***3.3684); Each person satisfying their internal customers*** (top - 3.8333, middle - 3.4795, lower - 3.8533); and ***Horizontal integration*** (top - 3.8333, middle - 3.5676, lower - ***3.6575).***

The lowest mean for any factor was 3.3333 scored by top management for ***Having partnership between organization and customers. The*** highest mean for any factor was 4.7237 scored by lower management for ***Satisfying external customers/clients.***

Mean scores for overall awareness of the importance of all the TQM factors show that top management had the highest score **(4.1399),** followed by lower management (4.0910). Middle management had the lowest mean of 3.9955. (Refer table 6.2).

Overall there was no mean significant differences among the levels of management regarding their awareness of the importance of TQM factors. However, there was found to be significant mean differences among top, middle and lower managers for two factors: ***Each person satisfying their internal customers*** and ***Developing partnership between organization and suppliers.*** (Refer Appendix D-3).

Table 6.2: **Mean Scores for Managers' Awareness of the Importance of TQM Factors According to Levels of Management**

Levels of Management / TQM Factors	Top x	Middle x	Level x
Satisfying external customers/clients	4.6667	4.5867	4.7237
Reducing costs	4.4545	4.3158	4.3117
Having partnership between organization and Customers	3.3333	3.4342	3.3684
Employee involvement and development	4.2500	4.2632	4.2208
Each person satisfying their internal custormers	3.8333	3.4795	3.8533
Teamwork	4.5833	4.3947	**4.5714**
Quality of working life	**4.4167**	4.2800	4.4675
Developing partnership between organization and suppliers	**4.1667**	3.5325	3.4211
Participative management	4.0833	3.8816	4.1184
Process management and systems	4.5000	4.2329	4.2597
Everyone in the organization is responsible for the continous process improvement of products and services	4.5833	4.2208	4.4079
Horizontal integration	3.8333	3.5676	3.6575
Policy depoloyemt (eg. QFD)	**4.0000**	3.7403	3.8082
Overall awareness of TQM	**4.1399**	3.9955	4.0910

Values are mean responses on a 5 - point scale on which "Not Important At All" = 1 and "Very Important" = 5.

Managers' Awareness of TQM According to Types of Departments

Table 6.3 shows the mean score of managers' awareness of the importance of TQM factors according to types of departments. The managers from all the departments had means of 4.0 and above for three factors - ***Satisfying external customers/clients, Teamwork,*** and ***Quality of working life.*** For the factor ***Reducing cost, all the*** departments scored a mean of 4.0 and above except Production Engineering (3.6250). EDP (Electronic Data Processing) had a mean of 3.4286 whilst the other departments had a mean of 4.0 and above for ***Employee involvement and development.*** Value Engineering and Engineering departments each scored 3.5 and 3.9348 respectively for ***Process management*** and ***Systems*** with all the other departments scoring a mean of 4.0 and above. Two departments, Cost Control and Production Engineering had means of 3.5 and 3.8750 whilst the rest had ***4.0*** and above for ***Everyone in the organization is responsible for the continous process improvement of products and services.*** There were significant mean differences for these factors (Refer Appendix **D-4).**

For Having partnership between organization and customers, Value Engineering and Production Control scored mean awareness of 4.0 each; Quality Control had 4.0769; and the rest scored between 2.5 and below 4.0. Three departments - Purchasing, Shipping, and Production Control - had means of 4.0; Production/Operations had 4.0750; Quality Control had 4.1667; and the other eight departments had means of 2.5 and below 4.0 for the factor ***Each person satisfying their internal customers.*** Four departments - Cost Control, EDP, Engineering, and Production Engineering had means of 3.5 and below 4.0 whilst the others had ***4.0*** and above for ***Participative management.*** As for ***Horizontal integration,*** Production Control, Quality Control and Parts Control scored above 4.0; other departments scored between 3.0 and 4.0. It is observed that mean scores were significantly different among the departments for these factors.

The overall mean scores for awareness of the importance of TQM factors differed among all the departments except Accounts and Value Engineering who both scored 4.0. The highest mean score for awareness was by Production Control (4.4066) followed by Quality Control **(4.3986),** Shipping (4.2564) and Productions/Operations (4.2146). The lowest awareness' mean was scored by Cost Control (3.6923). The other departments had mean awareness as follow: Personnel and General Affairs (4.111 **1),** Purchasing (4.205 1), EDP

(3.7949), Engineering (3.8104), Production Engineering (3.8132), and Parts Control (4.0947). It is noted that the overal mean scores for awareness of the importance of TQM factors differed significantly among the departments (Refer Appendix D-4).

Table 6.3: Mean Scores for Managers' Awareness of the Importance of TQM Factors Accord@ to Types of Departments

Types of Departments / TQM Factors	Personnel & General Affairs I	Cort Control I	Account8 X	Purchasing X	Shipping X	Electronic Data Processing X	Value Engineering I
Satisfying external customers/clients	4.2222	4.7500	5.0000	4.5000	5.0000	4.5000	5.0000
Reducing costs	4.5000	4.2500	5.0000	4.6667	4.3333	4.0000	**4.0000**
Having partnership between organization and customers	2.7000	2.7500	2.5000	3.6667	3.6667	**3.0000**	4.0000
Employee involvement and development	4.2000	4.1000	4.5000	**4.6667**	4.0000	3.4286	4.5000
Each person satisfying their internal customers	**3.7778**	3.2500	**3.0000**	4.0000	4.0000	2.5000	3.0000
Teamwork	4.3000	4.0000	4.5000	**4.8333**	5.0000	4.0000	4.5000
Quality of working life	4.3000	4.2500	5.0000	4.6667	4.6667	4.1429	5.0000
Developing partnership between organization and suppliers	3.4000	3.0000	3.0000	4.0000	4.0000	3.6667	4.0000
Participative management	4.2000	3.5000	**4.5000**	**4.0000**	4.0000	3.8333	4.0000
Process management and systems	4.4444	4.0000	4.5000	4.1667	4.6667	4.4286	3.5000
Everyone in the organization is responsible for the continous process improvement of product8 and services	4.5000	3.5000	5.0000	4.5000	4.6667	4.0000	4.0000

(Cont.)

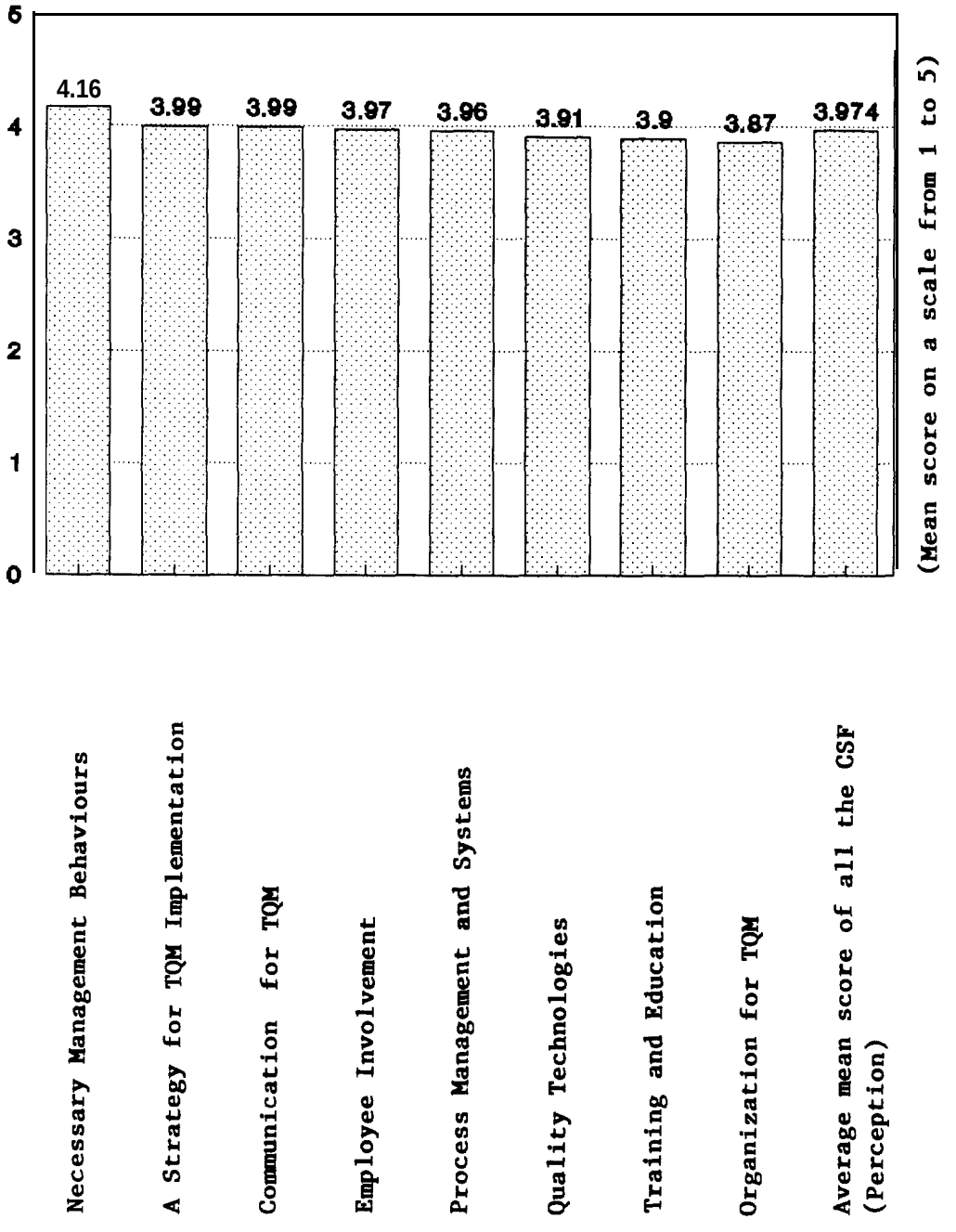
Types of Departments / TQM Factors	Personnel & General Affairs	Cost Control	Accounts	Purchasing	Shipping	Electronic Data Processing	Value Engineering	Engineering	Production/ Operations	Production Control	Production Engineering	Quality Control	Parts Control
	I	I	I	X	I	X	X	I	X	I	X	X	X
Horizontal Integration	4.0000	3.0000	3.0000	3.6667	3.6667	3.5000	3.0000	**3.1875**	3.7317	4.2857	3.5714	4.3333	4.0769
Policy Deployment (eg. QFD)	3.7000	3.7500	4.5000	3.8333	3.6667	3.5000	3.5000	3.5510	3.9000	**4.2857**	3.7143	**4.1538**	3.9231
Overall awareness of TQM	4.1111	3.6923	4.0000	4.2051	4.2564	3.7949	4.0000	3.8104	4.2146	4.4066	3.8132	4.3986	4.0947

Values are mean responses on a 5-point scale on which 'lot Important At All' = 1 and "Very Important". 5

6.1.2 Perception of TQM implementation (Critical Success Factors)

The overall mean score for managers' perception of the critical success factors in the TQM implementation process is 3.9739. The factor with the highest mean score is Necessary ***management behaviours (4.16)*** whilst the factor with the lowest mean score is ***Organization for TQM (3.87).*** Both, ***A strategy for TQM implementation*** and ***Communications for TQM*** received mean scores of 3.99. The other factors had mean scores of ***3.97*** for ***Employee involvement, 3.96*** for ***Process management and systems, 3.9*** 1 for ***Quality technologies,*** and 3.90 for ***Training and education.*** Figure 6.2 shows the mean scores for managers' perception of the critical success factors. (Refer Appendix D-5 for further details).

Fig. 6.2: Managed Perception of TQM Implementation (CSF)



More than 80% of all the managers have the opinion that ***Necessary management behaviours are critical (40.6 %)*** and very critical (40%) in the TQM implementation process. More than 70% of them think that ***A strategy for TQM implementation, Organizationfor TQM, Communicationfor TQM, Employee involvement,*** and ***Process management and systems are critical*** to very critical in implementing TQM. About 66.2% and 69.5 **%** of the managers indicated respectively that ***Training and education,*** and ***Quality technologies are critical*** to very critical in TQM implementation. (Refer Table 6.4 and for more details refer Appendix D-6).

Table 6.4: Managers' Perception of Critical Success Factors in the TQM Implementation Process

Critical Success Factors TQM	Not Critical at all		Not Critical		Slightly Critical		Critical		Very Critical		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Necessary management behaviours			8	4.8	24	14.5	67	40.6	66	40.0	165	100
A Strategy for TQM implementation			11	6.7	33	20.0	68	41.2	53	32. I	165	100
Organization for TQM			11	6.7	38	23.0	77	46.7	39	23.6	165	Ia,
Communication for TQM	I	.6	9	5.5	36	21.8	64	38.8	55	33.3	165	loo
Training ad education	2	I. 2	12	7.2	42	25.3	55	33.1	55	33.1	166	100
Employee Involvement	I	.6	9	5.4	38	22.9	64	38.6	54	32.5	166	100
Process management and system	1	.6	9	5.5	33	20.0	74	44.8	48	29.1	165	100
Quality Technologies			15	9.1	35	21.3	64	39.0	50	30.5	164	100

Managers' Perception of Critical Success Factors According to Levels of management

Table 6.5 shows managers' perception of mean scores for all the critical success factors in the TQM implementation process. It is observed that top, middle and lower management had means of 4.5, 3.8312 and 4.0658 respectively, for their perception of the CSF A ***strategy for TQM implementation.*** Mean scores of perception for ***Communication for TQM was*** 4.1667, 3.8026, and 4.1429 for top, middle and lower levels of management respectively. Mean scores differed significantly for these two factors among the levels of management (Refer Appendix D-7).

Overall, top management scored the highest means for all the individual CSF. The highest mean score was 4.5 for A ***strategy for TQM implementation.*** The lowest mean of perception for any single CSF was 3.7895 which was scored by middle management for ***Quality Technologies.*** The overall mean score for managers' perception of CSF in the implementation of TQM according to levels of management are 4.1563 for top level, 3.8964 for middle level, and 4.0233 for lower level. (Refer Table 6.5). It is seen that overall mean scores of perception of CSF do not differ significantly among the levels of management. (Refer Appendix D-7).

Table 6.5: **Mean Scores for Managers' Perception of TQM Implementation (Critical Success Factors) According to Levels of Management**

Levels of Management Critical success Factors	Top x	Middle x	Level x
Necessary Management behaviours	4.3333	4.1818	4.1053
A Strategy for TQM implementation	4.5000	4.8312	4.0658
Organization for TQM	3.9167	3.8442	3.8947
Communication for TQM	4.1667	3.8026	4.1429
Training and education	4.0000	3.8442	3.9351
Employee involvement	4.0833	3.9091	4.0130
Process Management and Systems	4.1667	3.9079	3.9870
Quality Technologies	4.0833	3.7895	4.0000
Overall Perception of CSF	4.1563	3.8964	4.0233

Values are mean responses on a 5 - point scale on which "Not Critical At all" = 1 and "Very Critical" = 5.

Managers' Perception of Critical Success Factors According to Types of Departments

For ***Necessary management behaviours, the*** highest mean (4.6667) was scored by the Purchasing department and the lowest mean (3.3333) was scored by EDP. The other departments had mean scores between 4.6 and 3.5 as is shown in Table 6.6.

The highest mean score for ***Communication*** *for* ***TQM*** was 4.625 by Production Control and the lowest mean score was 3.0 by Value Engineering. The second highest mean score was 4.5 by Accounts. The rest of the departments had mean scores between 4.5 and 3.0.

Purchasing and Production Control had means of 4.5 for Process ***management and Systems.*** Quality Control had 4.3077 mean score, followed by Production Engineering having 4.25 and Production/Operations having 4.2195. The lowest mean score was 2.5 by Value Engineering.

As for ***Quality Technologies,*** Purchasing and Shipping each scored mean perception of 4.3333. Production Control had 4.25, followed closely by Quality Control and Parts Control which each had 4.2308 mean scores. Production/Operations scored 4.0244. The lowest mean

score was 2.5 by Value Engineering. Other departments scored between 2.75 and 3.875.

The mean scores of perception for these four Critical Success Factors - ***Necessary Management Bahaviours, Communicaiton for TQM, Process Management and Systems,*** and ***Quality Technologies*** differed significantly among the managers from different departments. (Refer Appendix D-8). However, there were no significant mean differences among the mean scores for the various departments regarding the CSF - ***A Strategy for TQM implementation, Organization for TQM, Training and Education,*** and ***Employee Involvement.***

Overall mean scores of managers' perception of how critical the CSF are in the TQM implementation process, differed significantly among all the departments. Production Control had the highest mean score of 4.42 19, followed by Purchasing which had 4.375. Value Engineering had the lowest mean score of 3.3750. Other departments had mean scores as follows: Personnel and General Affairs (3.85), Cost Control (3.4063), Accounts (4.0), Shipping (3.8750), EDP (3.4167), Engineering (3.7839), Production/Operations (4.0688), Production Engineering (4.0469), Quality Control (4.2788) and Parts Control (4.2115).

Table 8.1: Mean Scores for Managers' Perception of TQM Implementation According to Types of Departments

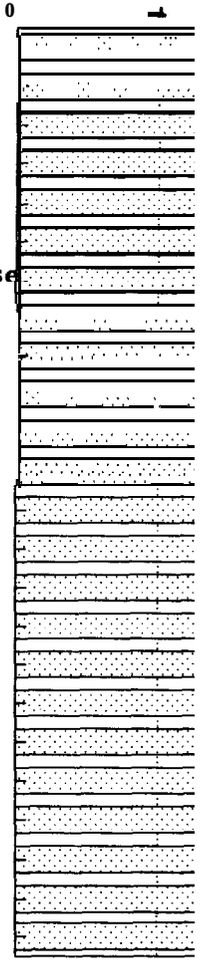
Types of Departments / Critical Success Factors	Personnel & General Affairs	Cost Control	Accounts	Purchasing	Shipping	Electronic Data Processing	Value Engineering	Engineering	Production/ Operations	Production Control	Production Engineering	Quality Control	Parts Control
	X	X	X	X	X	X	X	X	X	X	X	X	X
Necessary Management behaviours	3.8000	3.5000	4.0000	4.0667	4.0000	3.3333	4.5000	4.0412	4.1483	4.3750	4.3750	4.5385	4.5385
A Strategy for TQM Implementation	3.9000	3.7500	4.5000	3.5000	3.3333	3.8571	3.m	3.7551	4.1000	4.3750	4.0000	4.3077	4.0769
Organization for TQM	3.8000	3.2500	4.0000	4.0000	3.8667	3.3333	4.0000	3.7551	3.9024	4.5000	4.0000	4.0768	4.1538
Communication for TQM	3.9000	3.2580	4.5000	4.1467	3.8667	3.2157	3.0000	3.7083	4.1220	4.6254	4.2500	4.3846	4.3846
Training and education	3.9000	3.5000	4.0008	4.5000	4.0000	2.8571	3.5000	3.7143	4.0488	4.2500	4.0000	4.0768	4.0769
Employee Involvement	4.1060	3.5000	4.0000	4.3333	4.0000	3.7143	3.5000	3.7755	4.0244	4.5000	3.8250	4.3077	4.1538
Process Management and Systems	3.8000	3.7500	3.5000	4.5000	4.0000	3.1429	2.5000	3.6117	4.2195	4.5000	4.2500	4.3077	4.0769
Quality Technologies	3.8000	2.7500	3.5000	4.3333	4.3333	3.5000	2.5000	3.7500	4.0244	4.2500	3.1750	4.2308	4.2308
Overall Perception of CSF	3.8500	3.4063	4.0000	4.3750	3.8750	3.4117	3.3750	3.7039	4.0888	4.4219	4.0469	4.278:	4.2115

Values are mean responses on a 5-point stale on which 'Not Critical At All' = 1 and 'Very Critical' = 5

6.1.3 Perception of difficulties in getting commitment to TQM

The mean score for all managers' perception of difficulties in getting commitment to TQM is 3.3804. The highest possible mean score is 5. Among the 23 difficulties/barriers in getting commitment to TQM, the difficulty with the highest mean score is ***Lack of communication (3.74)*** whilst the lowest mean score was for ***Stastical Process Control (SPC) is the answer to all the problem (2.92). The*** mean scores for the rest of the difficulties are as shown in Figure 6.3 in order of their seriousness of problem. For more details refer Appendixes D-9 and D-10.

Lack of communication
Barriers between departments
Lack of expertise in quality management
Changing behaviour and attitudes
A lack of top management commitment
Employees are not sure of what is required of them
A tendency to cure symptoms of a problem and not the root cause
Conflict between production and quality department
Quality system based on detection not prevention
Lack of training and education
Managers are not sure what is required of them
Lack of objectives and strategies
Uncertainty about what to do next
Quality improvement is the concern of production
Lack of intellegent thought given to the subject
Production schedules and costs are treated as main priorities
Fear
Quality improvement is the concern of quality department
Quality management tools are seen as an end in themselves
A lack of resources
Over reliance on the quality manual
Emphasis on a short term objectives
SPC is the answer to all the problems
Overall mean score of perception of difficulties



(Mean score

Majority of the managers, that is, more than 70 % perceived all the difficulties/barriers except ***Over reliance on the quality*** manual (69%) and ***SPC is the answer to all the problems*** (65.3 %) as a fairly serious to a very serious problem in getting commitment to TQM in their organization. (Refer Appendixes D-10 and D-l 1 for further details).

Managers' Perception of Difficulties/Barriers In Getting Commitment to TQM According to Levels of Management

Table 6.7 shows mean scores of managers' perception of difficulties/barriers in getting commitment to TQM according to levels of management. Mean scores are on a **5-point** scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

For ***Changing behaviour and attitudes,*** lower management had means of 3.7467, middle management had 3.4079 and top management had 3.25. There was not much difference between the means of lower level (3.5676) and middle level (3.5395) management for ***A tendency to cure symptoms of a problem and***

not the root cause. Top management had a mean score of ***2.8333.*** For ***Fear,*** top management had mean scores of 2.75, middle management had 3.4533 and lower management had 3.1781.

A lack of top management commitment had means of 3.6712 by lower, 3.52 by middle and 2.8333 by top levels of management. Lower level scored 3.6757, middle level 3.4211 and top level ***2.8333*** for ***Conflict between production and quality department.***

For the above difficulties/barriers, there were significant mean differences in managers' perception. (Refer Appendix D-12). There were variations in the mean scores of managers' perception for the other difficulties/bakes in TQM implementaton (see Table 6.7) according to levels of management. However, these differences were found to be insignificant.

Lower management had the highest means for all the difficulties/barriers except ***Production schedules and costs are treated as main priorities; Fear;*** and ***Quality improvement is the concern of quality department.*** Overall mean scores of

managers' perception of difficulties/barriers in getting commitment to TQM according to levels of management are 3.0616 for top level, 3.3587 for middle level and 3.4553 for lower level. There is no significant mean difference in the managers' perception of difficulties/barriers in getting commitment to TQM according to levels of management.

Table 6.7: **Mean Scores for Managers' Perception of Difficulties/Barrier in Getting Commitment to TQM According to Levels of Management**

Levels of Management Difficulties/Barriers	Top X	Middle X	Level X
Changing behaviour and attitudes	3.2500	3.4879	3.7467
Emphasis on short-term objectives	3.0000	2.9605	3.0405
A tendency to cure symptioms of a problem and not the root cause	2.8333	3.5395	3.5676
Production schedule-s and costs are treated asmain priorities	3.3333	3.3289	3.2400
Employees are not sure of what is required of them	3.5833	3.4079	3.5946
Barriers between departments	3.2500	3.5455	3.6622
Managers are not sure what is required of them	3.0000	3.4474	3.5405
Lack of objectives and strategies	3.0000	3.4079	3.5467
Quality system based on detection not prevention	3.2500	3.3158	3.4757
Lack of expertise in quality management	3.1667	3.5325	3.6933
A lack of resources	2.7500	3.1169	3.2703
Lack of intellectual thought given to the subject	3.1667	3.3158	3.3243
Quality management tools are seen as and end in themselves	2.9167	3.1467	3.2568

Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Levels of Management Difficulties/Barriers	Top x	Middle x	Level x
Uncertainty about what to do next	3.1667	3.3067	3.4595
Fear	2.7500	3.4533	3.1781
Quality improvement is the concern of the quality department	3.0833	3.3333	3.2027
Quality improvement is the concern of production	3.0000	3.2800	3.4595
A lack of top management commitment	2.8333	3.5200	3.6712
Conflict between production and quality department	2.8333	3.4211.	3.6757
Over reliance on the quality mannual	2.6667	3.0000	3.1351
Statistical Process Control (SPC) is the answer to all the problems	2.9167	2.7945	3.0411
Lack of training and education	3.2500	3.3816	3.6301
Lack of communication	3.4167	3.7333	3.7945
Overall perception of difficulties	3.0616	3.3587	3.4553

Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

Managers' Perception of Difficulties/Barriers In Getting Commitment to TQM According to Types of Departments

Table 6.8 shows mean scores of managers' perception of difficulties/barriers in getting commitment to TQM.

For ***Barriers between departments***, highest mean score was 4.25 held by Production Control and the lowest mean score was 1.5 held by Accounts. Other departments had mean scores between 2.25 and 3.875. The highest mean score for ***SPC is the answer to all the problems,*** was 3.4359 held by **Production/Operations.** The lowest mean was 2.0 scored by Accounts. The other departments had mean scores between 3.3333 and 2.5. Mean scores of managers' perception for these two difficulties or barriers in TQM implementation differed significantly among the departments. (Refer Appendix D-13). Variations existed in the means scores of managers' perception from different departments regarding the other 21 difficulties/barriers. But, the differences were not significant.

For the overall managers' perception of difficulties/barriers in getting commitment to TQM in their organization, no any department had a mean score of 4.0 or above it. The highest mean score was 3.6812 received by Shipping, followed by Production/Operations who got 3.641. The lowest mean 2.3043 was scored by Accounts. Other departments had overall means between 2.7356 and 3.4281. The mean scores did not differ significantly among the various deparments. (Refer Appendix D-13).

Table 6.8: Mean Scores for Managers' Perception of Difficulties/Barriers in Getting Commitment to TQM According to Types of Departm

Types of Departments / Difficulties/Barriers	Personnel & General Affairs	Cost Control	Accounts	Purchasing	Shipping	Electronic Data	Value Engineering	Enginee
	I	I	I	I	I	I	I	I
Changing behaviour and attitudes	3.7000	3.7500	2.5000	3.1667	3.3333	3.4286	3.5000	3.21
Emphasis on short-ten objectives	**3.0000**	**3.2500**	2.0000	2.0333	4.0000	2.6667	2.5000	2.76
A tendency to cure symptoms of a problem and not the root cause	3.1000	3.5000	3.0000	3.1667	4.0000	3.6667	3.0000	3.34
Production schedules and costs are treated as main priorities	2.9000	3.5000	2.0000	3.3333	3.6667	2.7143	3.0000	3.19
Employees are not sure of what is required of them	3.1000	2.7500	4.0000	3.6667	3.6667	2.5000	3.0000	3.59
Barriers between departments	3.8000	2.2500	**1.5000**	3.5000	3.6667	3.1667	3.0000	3.35
Managers are not sure what is required of them	3.4000	2.5000	**3.5000**	3.8333	3.3333	2.1667	2.0000	3.40
Lack of objectives and strategies	1.1785	1.0000	**.7071**	1.3784	1.1547	1.1127	**.7071**	1.13
Quality system based on detection not prevention	3.6000	4.0000	**4.0000**	3.3333	4.3333	2.6667	2.5000	3.40
Lack of expertise in Quality Management	**3.5000**	3.5000	4.0000	**3.5000**	4.0000	2.4206	2.5000	3.79
A Lack of resources	3.4000	2.7500	2.5000	3.3333	3.3333	2.1667	2.0000	3.16
Lack of intellectual thought given to the subject	3.5000	3.5000	**2.5000**	3.1667	3.6667	**3.0000**	**3.5000**	3.44

Continue

Types of Department.8	Pemouuel & General Affairs	Cost Control	Accounts	Purchasing	Shipping	Electronic Data Processing	Value Engineering	Engineering	Production/ Operationa	Production Control	Production Engineering	Quality Control	Parts Control
Difficulties/Barriers	I	I	I	I	I	I	I	I	I	I	I	I	I
Uncertainty about what to do next	3.5556	2.7500	3.5000	3.3333	4.0000	2.0333	2.5000	3.3404	3.7500	2.0750	2.7500	3.2308	3.3046
Fear	2.9000	2.7500	2.0000	3.3333	3.3333	3.1667	2.0000	3.4130	3.3500	3.3750	3.3750	3.3077	3.1530
Quality improvement is the concern of tbe Quality dep` nt	3.1000	2.7500	3.0000	3.0000	3.6667	2.5714	3.0000	3.2609	3.3500	3.0000	3.0000	3.5305	3.6923
Quality improvement is the concern of production	3.1000	2.7500	2.0000	3.1667	3.3333	3.4206	3.0000	3.0217	3.7500	3.1250	3.6250	3.6154	3.4615
A lack of top management commitment	3.7000	2.7500	2.0000	3.3333	3.6667	2.0333	2.5000	3.4340	3.0500	3.5000	3.7500	3.7692	3.3046
Conflict between production and quality department	3.1000	2.5000	2.0000	3.0333	4.0000	2.7143	3.0000	3.4255	3.0250	3.1250	3.6250	3.4615	3.0462
over reliance on the quality mannual	3.1000	3.0000	2.0000	2.0333	3.3333	2.1429	3.0000	3.1087	3.3250	2.6250	2.6250	2.9231	3.0769
Satistical Process Control (SPC) is the answer to all tbe problem	2.7000	2.7500	2.0000	3.3333	3.0000	2.2057	2.5000	2.6009	3.4359	2.0571	2.3750	3.1530	2.7692
Lack of training aud education	3.4000	3.5000	2.8000	3.5000	4.0000	2.6667	2.5000	3.3617	3.0000	3.6250	3.3750	3.5385	3.4615
Lack of communication	4.0000	3.7500	1.0000	3.5000	4.3333	3.1667	3.5000	3.5070	3.0750	3.7500	3.0750	3.0462	3.9231
Overall Perception of Difficulties	3.3720	3.0543	2.3043	3.3261	3.6012	2.7356	2.7609	3.3190	3.6410	3.1988	3.3533	3.4001	3.4047

Values are mean responses as a 5-point scale on which 'lot A Problem" = 1 and 'A Very Serious Problem" = 5

6.2 Inferential Statistics

The ANOVA was used to test the following hypotheses. Table 6.9 below shows a summary of the results of hypotheses testing.

Table 6.9: A Summary of the Results of Hypotheses Testing Using ANOVA

Hypotheses		Results
Awareness of the importance of TQM Factors		
Ho:	Awareness of managers regarding TQM do not differ according to level of management.	Accept
HA:	Awareness of managers regarding TQM differ according to level of management.	Reject
Ho:	Awareness of managers regarding TQM do not differ according to departments.	Reject
HA:	Awareness of managers regarding TQM differ according to departments.	Accept
Perception of TQM Implementation (CSF)		
Ho:	Perception of managers regarding the critical success factors do not differ according to level of management.	Accept

(Cont.)

Hypotheses		Results
HA:	Perception of managers regarding the critical success factors differ according to level of management.	Reject
Ho:	Perception of managers regarding the critical success factors do not differ according to departments.	Reject
HA:	Perception of managers regarding the critical success factors differ according to departments.	Accept
Perception of Difficulties in Getting Commitment to TQM		
Ho:	The difficulties perceived by managers in getting commitment to TQM do not differ according to level of management.	Accept
HA:	The difficulties perceived by managers in getting commitment to TQM differ according to level of management.	Reject
Ho:	The difficulties perceived by managers in getting commitment to TQM do not differ according to departments.	Accept
HA:	The difficulties perceived by managers in getting commitment to TQM differ according to departments.	Reject

6.2.1 Awareness of managers regarding TQM according to level of mangement

Hypotheses:

Ho: Awareness of managers regarding TQM do not differ according to level of management.

HA: Awareness of managers regarding TQM differ according to level of management.

Results of the **ANOVA** reveal that overall awareness of managers regarding the importance of TQM factors, do not differ according to levels of management. That means, there is no significant mean differences among the top, middle and lower managers concerning their awareness of the importance of TQM factors (**F** = ***0.4323,*** p **<** 0.1). (Refer Table 6.10 and Appendix D-3).

Results of the **ANOVA** test reveal that there is significant mean differences among the top, middle and lower managers in their awareness of TQM for two factors - ***Each person satisfying their internal customers*** and ***Developing partnership between***

organization and suppliers, with F values of 0.0528 and 0.0582 respectively, at alpha level 0.1.

For the other 11 factors - ***Satisfying external customers/clients; Reducingcosts:Havingpartnershipbetweenorganizationand customers; Employee involvement and development: Teamwork; Quality of working life; Participative management; Process management and systems; Everyone in the organization is responsible for thecontinous process improvement of products and services; Horizontal Integration;*** and ***Policy deployment*** - there are no significant mean differences in the awareness of top, middle and lower managers.

Thus, generally, the results of this study do not substantiate the alternative hypothesis (HA). The null hypothesis is accepted.

Table 6.10: Results of the ANOVA for Differences in Managers' Awareness of the Importance of TQM Factors for Levels of Management

TQM Factors	Sig. of F	At Alpha Level 0.1
Satisying external customers/clients	.4359	Not Sig.
Reducing Costs	.8327	Not Sig.
Having partnership between organization and customers	.9034	Not Sig.
Employee involvement and development	.9465	Not Sig.
Each person satisying their internal customers	.0528	sig.
Team Work	.3272	Not Sig.
Quality of working life	.2970	Not Sig.
Developing partnership between organization and suppliers	.0582	Sig.
Participative management	.1746	Not Sig.
Process management and systems	.5093	Not Sig.
Everyone in tbe organization is responsible for the continous process improvement of products and services	.1185	Not Sig.
Horizontal Integration	.5863	Not. Sig.
Policy Deployment (eg. QFD)	.6170	Not Sig.
Overall Awareness of TQM	.4323	Not Sii.

6.2.2 Awareness of managers regarding TQM according to departments

Hypotheses

Ho: Awareness of managers regarding TQM do not differ according to departments.

HA: Awareness of managers regarding TQM differ according to departments.

With reference to Table **6.11,** results of **the ANOVA** show that overall, awareness of managers does differ according to types of departments (**F** = 0.0012, p < 0.1). There are significant mean differences among managers from the different departments, in their awareness of TQM. Production Control had the highest mean score (4.4066) whilst Cost Control had the lowest mean of 3.6923. (Refer Table 6.3).

Managers from the different departments had significant mean differences in their awareness of TQM for the following factors: ***Reducing costs*** (**F = *0.0763,*** p < 0.1); ***Having partnership between organization and customers*** (**F = *0.0001,***

p < 0.1); Each person satisfying their internal customers (F = 0.0018, p < 0.1); ***Participative management*** (F = ***0.0009,*** p < 0.1); ***Process management and systems*** (F = ***0.0388,*** p < 0.1); ***Everyone in the organization is responsible for the continous process improvement of products and services*** (F = 0.0108, p < 0.1); and ***Horizontal Integration*** (F = ***0.0005,*** p < 0.1). For more details refer Appendix D-4.

There were no significant mean differences among managers from the different departments regarding their awareness of the importance of the following TQM factors: ***Satisfying external customers/clients; Employee involvement and development; Teamwork; Quality of working life; Developing partnership between organization and suppliers;*** and ***Policy deployment.***

Hence, the managers from the different departments differed in their awareness of TQM. Results of this study substantiate the above alternative hypothesis. Ho is rejected and HA is accepted.

Table 6.11: Results of the ANOVA for Differences in Managers' Awareness of the Importance of TQM Factors for Types of Departments

TQM Factors	Sig. of F	At Alpha Level 0.1
Satisying external customers/clients	.4203	Not Sig.
Reducing Costs	.0763	Sig.
Having partnership between organization and customers	.0001	sig.
Employee involvement and development	.3957	Not Sig.
Each person satisying their internal customers	.0018	Sig.
Teamwork	.1857	Not Sig.
Quality of working life	.4454	Not Sig.
Developing partnership between organization and suppliers	.3438	Not Sig.
Participative management	.0009	Sig.
Process management and systems	.0388	Sig.
Everyone in the organization is responsible for the continous process improvement of products and services	.0108	Sig.
Horizontal Integration	.0005	Sig.
Policy Deployment (eg. QFD)	.4895	Not Sig.
Overall Awareness of TQM	.0012	Sig.

6.2.3 Perception of managers regarding the critical success factors according to level of management

Hypotheses

Ho: Perception of managers regarding the critical success factors do not differ according to level of management.

HA: Perception of managers regarding the critical success factors differ according to level of management.

Results of **the ANOVA** test reveal that there is no significant mean differences in the perception of managers regarding the critical success factors according to level of management (F = 0.3016, $p < 0.1$). (Refer Table 6.12 and Appendix D-7).

However, there are significant mean differences among the top, middle and lower managers in their perception for A ***strategy for TQM Implementation*** (F = 0.0301, $p < 0.1$) and ***Communication for TQM*** (F = 0.0531, $p < 0.1$).

As shown in Table 6.12 there are no mean significant differences among the top, middle and lower managers in their perception of the following critical success factors: ***Necessary management behuviours*** **(F = *0.6507,*** p < 0.1); ***OrganizationforTQM*****(F** = 0.9193, p < 0.1); ***Training and education*** **(F = *0.7948,*** p < 0.1); ***Employee involvement*** **(F =** 0.7065, p < 0.1); ***Process management and systems*** **(F = *0.6070*** p < ***0.1);*** and ***Quality Technologies*** **(F =** 0.3091, p < 0.1). For more details refer Appendix D-7.

Therefore, results of this study do not support the alternative hypothesis that perception of managers regarding critical success factors differ according to level of management. This allows HA to be rejected and Ho to be accepted.

Table 6.12: Results of the ANOVA for Differences in Managers' Perception of TQM Impl (Critical Success Factors) for Levels of Management

Critical Success Factors	Sig. of F	At Alpha Level 0.1
Necessary Management Behaviours	.6507	Not Sig.
A Strategy fot TQM implementation	.0301	Sig.
Organization for TQM	.9193	Not Sig.
Communication for TQM	.0531	Sig.
Training and Education	.7948	Not Sig.
Employee Involvement	.7065	Not Sig.
Process Management and systems	.6070	Not Sig.
Quality Technologies	.3091	Not Sig.
Perception of CSF	.3016	Not Sig.

6.2.4 Perception of managers regarding the critical success factors according to departments

Hypotheses:

Ho: Perception of managers regarding the critical success factors do not differ according to departments.

HA: Perception of managers regarding the critical success factors differ according to departments.

Results of the ANOVA show that there are significant mean differences among managers from different departments, in their overall perception of critical success factors (CSF) ($F = 0.0116$, $p < 0.1$). (Refer Table 6.13 and Appendix D-8).

Managers from the different departments, differ significantly in their mean perceptions of the following critical success factors: ***Necessary management behaviours*** ($F = 0.0707$, $p < 0.1$); ***CommunicationforTQM*** ($F = 0.0094$, $p < 0.1$); ***Process management and system*** ($F = 0.0014$, $p < 0.1$); and ***Quality Technologies*** ($F = 0.0559$, $p < 0.1$).

Results of the ANOVA show that there are no significant mean differences in the perception of managers from the different departments, regarding the following critical success factors: *A **strategy for TQM implementation*** ($F = 0.3943$, $p < 0.1$); ***Organization for TQM*** ($F = 0.3204$, $p < 0.1$); ***Training and education*** ($F = 0.2058$, $p < 0.1$); ***Employee involvement*** ($F = 0.4626$, $p < 0.1$).

Thus, the results of this study support the alternative hypothesis that perception of managers regarding the critical success factors differ according to departments. HA is accepted whilst Ho is rejected.

Table 6.13: Results of the ANOVA for Differences in Managers' Perception of TQM Implementation (Critical Success Factors) for Types of Departments

Critical Success Factors	Sig. of F	At Alpha Level 0.1
Necessary Management Behaviours	.0707	Sig.
A Strategy fot TQM Implementation	.3943	Not Sig.
Organization for TQM	.3204	Not Sig.
Communication for TQM	.0094	sii.
Training and Education	.2058	Not Sig.
Employee involvement	.4626	Not Sii.
Process Management and systems	.0014	Sig.
Quality Technologies	.0559	Sig.
Perception of CSF	.0116	sig.

6.2.5 The difficulties perceived by managers in getting commitment to TQM according to level of management

Hypotheses:

Ho: The difficulties perceived by managers in getting commitment to TQM do not differ according to level of management.

HA: The difficulties perceived by managers in getting commitment to TQM differ according to level of management.

There are no significant mean differences in the managers' perception of difficulties/ barriers in getting commitment to TQM, according to level of management ($F = 0.1987$, $p < 0.1$). (Refer Table 6.14 and Appendix D-12).

However, there were significant mean differences in the perception of top, middle and lower managers in getting commitment to TQM, for the following difficulties/barriers: ***Changing behuviour and attitudes*** ($F = 0.0696$, $p < 0.1$); ***A tendency to cure symptoms of a problem and not the root cause***

(F = 0.0997, p < 0.1); ***Fear*** (F = ***0.0825,*** p < 0.1); A ***lack of top management commitment*** (F = ***0.0592,*** p < 0.1); and ***Conflict between production and quality department*** (F = 0.0418, p < 0.1).

Results show that there were no significant mean differences among top, middle and lower managers, in their perception of all the other difficulties/barriers in getting commitment to TQM. (Refer Table 6.14 and Appendix D-12).

Hence, results of this study do not substantiate the alternative hypothesis that the difficulties perceived by managers in getting commitment to TQM differ according to level of management. Ho is accepted whilst HA is rejected.

Table 6.14: Results of the ANOVA for Differences in Managers' Perception of Difficulties/Barriers in Getting Commitment to TQM for Levels of Management

Critical Success Factors	Sig. of F	At Alpha Level 0.1
Changing behavior and attitudes	.0696	sig.
Emphasis on short-term objectives	.8937	Not Sig.
A tendency to cure symptoms of a problem and not the Root Cause	.0997	Sig.
Production schedules and costs are treated as main priorities	.8704	Not Sig.
Employees are not sure of what is required of them	.5348	Not Sig.
Barriers between departments	.4401	Not Sig.
Managers are not sure what is required of them	.4214	Not Sig.
Lack of objectives and strategies	.2801	Not Sig.
Quality system based on detection not prevention	.1236	Not Sig.
Lack of expertise in quality management	.2296	Not Sig.
A lack of resources	.2573	Not Sig.
Lack of intelectual thought given to the subject	.8612	Not Sig.
Quality management tools are seen as an end in themselves	.5238	Not sig.
Uncertainty about what to do next	.5915	Not Sig.
Fear	.0825	Sig.
Quality improvement is the concern of the quality department	.6694	Not Sig.
Quality improvement in the Concern of Production	.3137	Not Sig.
A Lack of top management commitment	.0592	Sig.
Conflict between production and quality department	.0418	Sig.
Over reliance on the quality manual	.2605	Not Sig.
Statistical process control (SPC) is the answer to all the problems	.3522	Not Sii.

(Cont.)

Critical Success Factors	Sig. of F	At Alpha Level 0.1
Lack of training and education	.2794	Not Sig.
Lack of communication	.5611	Not Sig.
Overall Perception of Difficulties	.1987	Not Sig.

6.2.6 The difficulties perceived by managers in getting commitment to TQM according to departments

Hypotheses:

Ho: The difficulties perceived by managers in getting commitment to TQM do not differ according to departments. .

HA: The difficulties perceived by managers in getting commitment to TQM differ according to departments.

Results of the ANOVA test show that there are no significant mean differences among the managers from the different departments, in their perception of the difficulties/barriers in getting commitment to TQM ($F = 0.1954$, $p < 0.1$). (Refer Table 6.15 and Appendix D-13).

Only two difficulties or barriers showed that there were significant mean differences in the managers' perception of difficulties/ barriers in getting commitment to TQM according to departments. They ***are Barriers between depanments*** ($F = 0.0117$, $p < 0.1$) and ***SPC is the answer to all the problems***

(F = 0.0480, p c 0.1).

As shown in Table 6.15 and Appendix D-13, there were no significant mean differences of managers' perception of difficulties/barriers in getting commitment to TQM, according to departments for the remainder 21 difficulties/ barriers.

Results do not substantiate the hypothesis that the difficulties perceived by managers in getting commitment to TQM differ according to departments. Again Ho is accepted whilst HA is rejected.

Table 6.15: Results of the ANOVA for Differences in Managers' Perception of Difficulties/Barriers in Getting Commitment to TQM for Types of Department

Critical Success Factors	Sig. of F	At Alpha Level 0.1
Changing behavior and attitudes	.2585	Not Sig.
Emphasis on short-term objectives	.3240	Not Sig.
A tendency to Cure symptoms of a problem and not the root cause	.2896	Not Sig.
Production schedules and costs are treated as main priorities	.6203	Not Sig.
Employees are not sure of what is required of them	.3245	Not Sii.
Barriers between departments	.0117	Sig.
Managers are not sure what is required of them	.2409	Not Sig.
Lack of objectives and strategies	.6969	Nat Sig.
Quality system based on detection not prevention	.6243	Not Sig.
Lack of expertise in quality management	.2980	Nat Sig.
A lack of resources	.3077	Not Sii.
Lack of intelectual thought given to the subject	.7944	Not Sig.
Quality management tools are seen as an end in themselves	.6679	Not sig.
Uncertainty about what to do next	.3484	Nat Sig.
Fear	.8691	Nat Sig.
Quality improvement is the concern of the quality department	.7636	Not Sig.
Quality improvement in the concern of production	.2216	Nat Sig.
A Lack of top management commitment	.4033	Not Sig.
Conflict between production and quality department	.1559	Not Sig.
Over reliance on the quality manual	.2370	Not Sig.
Statistical process control (SPC) is the answer to all the problems	.0480	Sig.

(Cont.)

Critical S - Factors	Sig. of F	At alpha Level 0.1
Lack of training and education	.4591	Not Sii.
Lack of communication	.5171	Not Sig.
Overall perception of difficulties	.1954	Nat Sig.

CHAPTER SEVEN

DISCUSSION

7.0 Introduction

Having presented the findings of this study in the previous chapter, the researcher would now attempt to discuss the results, draw inferences and relate it to past studies and literature.

Awareness and perception is important because it has such an enormous impact on organizational behavior. We cannot understand managers' behavior regarding TQM unless we have an insight to their awareness and perception of TQM. People's behavior is based on their perception of what reality is, not reality itself (Robbins, 1991). That's why two individuals observing the same event can honestly see something entirely different (Cherrington, 1989). Covey (1989) explains these differences in perceptions by various centres (spouse, family, money, work, possessions, pleasure, friend, enemy, church, self and principles) which might possibly affect the way we see everthing else. Managers also face a variety of barriers to accurate perception of others in the work situation (Steers, 1988). Hence, any organization implementing TQM has to ensure that managers are aware and perceive TQM the way it should be

perceived for successful implementation. It is important to recognise the existence of difficulties/barriers to TQM and work to reduce or eliminate them.

7.1 Awareness of TQM

Findings of this study indicate that managers are well aware of the importance of TQM factors. The overall mean score for managers' awareness of the importance of TQM factors is 4.05 out of a maximum score of 5. This also reflects that they have a relatively clear understanding of what TQM means. This contradicts Aschner and Pataki's (1988) observation that quality aspects do not play a central role in managerial activities in many regions of the world, and in some countries quality is only of peripheral importance. In a number of countries, companies' managers still lack adequate knowledge on quality. Well, in the case of Sharp-Roxy Corporation (M) Sdn. Bhd. (SRC) this is not true. In this organization the managers are highly aware of TQM. This could be because "...managers may feel compelled to pursue quality improvement for their own reasons (some good reasons commonly cited include integrity, sanity, career improvement, loyalty/responsibility to their company and coworkers, quality of work life, and pride). " (Schuler and Harris, 1992, p. 9).

Although top management had the highest mean score (4.14) for awareness of TQM, followed by lower management (4.09) and middle management (4.0), the difference is not significant. This means that top, middle and lower managers have an equal level of awareness of the importance of TQM factors and they also possess a similar understanding of TQM. Therefore, in this study awareness of managers regarding TQM does not differ according to levels of management. These findings do not support Ishikawa's (1985) comment that top managers often have little or no understanding of total quality control and Moskal (1991) who said there appears to be a general lack of understanding of what quality is and is not at the highest levels. On the other hand, findings support vank Donk and Sanders (1993) opinion that during the last decade top management has become aware of the strategic importance of quality and quality management, after decades of warnings and pleadings by people such as Juran, Deming, Crosby, Feigenbaum and Ishikawa.

Crosby (1989) in Let's Talk Quality has said that the problem with airlines is that management doesn't think that any of the quality problems are their fault. Lascelles and Dale (1989) have reported that many chief executives appear to perceive quality management as a functional activity delegated to a specialist, with their own role being limited to setting objectives and/or managing by exception. However, it was found out that in this study, 88.5% of the managers indicated *Everyone in the organization is responsible for the*

continuous process improvement of products and services, as an important to very important factor in Total Quality Management. Their response indicates that they are well aware (4.33) of their role in total quality management.

Findings reveal that ***Satisfying external customers/clients*** is what TQM means to most managers in SRC, followed by ***Teamwork, Quality of working life, Everyone in the organization is responsible for the continuous process improvement of products and services, Reducing costs, Process management and systems,*** and ***Employee involvement and development.*** Results of a survey conducted by Wiele, Dale, Timmers, **Bertsch,** and Williams (1993) on 358 organizations revealed that satisfying external customers is what TQM means to most organizations. This is followed by: reducing costs, partnership between an organization and its customers, each person satisfying their internal customers and employee involvement and development.

This study revealed that managers from different departments have a different level of awareness of TQM. There was a significant difference among the various departments regarding their managers' mean scores of awareness. Production Control and Quality Control had the highest mean scores (4.41 and 4.4 respectively) , whilst Productions/Operations had means of 4.2, thus indicating that managers in these departments are relatively more aware of TQM than their counterparts in other departments. These differences could be explained by what Crosby (1979) has listed among his five erroneous

assumptions that are held by most management individuals - all the quality problems originate in the manufacturing area and quality originates in the quality department. These differences in understanding of TQM could be as a result of such barriers as attitude, 'perceived status', compartmentalization, or sheer big-headedness! (Spenley , 1992).

Evidence from this study indicates that managers from different departments have a different level of awareness and possess a different level of understanding regarding the importance of TQM factors such as Everyone ***in the organization is responsible*** *for* ***the continous process improvement*** *of* ***products and services: Participative management*** and ***Horizontal Integration.*** This could also be due to the attitude that "Let the inspection section or QC section handle QC." and "QC has nothing to do with the headquarters, administrative division, or sales division." (Ishikawa, 1985). Or as Atkinson and Naden (1989) observed in European industry, too many managers think that quality circles are the beginning and end of TQM.

The managers from the different departments were significantly different in their awareness of the importance of TQM factors such as ***Reducing costs, Having partnership between organization and customers, Each person satisfying their internal customers, Participative management, Process management and systems, Everyone in the organization is responsible*** *for* ***the***

continuous process improvement of products and services, and ***Horizontal Integration.***

Therefore, in this study, managers' awareness of TQM differ **according to the** types of departments in which they are working.

7.2 Perception of TQM Implementation (Critical Success Factors)

Managers had an overall mean score of 3.97 from a maximum score of **5** regarding their perception of the critical success factors in TQM implementation. The managers considered that all the critical success factors (CSF) were critical in the TQM implementation process.

Leadership through quality encompasses **necessary** management behavior and actions, besides quality principles and quality tools. The most critical to the success of leadership through quality is the behavior and actions of senior management (Mercer and Judkins, 1990). In this study the managers considered ***Necessary management behaviors*** as the most critical factor in implementing TQM. Managers perceive that management behaviors such as leadership, management involvement, commitment, support, etc. are most critical in the successful implementation of TQM.

This study supports research done by others which indicate that ***Necessary***

management behaviors is perceived as the most critical factor in TQM (Mercer and Judkins, 1990; Chapman, Clarke and Sloan, 1991; Hakes, 1991; Bowen and Lawler III, 1992; Benson, 1993a; Kukalis, Chong, and Mortagy, 1993; Porter and Parker, 1993). At the same time, this finding contradicts Lascelles and Dale (1989) who have observed in their study that relatively few of the chief executives see their role as active quality management leaders.

The TQM implementation process cannot proceed until management demonstrate that they have adopted the behaviors necessary to create the environment and culture for TQM. "... Upper managers must participate personally and extensively in the effort. It is not enough to establish policies, create awareness, and then leave all else to subordinates." (Juran, 1989, p. 72). For example, leaders of companies where there have been very good TQ results have convinced employees that Total Quality is important, that it is not just another program, and that they, the leaders, are serious about the company embarking on TQ and making it work. They do this by being credible, clear, consistent, and confident. (Ciampa, 1992).

In the order of hierarchy of criticality, next most critical factor perceived by managers in the TQM implementation process is A ***strategy for TQM implementation,*** followed by ***Communication*** *for* ***TQM, Employee involvement, Process management and systems, Quality technologies, Training and education,*** and ***Organization*** *for* ***TQM.*** With reference to Table 2.1, it is

noted that results of this survey is in line with Porter and Parker, Saraph et. al. and Malcolm Baldrige Award (Porter and Parker, 1993) for ***Management behaviors*** and ***Strategy for TQM,*** where they are also the first and second respectively, on their list of critical factors of TQM.

Results of this study supports Cieri et. al. (1991) who in their study identified some of the critical success factors: senior management must understand TQM, good communication, worker involvement and commitment, and continuous improvements.

Managers from all levels and departments perceived ***Training and education*** as a critical factor in the TQM implementation process. Interpersonal skills and new learning is required for managing in a TQM environment **(Patten,** Jr., **1991/92).** As Collard states (in Brown, 1992) "investment training is a critical factor in the success of a total quality programme". Denting's 14 points for managers include two which relate to training, numbers 6 and 13. Point 6 is, "institute training". Point 13 is, "Institute a vigorous program of education and self improvement". (Aguayo, 199 1). According to Juran **(1988),** another form of corporate mandate involves training programs in such matters as basic statistical tools, or quality "awareness". The expectations are that the trainees will thereby become knowledgeable and stimulated to a degree that will cause them to solve the company's quality problems. So far as training is concerned, a US survey reported that quality improvement was the major

training issue in 1991 (Lee, 1992 in Brown, 1992). Training and education as one of the critical success factors is reflected in all those companies associated with product and service quality who have embedded training and education in their total management system. Examples are Xerox, AT & T, 3M and IBM. (Shetty, 1989).

Findings of this study also show that perception of managers regarding the critical success factors do not differ according to level of management. Generally, the managers irrespective of their levels have a similar opinion of how critical the factors are in implementing TQM. Although the difference among the levels of management is not significant, from a maximum score of 5 top managers had the highest mean (4.16), followed by lower managers (4.02) and middle managers (3.9) for their perception of the critical success factors in implementing TQM.

It is interesting to note that overall, top management scored the highest means for all the individual CSF. The highest mean was 4.5 from a maximum score of 5 for *A strategy for TQM implementation.* This is a reflection of their role in strategic management. Apparently, SRC is doing what Mortiboys (1990) has suggested that the only way to start total quality management is at board level, or with the management committee in those satellite operations which have sufficient autonomy to be able to choose how they manage themselves. There can be no better endorsement of this than the formation of the

European Foundation of Quality Management (EFQM) by the presidents of 14 leading European industries' 'To create conditions to enhance the position of European industry in the world market by strengthening the role of management in quality strategies'. (Dale and Plunkett, 1990). Behavioral scientists also note that plants, and service quality is associated with active involvement on the part of senior management (Bowen and Lawler III, 1992).

Results of this study also indicate that perception of managers regarding the critical success factors differ according to types of departments. Managers from the various departments have different opinions regarding how critical are the CSF in implementing TQM. The difference in perception is significant especially for CSF: ***Necessary management behaviors, Communication for TQM, Process management and systems,*** and ***Quality Technologies.*** Relatively, Production Control, Purchasing, Production/Operations, Production Engineering, Quality Control and Parts Control had high perception mean scores compared with the other departments. Obviously, managers from these departments view the CSF as more critical in the TQM implementation process than their counterparts in the other departments.

Bedian (1986) says that individual perceptions of the environment and organizational strengths and weaknesses are unquestionably influenced by personal values and beliefs. Consequently and most probably, managers from different departments perceive the CSF differently due to their background,

experiences, working environment, values and beliefs. Results of the ANOVA clearly show that there were significant differences in managers' perception of CSF such as ***Process Management and Systems,*** and Quality Technologies among the various departments. Certain departments such as Production/Operations, Production Control, Quality Control and Parts Control had mean scores above 4 whilst other departments like Cost Control and Value Engineering had mean scores below 3. This sort of reflects "that each executive will perceive those aspects of a situation that relate specifically to the activities and goals of his or her departments" (Dearbon and Simon, cited in Steers, 1988, p. 115).

The individual's perception of the work environment and the external environment, the culture of the organization, the individual's intrinsic and extrinsic motivating factors as well as the TQM training will all influence the degree of acceptance of TQM (Kowalski and Walley, 1993). It is likely that managers from certain departments like Quality Control, Production Control, Production/Operations would have received more exposure and training concerning TQM. For instance, Production/Operations and Production Control had mean scores of more than 4 as compared to Electronic Data Processing which scored less than 3, for their perception of the criticality of ***Training and education*** as a critical success factor in implementing TQM. Results of the survey suggest that TQM is not being emphasized equally in all the departments concern. This confirms the information received through

interviews with key personnels that TQM is partially practiced in certain departments. Hence, the significant differences in managers' perception of the CSF.

Elsewhere Wilkinson and Witcher, 1991 (in Wilkinson and Witcher, 1993) have argued that full TQM in the UK might be constrained by barriers associated with short-termism, organizational segmentalism, reluctant middle managers and poor industrial relations. 'Nearly every TQM example that we know about in the UK falls short of a total approach to TQM, because the companies concerned do not seem ready for full-blown TQM' (p.53). In fact, most existing forms of TQM are partial. Dale and Plunkett (1990) state that an important factor hindering the development of quality management in UK manufacturing industry is the shortage of able people qualified to take up quality management positions. This could also be in the case of SRC where managers from different departments may not have received equal and sufficient training in TQM. As findings revealed ***Lack of expertise in Quality Management*** was perceived by managers as the second most serious barrier in getting commitment to TQM. Lack of training and expertise in TQM were also mentioned by the managers during the interviews.

If there is one thing that separates the high-performance organizations from the low performers, it is the gap between how important participants say certain factors are to the success of TQM and how well these factors are

actually executed (Benson, 1993a). If this is true, one can conclude that managers' perception of the CSF from the different departments would have an impact on their performance. Does this mean that the different departments have a different performance level due to the differences in their perception of CSF?

7.3 Perception of Difficulties/Barriers in Getting Commitment to TQM

The overall mean score (3.38 out of 5) of managers' perception of the difficulties/barriers in their organization, show that on the whole the managers do not think that the barriers/difficulties existing in their organization pose as very serious problems in getting commitment to TQM. Majority of the managers, that is, more than **65%**, perceive all the 23 barriers/difficulties as fairly serious to very serious problems in getting commitment to TQM.

The main difficulties/barriers perceived by managers in SRC are similar to difficulties/barriers observed in previous research. Table 7.1 shows a summary of the difficulties/barriers to TQM found in the literature and those perceived by managers in this study. ***Lack of communication*** (Oakland, 1989; Charlton, 1990b; Aguayo, 1991; Davies, 1988 cited in May and Pearson, 1993; Reeves and Bednar, 1993) was perceived as the most serious problem in the organization, followed by other difficulties/barriers (in order of their seriousness) as shown in Table 7.1.

Table 7.1: Difficulties/Barries to TQM Found in the Literature and Perceived by Managers

Difficulties/Barrier	Literature	Perceived by Managers
Lack of communication	Oakland, 1989; Charlton, 1990b; Aguayo, 1991; Davies, 1988 cited in May and Pearson, 1993; Reeves and Bednar, 1993.	/
Barriers between departments	Charlton, 1990b; Moreno-Luzon, 1993; Wilkinson and Witcher, 1991 cited in Wilkinson and Witcher, 1993; Coulson-Thomas, 1992; Wiele et. al., 1993.	/
Lack of expertise in Quality Management	Dale and Plunkett, 1990; Moreno-Luzon , 1993; Wiele et. al., 1993.	/
Changing behaviour and attitudes	Charlton, 1990b; Cieri, Samson and Sohal, 1991; Milakovich, 1991; Dale, 1991 cited in Watson, McKenna and McLean, 1992; Moreno-Luzon, 1993; Wiele et. al., 1993; Whyte and Witcher, 1992 cited in Wilkinson and Witcher, 1993.	/
A lack of top management commitment	Ching, 1988; Lascelles and Dale, 1988; Oakland, 1989; Charlton, 1990a; Charlton, 1990b; Demouy, 1991; Coulsan-Thomas, 1992; Dale, 1991 cited in Watson, McKenna and McLean, 1992; May and Pearson, 1993; Moreno-Luzon, 1993; Reeves	/

(Cont.)

Difficulties/Barriers	Literature	Perceived by Managers
	and Bednar, 1993; Wiele et. al., 1993.	
Employees are not sure of what is required of them	Aguayo, 1991; Chapman, Clarke and sloan, 1991; Wiele et. al., 1993.	/
A tendency to cure symptoms of a problem and not the root cause	Wiele et. al., 1993	/
Conflict between production and quality department	Wiele et. al., 1993	/
Quality system based on detection not prevention	Moreno-Luzon, 1993 ; W iele et. al., 1993	/
Lack of training and and education	Ching, 1988; Lascelles and Dale, 1988; Oakland, 1989; Charlton, 1990b; Aguayo, 1991; Chapman et. al., 1991; Demouy, 1991; Milakovich, 1991; Reeves and Bednar, 1993.	/
Managers are not sure what is required of them	Dempsey and Hesketh, 1988; Wiele et. al., 1993.	/
Lack of objectives and strategies	Oakland, 1989; Aguayo, 1991; Cieri et. al., 1991; Moreno-Luzon, 1993; Wiele et. al., 1993.	/

The problem of changing behaviors and attitudes was also voiced out by the managers who were interviewed. According to them there is some reluctance on the part of certain managers to want to change their ways of doing things. Mostly it is the problem with old timers who have arosen from rank and file. Wiele et. al., (1993) found out that changing behavior and attitudes was the main difficulty faced by organizations in getting commitment to TQM. Moreno-Luzon (1993) found out that resistance to change was the principal obstacle encountered by 44 small manufacturing firms, implementing TQM. In an earlier survey by Whyte and Witcher, 1992 (in Wilkinson and Witcher, 1993) found that a third of 235 TQM companies thought that culture and attitudes were its main difficulties. According to Juran (1988) some of the objections to "corporate interference" are in the nature of "cultural resistance". Studies (e.g., Steers and Porter 1987, cited in Schuler and Harris, 1992) show that managers often suffer from a change in role identity due to a lack of preparation for their new role. Attitudes change when a business's culture or working environment is changed, not until. Getting people together and preaching to them, or "motivating" them, changes very little (Crosby, 1989). Not all chief executives appear able to act as transforming leaders, particularly with regard to the leadership of the quality improvement process. There are several possible reasons for this, such as lack of sustained commitment, a lack of vision, and a lack of understanding. (Lascelles and Dale, 1988). This would mean that the organization is not prepared fully for TQM . Unless the right cultural climate prevails in the company,

implementation of TQM would be hindered. Companies who succeed in their quest for total quality, understand the importance and dynamics of creating the right organizational culture. According to Atkinson (1990), cultural change is the secret to implementing TQM. Companies who succeed in their quest for total quality, understand the importance and dynamics of creating the right organizational culture.

Lower managers perceived the difficulties/barriers as more serious than did the middle and top managers. There were significant differences in the perception of top, middle and lower managers in getting commitment to TQM for *Changing behavior and attitudes, A tendency to cure symptoms of a problem and not the root cause, Fear, A lack of top management commitment,* and *Conflict between production and quality department.* It has been consistently found that superiors and subordinates tend to view situations somewhat differently, and these varying viewpoints influence how everyone behaves (Steers, 1988). Various studies (Haire, 1955; Likert, 1961; Webber 1970; Lawler, 1971; and Haire, 1976 cited in Steers, 1988) have shown marked differences occur between superior and subordinate perceptions of the superiors' behavior. The Hassard research revealed that a definite gap existed between senior management's commitment to TQM and that shown by the workers in an electronics company (Ashton, 1992). Although top management's commitment to quality is critical, studies indicate that there is no common understanding of the term "commitment", and that managers'

perceptions of their commitment often is not shared by their subordinates (Shetty, 1991/92). Robson states 'the management role remains the weakest area in most companies that have initiated the TQM process' whilst Brown comments, 'although many executives truly believe in TQM, their behavior does not show that commitment. ' (May and Pearson, 1993).

In their study, Reeves and Bednar (1993) found that top and middle managers perceived somewhat different obstacles to TQM implementation. Top managers focused on organizationwide implementation obstacles, (e . g . inadequate knowledge about and understanding of TQM; unclear definitions of TQM goals, boundaries, and authority; and inadequate planning for implementation) while middle managers focused on operational and process barriers (e.g. lack of support from top management; lack of resources; and inadequate/insufficient training) to implementation. It was found out that in this study there was no significant difference in the perception of top, middle and lower managers regarding organizationwide implementation obstacles - such as ***Lack of objectives and strategies, Lack of expertise in Quality Management,*** and ***Lack of intellectual thought given to the subject*** - and operational and process barriers - such as A ***lack*** of resources and ***Lack of training and education.*** The perception of ***A lack*** of ***top*** management ***commitment*** as a barrier to TQM implementation varied significantly across the three management levels.

In this study however, overall, the differences in perception among managers from different levels is not significant. Findings show that the difficulties perceived by managers in getting commitment to TQM do not differ according to level of management.

Findings also revealed that there are no differences among managers from different departments as regards their perception of difficulties/barriers in getting commitment to TQM. Out of the 23 difficulties/barriers, their perceptions differed only for two difficulties/ barriers - ***Barriers between departments*** and ***SPC is the answer to all the problems.*** Therefore, as far as perception of difficulties/barriers in getting commitment to TQM is concern, the managers from the various departments do not seem to differ in their perceptions.

1.4 Conclusion

In this study managers seem to be well aware of the importance of TQM factors. They seem to have an equal level of awareness and possess a similar understanding of TQM factors. In line with past studies, findings reveal that ***Satisfying external customers/clients*** is what TQM means to most managers in SRC.

Managers from different departments have a different level of awareness and possess a different level of understanding regarding the importance of TQM factors.

This study supports research done by others which indicate that ***Necessary management behaviors*** is perceived as the most critical factor in TQM. It is also noted that results of this survey are in line with Porter and Parker, Saraph et. al. and Malcolm Baldrige Award (Porter and Parker, 1993) for ***Management behaviors*** and ***Strategy for TQM,*** where they are also the first and second respectively, on their list of critical factors of TQM.

Managers irrespective of their levels have a similar opinion of how critical the factors are in implementing TQM. However, managers from the various departments seem to have different opinions regarding how critical are the CSF in implementing TQM. This reflects that TQM is partially practiced in the organization.

Managers perceived the difficulties/barriers in getting commitment to TQM as fairly serious to serious problems. The main difficulties/barriers perceived by managers in SRC are similar to difficulties/barriers observed in previous research. There are no differences in the perception of managers in getting commitment to TQM according to level of management and departments.

For the organization to be fully prepared for TQM, the right organizational climate has to prevail so that organizational and cultural changes can take place smoothly to pave the way for a full blown TQM.

The participation of all levels of the organization has been identified as a critical feature of successful quality improvement programmes (Luce, 1985, cited in Morrison and Rahim, 1993). Achievement of TQM depends on a clear and effective organization-wide. program, rather than on a single department or a few specialists (Feigenbaum, 1993). According to Feigenbaum (1993), the quality role of senior manager today requires not only quality awareness but also, and perhaps more important, personal managerial know-how for leading in quality improvement. In other words, it is not good enough for managers in this study just to have a high level of awareness of TQM without possessing ***the Necessary management behaviors*** required to implement TQM.

CHAPTER EIGHT

CONCLUSIONS AND IMPLICATIONS

8.0 Introduction

This chapter will try to round up the whole study and its findings. It will discuss about the implications of the findings and limitations of the survey.

8.1 Overview of the Study and Its Findings

In Chapter One, the reader was introduced to the research problems, reasons for the study being undertaken, and significance of this study.

In Chapter Two, Total Quality Management was discussed from its roots to its present state, related quality concepts, and principles and elements of TQM were discussed. Two models - Model for TQM implementation and Critical Hierarchy model were put forward. Critical success factors and difficulties/barriers in TQM implementation were also highlighted.

Chapter Three, talked about awareness and perception, the importance of awareness and perception of managers towards TQM for an organization.

Chapter Four dealt with the theoretical framework of the study. Independent variables - levels of management and types of departments - and dependent variables - awareness and perception of managers towards TQM - were identified and operationalised. Based on this framework six hypotheses were developed to be tested.

Chapter Five discussed about the research methodology of this study, that is, research design, sample, data collection method, pilot testing, reliability of questionnaires, implementation of the survey, and data processing and analysis.

In Chapter Six, results and findings were put forward. Out of the six null hypotheses, four were accepted and the other two rejected. It was found out that: Awareness of managers do not differ according to level of management. Awareness of managers did differ according to departments. Perception of managers regarding the critical success factors do not differ according to level of management. Perception of managers regarding the critical success factors differ according to departments. The difficulties perceived by managers in getting commitment to TQM do not differ according to level of management. The difficulties perceived by managers in getting commitment to TQM do not differ according to departments.

Chapter Seven attempted to throw some light on the findings of this study, in relation with past research and literature on TQM. Relationships between independent and dependent variables were observed and inferences were drawn based on the findings. It was discussed how one variable could possibly influence the other.

Chapter Eight, presently intends to end this study by discussing the implications of the findings and also the limitations plus suggestions for future research.

8.2 Implication of the Findings

TQM does not seemed to be emphasized equally in all the departments. Findings also indicate that TQM is partially practiced. Implications of this for SRC would mean that for TQM to be total, all departments should be equally involved in the implementation of TQM. If there are differences in perception of managers from the different departments, it would mean attitude, performance and behavior would also be different in the implementation of TQM. SRC would have to consider training and education for all departments and not concentrate on certain departments. Managers who are highly aware of TQM and understand the quality-improvement process will be in a position to make greater changes with greater authority. Not only will these managers

be regarded as better and more effective by executives and subordinates; they will in fact be better managers.

Lower managers perceived ***Lack*** *of top management commitment* as one of the barriers/difficulties in getting commitment to TQM. However, top management perceived it as a less serious difficulty /barrier. If, top management is really committed then, it has to manifest to the middle and lower management that it is so. Just believing or being highly aware of TQM is not enough. Top management through *Necessary management behaviours* have to show it to the others that they are truly committed to TQM.

No significant differences were found among levels of management, regarding their perception of difficulties/ barriers. However, lower managers perceived the difficulties/barriers in getting **commmitment** to TQM as more serious than the middle or top managers. Perhaps top management can look deeper into their problems and help solve them. By understanding the perceived barriers, SRC managers can more precisely define and anticipate problems impeding effective TQM implementation. For example, when such barriers as lack of communication and barriers between departments are perceived by the managers, then some action can be taken to rectify the matter. To have a strategic and global focus on the management of quality, then these perceived problems have to be eradicated.

8.3 Limitations of the Study

This study did not undertake the task of determining the variables that might cause the differences that exist between managers of different departments concerning their awareness and perceptions of TQM. It was limited to discovering if any significant differences existed between managers from different levels of management and departments with regards to their awareness and perceptions of TQM. The alternative hypotheses were in the nondirectional form. A directional test of the null hypotheses (Ho) will always be more powerful than a nondirectional test of Ho for a fixed alpha level (Glasnapp and Poggio, 1985, p. 328).

The questionnaires which were designed purposely for this study were based on a few studies done by other researchers. They have not been used or tested in any previous studies.

Time and financial limitations also did not permit the researcher to carry out a pretest and post-test of the questionnaires.

Considering the small sample size (166 out of 261 managers) which was taken from only one manufacturing firm, subjects (managers) of this study may not be truly representative of all the managers in all the manufacturing firms. As a result reservations are made in generalizing

the findings of this study to the rest of the managers in the manufacturing firms of Malaysia. However, for this organization, the sample size is considered to be representative of the managers. The findings should be viewed with caution until they have been replicated.

8.4 Suggestions for Future Research

In future, studies can be undertaken to determine the variables that might cause the differences that exist between managers from different departments concerning their awareness and perceptions of TQM.

Similar studies in other manufacturing firms can also be carried out to verify the findings of this study.

8.5 Conclusion of the Study

In recent years, the criticality of increased productivity and competitiveness has accelerated in step with global trends toward privatization, marketization and democratization, coupled with a more highly educated, more vocal and more demanding consumer market. The forward looking business is addressing quality in all aspects of the organization, recognizing that not only does quality represent competitive advantage, but that organizational survival may come to depend on it.

Nothing will be more important than product quality and customer service in the future market. TQM is a comprehensive approach to improve a product's or service's reliability and performance and to improve customer satisfaction. This never-ending effort begins with top management and involves employees throughout the organization. Design engineers, material managers, production planners, machine operators, salespeople, marketing specialists, and all other workers have a stake in the success of TQM. So do external customers and suppliers. Therefore, it is helpful for an organization launching TQM to have some insight and feedback on the awareness and perception of managers regarding TQM who are after all the drivers of TQM.

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Appendix A-l

Background of Sharp-Roxy Corporation (M) Sdn. Bhd

Sharp Group in Malaysia

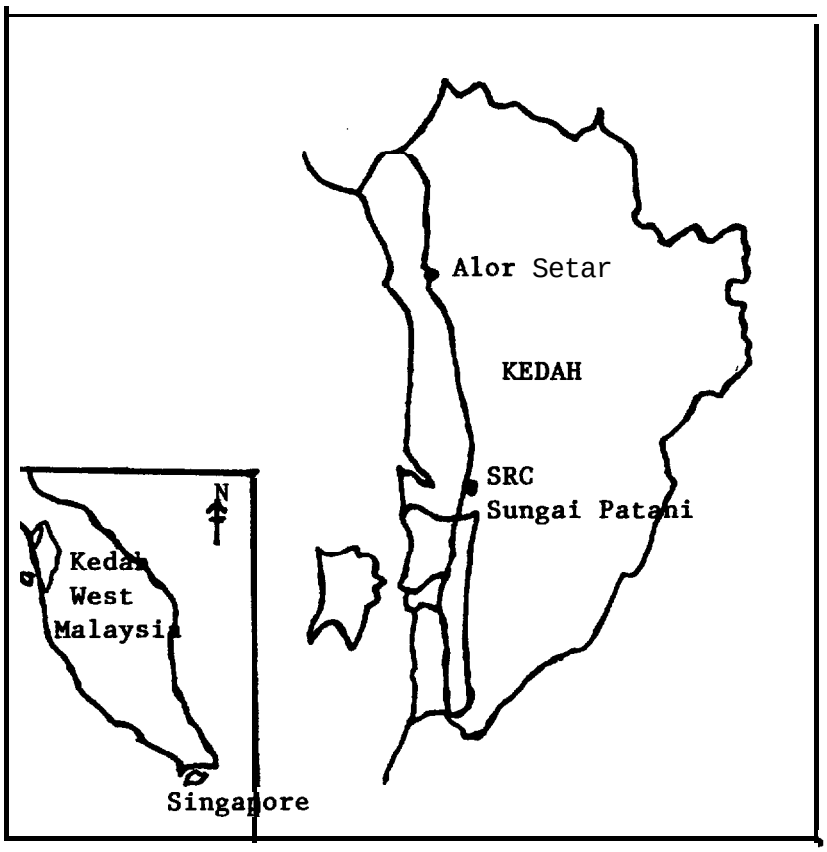
The sharp group in Malaysia consists of four production bases -

- Sharp-Roxy Corporation (M) Sdn. Bhd. (SRC)
  Lot 202, Bakar Arang Industrial Estate, Sungai Petani, Kedah.
- Sharp-Roxy Appliances Corporation (M) Sdn. Bhd. (SRAC)
  Lot 4 & 6, Jalan 225, Section 51-A, Petaling Jaya, Selangor.
- Sharp-Roxy Electronics Corporation (M) Sdn. Bhd. (SREC)
  PLO-l, Kawasan Perindustrian, Sri Gading Industrial Estate, Batu Pahat, Johore.
- Sharp Manufacturing Corporation (M) Sdn. Bhd. (SMM)
  PLO-225, Kawasan Perindustrian, Sri Gading, Batu Pahat, Johore.

and one sales base -

- Sharp-Roxy Sales & Service Company (M) Sdn. Bhd. (SRSSC)
  No. 11B, Jalan 223, Section 51-A, Petaling Jaya, Selangor.

Working together, all five companies have promoted their business activities and maintained steady growth. A total of 6,000 personnel were employed by Sharp's bases in Malaysia as of March, 1992. The Sharp group promotes long-term regional benefits through such activities as technology transfer from Sharp Headquarters, technical training programs and educational development.



Map Showing Location of Sharp-Roxy Corporation (M) Sdn. Bhd.

Sharp-Roxy Corporation (M) Sdn. Bhd. (SRC)

Location

Sharp-Roxy Corporation (M) Sdn. Bhd. (SRC) is located at Lot 101 and 202, Bakar Arang Industrial Estate, 08000 Sungai Petani, Kedah, West Malaysia.

Production

SRC was established in 1974. It started production in 1976. Presently, SRC produces radios, tape recorders, CD units, cassette tape mechanisms, PCB Sub-assemblies, Kits, Cordless Telephones, Facsimile Machines.

Capital

SRC has paid-up capital of RM 24 million. Its shareholders consists of:-

Name of Share Holders:	**Amount of Shares**	
Sharp Corp.	9,592,800shares	**(39.97%)**
Roxy Group	9,592,800 shares	**(39.97%)**
Yayasan Terengganu	4,800.00 shares	**(20.00%)**
R. Hanim Hussein	14,400 shares	**(0.06%)**
Total	24,000,000 shares	(100.00%)

Board of Directors

Chairman	Dr. Li Dak Sum (President of Roxy Electric Corp.)
Managing Director	Mr. Sumizo Akahodani
Factory Manager/Director	Mr. Toshiyasu Ito
General Adm./Director	Mr. Takashi Aratani

Directors:

Mr. Y. Wada	Sharp Corportion
Dato' Haji Abdul Rashid bin Ngah	Y ayasan Terenganu
En. Mohamed bin Endut	Yayasan Terengganu
Mr. Chan Sik Fan	Roxy Singapore
Mr. Li Lap Fung, Richard	Roxy Hong Kong
Puan Roquaiya Hanim binti Hussein	

Manpower

		Malay	Chinese	Indian	Others	Total
1.	Professionals (M GR, A.M GR)	4	28	3	13	6
2.	Semi Professionals (ENG, EXEC A.ENG, OFF)	64	101	24	1	190
3.	Clerical Staff (SEC, C. ASST, CLK)	49	48	14	2	113
4.	Supervisors/ Technicians (TEC, MEC, L.L., Q.C. INSP)	186	92	107	4	389
5.	General Workers	1445	78	514	8	2045
Total:		1748	347	662	16	2773

History

1974,	Dec	SRC Establish
76,	Jan	Production Started, Portable Radio
76,	Apr	Started to produce Mono-Cassette TRC
77,	Apr	Started Mono-Radio Cassette TRC
79,	Aug	Started Music Centre
81,	Apr	Introduced Auto Insertion Machine
81,	Apr	Started Stereo Radio Cassette TRC
81,	Jul	Completed Building of 2nd Factory
82,	Jan	Started Car Stereo
83,	Jul	ZD (Zero Defect) Activity
85,	Sept	Introduced Tip Parts Insertion Machine "Increased Auto-Mation Portion"
86,	Feb	Started to produce Self-Development Models (Stereo Headphone and Double Cassette TRC)
86,	May	QCC Activity
87,	Feb	Completed Expansion of 2nd Factory
88,	Aug	Started Products with Compact Disk
89,	Feb	Warehouse Completed
90,	Apr	Started Building of 3rd Factory
90,	Oct	Increasing Capital (RM16 mil --> RM24 mil)
90,	Dec	Completed Building of 3rd Factory
91,	Oct	CD Pick-Up Production Start
92,	Mar	IS09000 BSI's Certification

93, Feb Production of Fax Machines

93, May CD-Pick 2 Million Achievement

5. **Sales Exports**

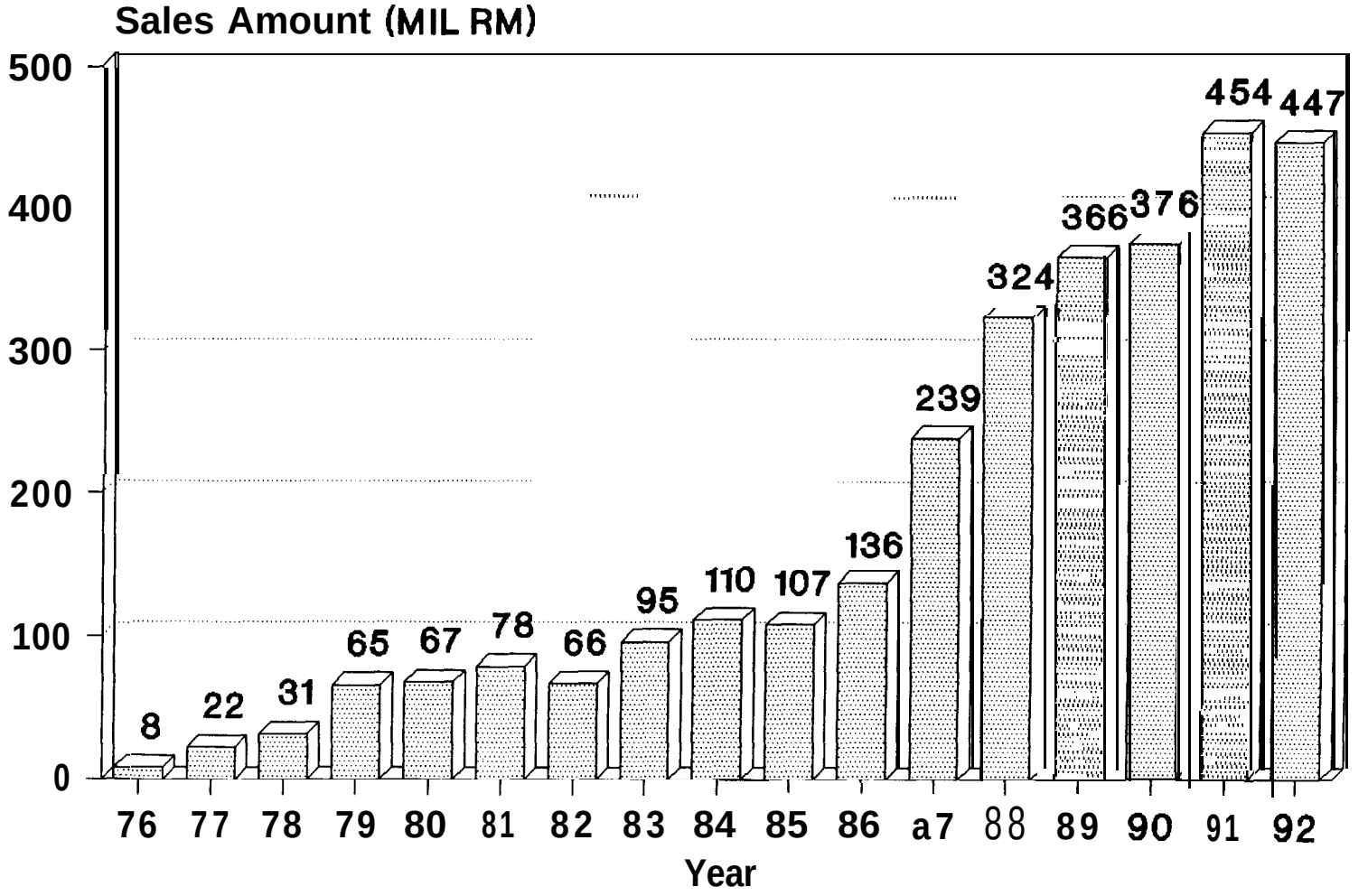
Chart 1 shows the amount of sales (mil **RM)** achieved by SRC from 1976 to 1992.

Exports

Export Statistics in 1992 (Quantity Base)

USA, Canada	.....	34.9%
Europe	.....	18.4%
Japan	.....	12.9%
Malaysia	.....	5.5%
Others	.....	28.3%
Total	.....	100.0%

Chart I: Sales (Mil RM) of Sharp-Roxy Corporation (M) Sdn. Bhd. for the period 1976 - 1992



Appendix A-2

SHARP-ROXY- POLICY ON QUALITY

Company Policy on Quality

Purpose:

Sharp-Roxy Corporation (M) Sdn. Bhd. wants its quality to be recognized nationally and internationally to be an established hallmark on all its products and services. In this, we wish to improve our market position and secure our future growth potential.

Aims:

Our over-riding quality aims are to:

- Satisfy our customers
- Maintain their full confidence in Sharp-Roxy Corporation as a manufacturer.
- Meet the demands and stipulation of the customers.
- Ensure our products conform to all agreed terms and specifications.
- To be a leader in the field of quality through our technology innovation.
- Ensure all staff are aware of the Company Policy on Quality.

Means:

We shall approach our aim via the concept of Total quality Management. This include among other things the **following:-**

- Sharp-Roxy Corporation's Total Management commitment at all levels.
- Ensuring that all our actions and products are an expression of quality.
- Fostering team work among all employees.
- Using project team to analyze and resolve problems.
- Quantifying all quality problems and establishing aims and objectives.
- Ensuring that proper training are provided to all levels enabling all employees to be proficient in their work using relevant statistical techniques for process and quality control.
- Constantly working and seeking to improving the system.
- Integrating total company quality control system through implementation of Quality Innovation Plan.

Sharp-Roxy's Quality Motto:

"Quality first in heart and mind"

SHARP-ROXY CORPORATION CREED

Sharp-Roxy is dedicated to two principal ideals **"Sincerity and Creativity".**

By devoting ourserlves to the above two ideals our work will bring genuine satisfaction and joy to people and provide a meaningful contribution to society.

Sincerity is the most fundamental of human ethics- Always work with sincerity.

Harmony is power-Trust each other for a united effort.

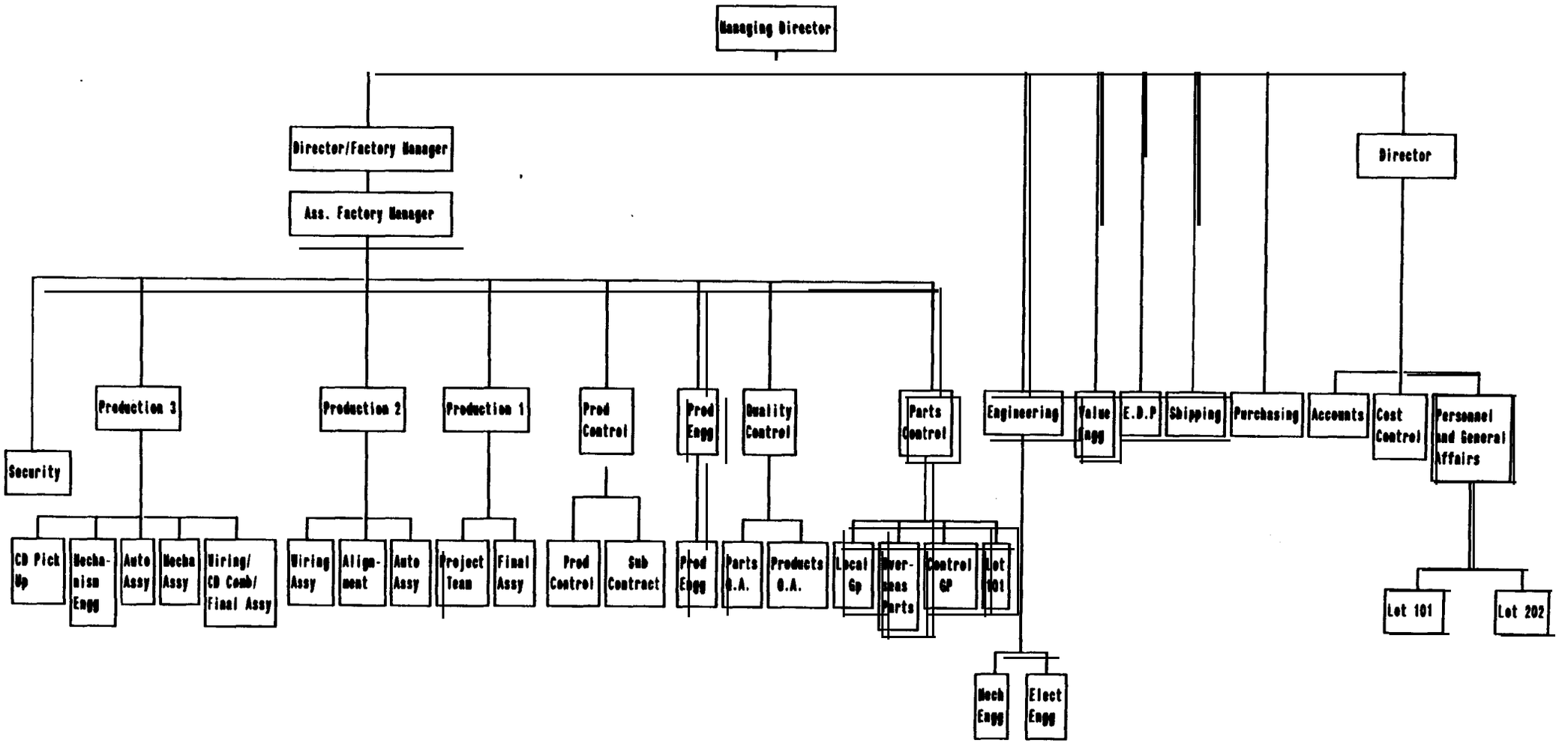
Politeness is a virtue-Be grateful and respectful to others.

Creativity is progress-Always have a mind toward ingenuity and improvement.

Courage is the source of a meaningful life-Tackle difficulties with a positive attitude.

SHARP-ROXY CORPORATION (M) SDN. BHD.

ORGANIZATION CHART



No. of Managers According to types of departments and levels of management in Sharp-Roxy **Corporation (M) Sdn. Bhd.**

Levels of management / Types of Department	Top Level No	%	Middle Level No	%	Lower Level No	%	Total No	%
Personnel and General Affairs	1		7		5		13	5.0
Cost Control			2		3		5	1.9
Accounts	2		1		3		6	2.3
Purchasing	2		2		5		9	3.4
Shipping	1		2		4		7	2.7
EDP (Electronic Data Processing)	1		3		3		7	2.7
Value Engineering	1		2				3	1.1
Engineering	2		55		8		65	25.0
Production/Operations	4		22		61		87	33.3
Production Control	1		4		7		12	4.6
Production Engineering	2		1		7		10	3.8
Quality Control	2		5		8		15	5.8
Parts Control	2		9		11		21	8.0
Others (Security)			1				1	0.4
Total	20	7.7	116	44.4	125	47.9	261	100.0

Note: Top level includes managing director, director, factory manager, senior manager and manager

Middle level includes assistant manager, executive, senior engineer and engineer.

Lower level includes officer (supervisor) and assistant engineer.

UNIVERSITI UTARA MALAYSIA
SINTOK
GRADUATE SCHOOL

Dear respondent,

This study is being carried out to determine the awareness and perception of managers regarding Total Quality Management **(TQM).** To make this study successful, your cooperation and honest response is greatly needed and appreciated.

This research is a partial requirement for my Masters degree in Management Science. At the same time I would like to take this opportunity to contribute something to your organization by carrying out this study and consequently, submitting my report to top management for their further action.

Please answer all questions TRUTHFULLY. All information given will be regarded with strict confidence. Thank you for your kindness in answering this questionnaire.

Yours sincerely,

(Amarjit Kaur)
Graduate School
UUM

QUESTIONNAIRE REGARDING TOTAL QUALITY MANAGEMENT (TQM)

Section A

(Please tick _/ your answer in the blanks provided)

1. Age :

____ Below 25 yrs. ____ 26 - 35 yrs.

____ 36 - 45 yrs. ____ 46 - 55 yrs.

____ Above 55 yrs.

2. Gender :

____ Male ____ Female

3. Length of employment with this organization:

____ Less than 2 yrs. ____ 3 - 5 yrs.

____ 6 - 10 yrs. ____ 11 - 15 yrs.

____ More than 15 yrs.

4. Level of management in the organization:

____ Top level
(Managing director, director, factory manager, senior manager, and manager)

____ Middle level
(Assistant manager, executive, senior engineer, and engineer)

____ Lower level
(officer and assistant engineer).

5. Presently attached to which department?

_____ Personnel & General Affairs

_____ Cost Control

_____ Accounts

_____ Purchasing

_____ Shipping

_____ EDP (Electronic Data Processing)

_____ Value Engineering

_____ Engineering

_____ Production/operations

_____ Production Control

_____ Production Engineering

_____ Quality Control

_____ Parts Control

_____ Others _____
(Please specify)

Section B

Based on your understanding, please rank on a 5 point scale how IMPORTANT are the following factors in Total Quality Management **(TQM)**.

Not important at all	Not Important	Moderately Important	Important	**Very** Important
1	2	3	4	5

Example:
2 Reducing costs.

____ Satisfying external customers/clients

____ Reducing costs (costs decrease due to fewer mistakes, less rework, fewer delays, better use of people and other resources)

____ Having partnership between organization and customers

____ Employee involvement and development (training and education)

____ Each person satisfying their internal customers

____ Teamwork (collaboration and cooperation among members)

____ Quality of working life
(The extent to which the organizational culture provides employees with information, knowledge, authority, and rewards to enable them to perform safely and effectively, be compensated equitably, and maintain a sense of human dignity)

____ Developing partnership between organization and suppliers

____ Participative management

____ Process management and systems
(integration of people, materials, methods, and machines involving ownership, planning, control, measurement, improvement, and optimization)

____ Everyone in the organization is responsible for the **continous** process improvement of products and services.

____ Horizontal integration (cross functional management)

____ Policy deployment (e.g. Quality Function Deployment)

Section C

In your opinion, how CRITICAL are the following factors in the TQM implementation process ?

Please use the following scale to indicate your answer.

Not critical At All	Not Critical	Slightly Critical	Critical	**Very** Critical
1	2	3	4	5

Example:
2 Training and education

____ Necessary management behaviours
(e.g. leadership, management involvement, commitment, support, etc.)

____ A strategy for TQM implementation
(TQM objectives, requirements of the organization, and means for continuous improvement are established)

____ Organization for TQM
(an organizational structure that demands and harness the full potential of the work force)

____ Communication for TQM
(means of raising quality awareness, reinforce the message, publicize achievements, and **recognise** contributions to quality improvement)

____ Training and education
(should cover all employees as part of an ongoing process)

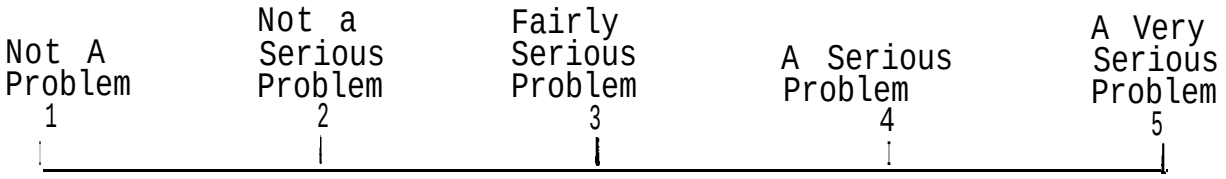
____ Employee involvement

____ Process management and systems
(integration of people, materials, methods, and machines involving; includes ownership, planning, control, measurement, improvement, and optimization)

____ Quality technologies
(e.g. Statistical process control, quality costing, benchmarking, Quality function deployment, charts analysis, etc.)

Section D

Below are DIFFICULTIES/BARRIERS in getting commitment to TQM. In your organization, how do you perceive them? Please use the following scale to answer.



Example:
2 A lack of resources

____ Changing behaviour and attitudes

____ **Emphasis on** short term objectives

____ A tendency to cure symptoms of a problem and not the root cause

____ Production schedules and costs are treated as main priorities

____ Employees are not sure of what is required of them

____ Barriers between departments

____ Managers are not sure what is required of them

____ Lack of objectives and strategies

____ Quality system based on detection not prevention

____ Lack of expertise in Quality Management

____ A lack of resources

____ Lack of intellectual thought given to the subject

____ Quality Management tools are seen as an end in themselves

____ Uncertainty about what to do next

Not A Problem 1	Not a Serious Problem 2	Fairly Serious Problem 3	A Serious Problem 4	A Very Serious Problem 5

____	Fear (e.g. asking questions; making mistakes)
____	Quality improvement is the concern of the Quality department
____	Quality improvement is the concern of production
____	A lack of top management commitment
____	Conflict between production and quality department
____	Over reliance on the quality manual
____	**Stastical** Process Control (SPC) is the answer to all the problems
____	Lack of training and education (for all employees)
____	Lack of communication

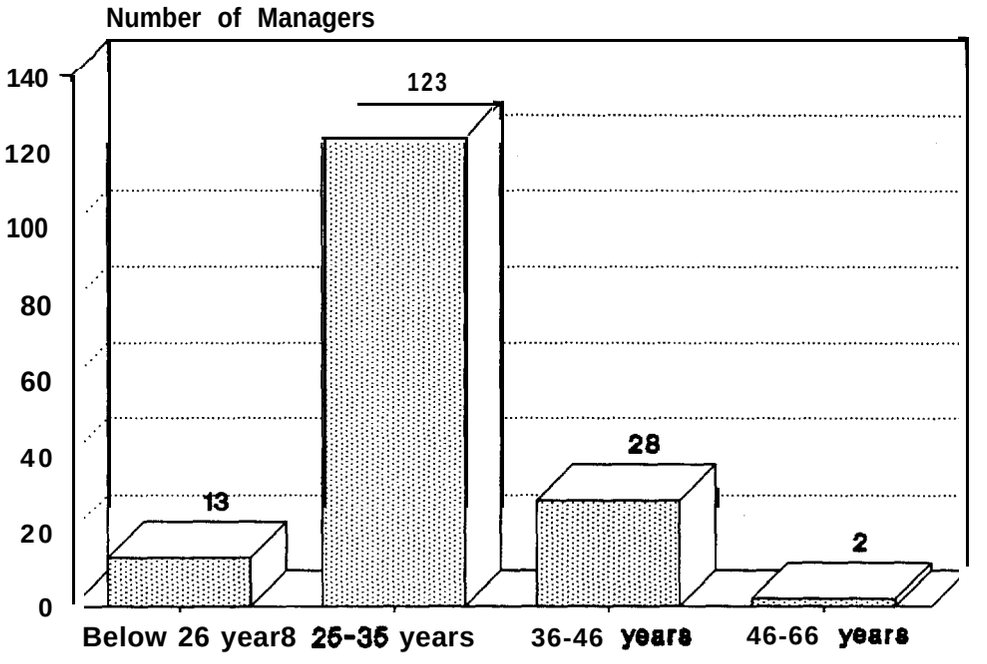
END.

THANK YOU

No. of Managers According to Age Group

Categoty	No. of Managers	Percent
Below 25 years	13	7.8
25 - 35 years	123	74.1
36 - 45 years	28	16.9
46 55 years	2	1.2
Total	166	100.0

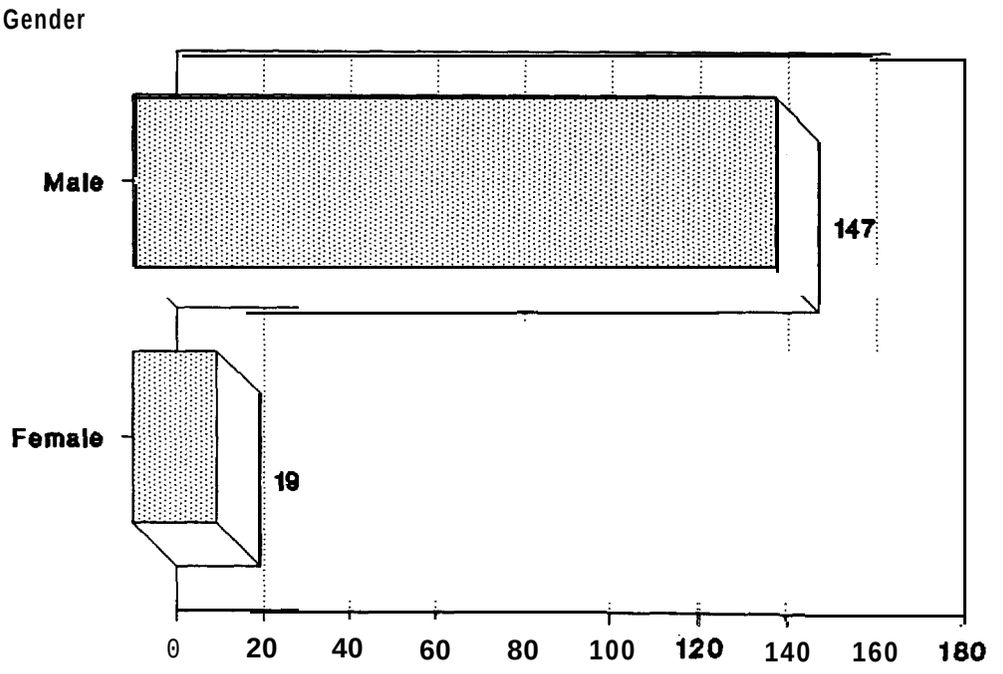
Chart 2: No. of Manager6 According to Age Group



No. of Managers According to Gender

Gender	No. of Managers	Cum Percent
Male	147	88.6
Female	19	11.4
Total	166	100.0

Chart 3: Number of Manager8 According to Gender

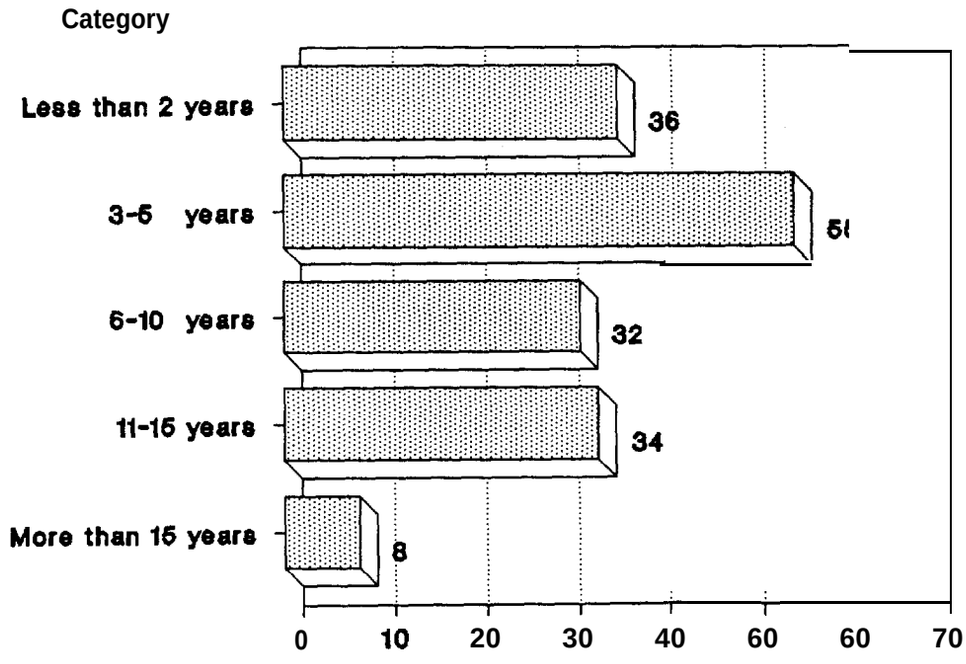


Appendix C-5

Length (Duration) of Employment wtih Sharp-Roxy Corporation (M) Sdn. Bhd.

Category	No. of Managers	Percent
Less than 2 years	36	21.7
3 - 5 years	55	33.1
6 - 10 years	32	19.3
11 - 15years	34	20.5
More than 15 years	8	4.8
Missing	1	.6
TOTAL	166	100.0

Chart 4: Length (Duration) of Employment
wlth Sharp-Roxy Corporation (M) Sdn. Bhd

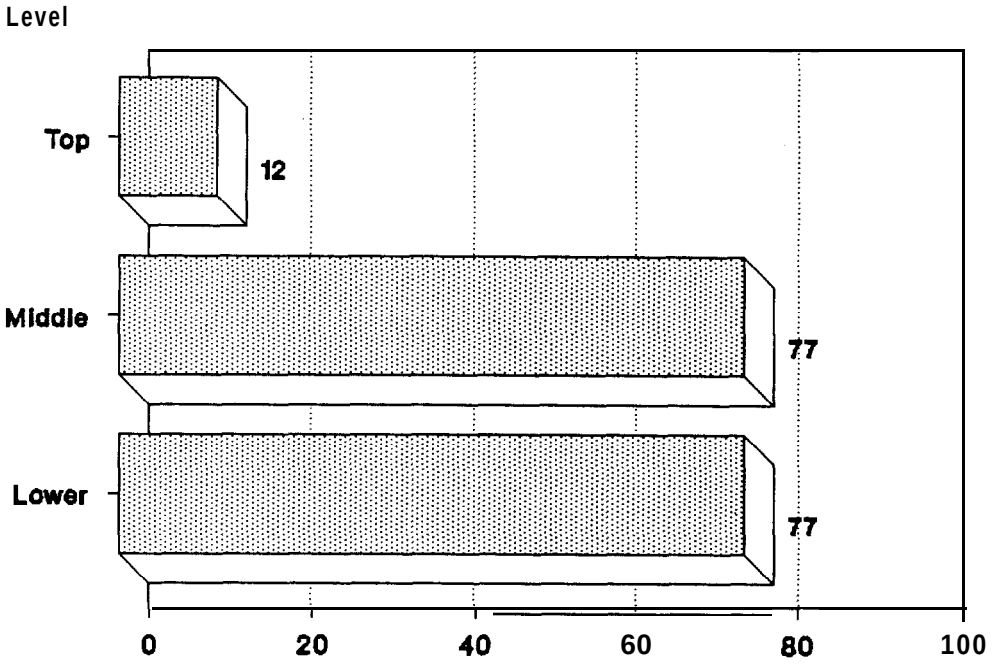


Appendix C-7

Managers According to Level of Management

Level	No. of Managers	Percent
Top	12	7.2
Middle	77	46.4
Lower	77	44.4
Total	166	100.0

Chart 5: Manager8 According to Level of Management



Sample distribution by levels of management and types of departments

Levels of management / Types of Department	Top Level	Middle Level	Lower Level	Total No.	Total %
Personnel and General Affairs	1	4	5	10	6.0
Cost Control		2	2	4	2.4
Accounts			2	2	1.2
Purchasing	1	1	4	6	3.6
Shipping	1		2	3	1.8
EDP (Electronic Data Processing)	1	4	2	7	4.2
Value Engineering	1	1	-	2	1.2
Engineering	1	39	9	49	29.5
Production/Operations	1	10	30	41	24.7
Production Control	1	4	3	8	4.8
Production Engineering	2	1	5	8	4.8
Quality Control	2	5	6	13	7.8
Parts Control	-	6	7	13	
Total	12	77	77	166	100.0
(%)	7.2	46.4	46.4	100.0	100.0

Mean Score of Managers' Awareness of the Importance of TQM Factors

Factors in TQM	Mean * $\bar{X}$	Std. Deviation S D	No. of Managers N
Satisfying external customers/clients	4.66	.65	163
Teamwork	4.49	.76	165
Quality of working life	4.38	.75	164
Everyone in the organization is responsible for the continous process improvement of product and services	4.33	.71	165
Reducing costs	4.32	.74	164
Process management and systems	4.27	.74	162
Employee involvement and development	4.24	.79	165
Participative management	4.01	.79	164
Policy deployment (eg. QFD)	3.79	.87	162
Each person satisfying their internal customers	3.68	.97	160
Horizontal integration	3.63	.88	159
Developing partnership between organization and suppliers	3.53	1.01	165
Having partnership between organization and customers	3.40	1.02	164
Average mean score of all the factors (Awareness)	4.0513	.4926	150

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

Managers' Awareness of the Importance of TQM Factors According to Levels of Management

TQM Factors / Levels of Management	Not Important at all		Not Important		Moderately Important		Important		Very Important		Total (Level)	
	No	a	No	a	No	a	No	a	No	a	No	a
Satisfying external customers/clients												
Top	-		1	8.3			1	8.3	10	83.4	12	100
Middle	-		2	2.0	S	6.7	15	20.0	53	71.3	75	100
Lower	-				2	2.6	17	22.4	57	75.0	76	100
Total (overall)	-	-	3	1.8	7	4.3	33	10.2.	120	73.6	163	100
Reducing Costs												
Top		-	-	-	1	9.1	4	36.4	6	54.5	11	100
Middle		-	1	1.3	8	10.5	33	43.4	34	44.8	76	100
Lower	1	1.3			9	11.7	31	40.3	36	46.7	77	loll
Total (overall)	1	.6	1	.6	18	11.0	68	41.5	76	46.3	164	100
Having partnership between organization and customers												
Top			1	8.3	7	58.4	3	25.0	1	8.3	12	loo
Middle	S	6.6	8	10.5	2s	32.9	25	32.9	13	17.1	76	loo
Lower	1	1.3	14	18.4	28	36.8	22	la.9	11	14.6	76	loo
Total (overall)	6	3.7	23	14.0	60	36.6	50	30.5	2s	15.7.	164	100
Employee involvement and development												
Top							7	58.3	4	33.4	12	loo
Middle		1.3	-		1	8.3	29	38.2	34	44.7	76	100
Lower	1	.6	1	1.3	12	15.8	34	443	32	41.5	77	100
Total (overall)	1	.6	3	1.8	21	12.7	70	42.4	70	42.4	16s	100
Each person satisfying their internal customers												
Top			1	8.3	4	33.3	3	25.1	4	33.3	12	100
Middle	2	2.7	10	13.7	24	32.9	2s	34.2	12	16.5	73	100
Lower			S	6.7	20	26.7	31	41.3	19	75.3	7s	100
Total (overall)	2	1.3	16	10.0	48	30.0	59	36.9	3s	21.9	160	100

(Cont.)

TQM Factors / Levels of Management	Not important		Not Important		Moderately Important		Important		Very Important		Total (Level)	
	NO.	%	NO.	%	No	%	NO	%	No	%	No	%
Teamwork												
Top					I	a.3	3	25.1	a	66.6	12	loo
Middle	2	1.6	2	1.6	3	3.9	7.6	34.2	4 3	56.7	76	100
Lower					5	65	23	29.9	4 9	63.6	n	100
Total (overall)	2	1.2	2	1.2	9	5.5	52	31.5	100	66.6	165	100
Quality of working life							7	58.4	5	41.6	12	100
							3 3	44.0	3 3	44.0	75	100
Top							25	3 2 5	45	58.4	n	100
Middle			3	4.0	6	8.0						
Lower			2	2.6	5	65						
Total (overall)		-	5	3.0	11	6.7	65	39.6	a	50.6	164	loo
Developing partnership between organization and suppliers												
Top					2	16.7	6	50.0	4	333	12	100
Middle	3	3.9	9	11.7	21	27.3	32	41.6	12	15.5	n	100
Lower	2	2.6	12	15.8	25	32.9	26	34.2	11	14.5	76	100
Total (overall)	5	3.0	21	12.7	48	29.1	64	38.8	27	16.4	165	100
Participative												
Top			1	8.3	1	a.3	6	50.0	4	33.4	12	100
Middle			3	3.9	21	27.6	34	44.7	18	23.8	76	100
Lower			2	2.6	11	14.5	39	51.3	24	31.6	76	100
Total (overall)			6	3.7	33	20.1	79	4.2	46	28.0	164	100
Process and systems												
		-			2	16.7	2	16.7	8	66.6	12	100
Top		-	1	1.4	11	15.1	31	425	30	41.0	73	100
Middle		-	2	2.6	6	7.8	39	SO.6	30	39.0	n	100
Lower												
Total (overall)			3	1.9	19	11.7	72	44.4	68	42.0	162	100

(cont.)

TQM Factors / Levels of Management	Not important at all		Not Important		Moderately Important		Important		very Important		Total (Level)	
	NO	%	NO	%	NO	%	NO.	%	NO	%	NO	%
Everyone in the organization is responsible for the continuous process improvement of products and services												
Top	-						5	41.7	1	58.3	12	loo
Middle	-		2	2.6	7	9.1	40	52.9	28	36.4	77	100
Lower	-				10	13.2	2s	2.9	41	53.9	76	100
Total (overall)			2	1.2	17	10.3	m	42.4	76	46.1	165	100
Horizontal integration												
Top	1	1.4	1	8.3	3	2S.O	5	41.7	3	25.0	12	100
Middle			6	6.1	30	a s	24	32.4	13	17.6	74	100
Lower			3	4.1	33	45.2	23	31.5	14	19.2	73	100
Total (overall)	1	.6	10	6.3	66	41.5	52	32.7	30	18.9	159	100
Policy deployment (eg. QFD)												
Top					3	2S.O	6	SO.0	3	2S.O	12	100
Middle	2	2.6	4	5.5	23	29.9	31	40.3	17	21.7	77	100
Lower	1	1.4	2	2.7	20	27.4	37	50.7	13	17.8	73	loo
Total (overall)	3	1.9	6	3.7	46	28.4	74	46.7	33	20.4	162	100

Group (Levels of Management) Differences in Managers' Awareness of the importance of TQM Factors - ANOVA

TQM Factors Levels of Management	n	* X	SD	DF	F	Sig. of F	At alpha Level 0.1
Satisying external customers/clients							
Top	12	4.6667	.8876				
Middle	75	4.5861	.7369				
Lower	76	4.7237	.5059				
Within Groups Total	163	4.6564	.6522				
Between Groups				2	.8347	.4359	Not Sig.
Reducing Costs							
Top	11	4.4545	.6876				
Middle	76	4.3158	.7157				
Lower	77	4.3117	.7824				
Within Groups Total	164	4.3232	.7463				
Between Groups				2	.1833	.8327	Not Sig.
Having partnership between organization and customers							
Top	12	3.3333	.7785				
Middle	76	3.4342	1.0995				
Lower	76	3.3684	.9912				
Within Groups Total	164	3.3963	1.0307				
Between Groups				2	1016	.9034	Not sig.
Employee involvement and development							
Top	12	4.2500	.6216				
Middle	76	4.2632	.7723				
Lower	77	4.2208	.8370				
Within Groups Total	165	4.2424	.7944				
Between Groups				2	.0550	.9465	Not Sig.

*Values are mean responses on a 5 - point scale on which "Not Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM Factors / Levels of Management	n	x*	SD	DF	F	Sig.of F	Al alpha Level 0. I
Each person satisying their internal customers							
Top	12	3.8333	1.0299				
Middle	73	3.4795	1.0153				
Lower	75	3.8533	.8806				
Within Groups Total	160	3.6813	.9553				
Between Groups				2	2.9977	.0528	. Sig.
Team Work							
Top	12	4.5833	.6686				
Middle	76	4.3947	.8956				
Lower	n	4.5714	.6162				
Within Groups Total	165	4.4909	.7615				
Between Groups				2 '	1.1250	.3272	Not Sig.
Quality of **working life**							
Top	12	4.4167	.5149				
M iddk	75	4.2800	.7809				
Lower	n	4.4675	.7360				
Within Groups Total	164	4.3780	.7444				
Between Groups				2	1.2232	.2970	Not Sig.
Developing partnership **between organization** and suppliers							
Top	12	4.1667	.7177				
Middle	n	3.5325	1.0206				
Lower	76	3.421 I	1.0101				
Within Groups Total	165	3.5273	.9980				
Between Groups				2	2.8961	.0582	Sig.
Participative management							
Top	12	4.0833	.9003				
Middle	76	3.8816	.8160				
Lower	76	4.1184	.7477				
Within Groups Total	164	4.0061	.7912				
Between Groups				2	I .7642	.1746	Not Sig.

*Values are mean responses on a 5 - point scale on which 'Not Important At All" = I and "Very Important' = 5.

(Cont.)

TQM Factors Levels of Management	n	$\bar{X}$ *	SD	DF	F	Sig of F	Al alpha Level 0. l
Process management and systems							
Top	12	4.5000	.7977				
Middle	73	4.2329	.7550				
Lower	n	4.2597	.7146				
Within Groups Total	162	4.2654	.7391				
Between Groups				2	.6775	.5093	Not Sig.
Everyone in the **organization** k **responsible for** the **continous process improvement** of **products and services**							
Top	12	4.5833	.5149				
Middle	77	4.2208	.7186				
Lower	76	4.4079	.7151				
Within Groups Total	165	4.4333	.7050				
Between Groups				2	2.1608	.1185	Not rig.
Horizontal Integration							
Top	12	3.8333	.9374				
Middle	74	3.5676	.9228				
Lower	73	3.6575	.8370				
Within Groups Total	159	3.6289	.8853				
Between Groups				2	.5357	.5863	Not Sig.
Policy Deployment **(eg. QFD)**							
Top	12	4.0000	.7385				
Middle	77	3.7403	.9515				
Lower	73	3.8082	.8107				
Within Groups Total	162	3.7901	.8764				
Between Groups				2	.4843	.6170	Not Sig.
Overall **Awareness** of TQM							
Top	11	4.1399	.3054				
Middle	68	3.9955	.5337				
Lower	71	4.0910	.4739				
Within Groups Total	150	4.0513	.4931				
Between Groups				2	.8435	.4323	Not Sig.

*Values are mean responses on a 5 - point scale on which "Not Important At All" = 1 and "Very Important" = 5.

Groups (Types of Departments) Differences in Managers' Awareness of the Importance of TQM Factors - ANOVA

TQM Factors / Types of Departments	n	$\bar{x}$*	S D	DF	F	sii. of F	At alpha Level 0.1
Satisfying External Cust							
1. Personnel & General Affairs	9	4.2222	1.0929				
2. Cost control	4	4.7500	.5000				
3. Accounts	2	5.0000	.0000				
4. Purchasing	6	4.5000	.5477				
5. shipping	3	5.0000	.0000				
6. EDP (Electronic Data Processing)	6	4.5000	.8367				
7. Value Engineering	2	5.0000	.0000				
8. Engineering	48	4.5417	.6829				
9. Production/ Operation	41	4.7561	.5376				
10. Production Control	8	4.8750	.3536				
11. Production Engineering	8	5.0000	.0000				
12. Quality Control	13	4.6923	.8549				
13. Parts Control	13	4.6154	.6504				
Within Groups Total	163	4.6564	.6507				
Between Groups				12	I.0347	A203	Not Sig.
- -							
1. Personnel and General Affairs	10	4.5000	.5270				
2. Cost Control	4	4.2500	.5000				
3. Accounts	2	5.0000	.0000				
4. Purchasing	6	4.6667	.5164				
5. Shipping	3	4.3333	.5774				
6. EDP (Electronic Data Processing)	7	4.0000	1.5275				
7. Value Engineering	2	4.0000	.0000				
8. Engineering	48	4.1667	.7532				
9. Production/ Operations	41	4.4390	.6344				
10. Production Control	8	4.7500	.4629				
11. Production Engineering	8	3.6250	.7440				
12. Quality Control	11	4.3333	.7785				
13. Parts Control	13	4.5385	.6602				
Within Groups Total	164	4.3232	.7246				
Between Groups				12	1.6800	.0763	Sig.

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM Factors Types of Department	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Having partnership between							
1. Personnel & General Affairs	10	2.7000	1.1595				
2. Cost Control	4	2.7500	.5000				
3. Accounts	2	2.5000	.7071				
4. Purchasing	6	3.6667	.8165				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	3.0000	1.2649				
7. Value Engineering	2	4.0000	.0000				
8. Engineering	48	3.3958	.9165				
9. Production/ Operations	41	3.7317	.8070				
10. Production Control	8	4.0000	.7559				
11. Production Engineering	8	2.6250	1.0607				
12. Quality Control	13	4.0769	1.2558				
13. Parts Control	13	2.5385	.9674				
Within Groups Total	164	3.3963	.9382				
Between Groups				12	3.6291	0001	Sig.
Employee Development							
1. Personnel and General Affairs	10	4.2000	.6325				
2. Cost Control	4	4.0000	1.1547				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	4.1667	.7528				
5. Shipping	3	4.0000	.0000				
6. EDP (Electronic Data Processing)	7	3.4286	1.1339				
7. Value Engineering	2	4.5000	.7071				
8. Engineering	48	4.1458	.7143				
9. Production/ Operations	41	4.4146	.6315				
10. Production Control	8	4.2500	1.0351				
II. Production Engineering	8	4.2500	1.3887				
12. Quality Control	13	4.3846	.7679				
13. Parts Control	13	4.4615	.7763				
Within Groups Total	165	4.2424	.7880				
Between Groups				12	1.0625	.3957	Not sig.

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM Factors Types of Departments	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Each person satisfying their internal customers							
1. Personnel & General Affairs	9	3.7778	.8333				
2. Cost Control	4	3.2500	.9574				
3. Accounts	2	3.0000	.0000				
4. Purchasing	6	4.0000	.6325				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	6	2.5000	.5477				
7. Value Engineering	2	3.0000	.0000				
8. Engineering	47	3.3404	1.0060				
9. Production/ Operations	40	4.0750	.8883				
10. Production Control	8	4.0000	.9258				
11. Production Engineering	8	3.5000	.5345				
12. Quality Control	12	4.1667	.9374				
13. Parts Control	13	3.7692	1.0127				
Wii Groups Total	160	3.6813	.9077				
Between Groups				12	2.7953	.0018	Sig.
Teamwork							
1. Personnel and General Affairs	10	4.3000	.9487				
2. Cost Control	4	4.0000	1.1547				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	4.8333	.4082				
5. Shipping	3	5.0000	.0000				
6. EDP (Electronic Data Processing)	7	4.0000	.5774				
7. Value Engineering	2	4.5000	.7071				
8. Engineering	49	4 . M	.9574				
9. Production/ Operations	40	4.7250	.4522				
10. Production control	8	4.6236	.5175				
11. Production Engineering	8	4.5000	.7559				
12. Quality Control	13	4.6154	.6504				
13. Parts control	13	4.6154	.7679				
Within Groups Total	165	4.4909	.7519				
Between Groups				12	1.3706	.1857	Not sig.

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM Factors Types of Departments	n	$\bar{X}$*	S D	D F	F	Sig. of F	At alpha Level 0.1
Quality of Working Life							
1. Personnel & General Affairs	10	4.3060	.6749				
2. Cost Control	4	4.2500	.9574				
3. Accounts	2	5.0000	.0000				
4. Purchasing	6	4.6667	.5164				
5. Shipping	3	46667	.5774				
6. EDP (Electronic Data Processing)	7	4.1429	.6901				
7. Value Engineering	2	5.0000	.0000				
8. Engineering	47	4.2128	.8831				
9. Production/ Operations	41	4.3659	.6984				
10. Production Control	8	4.6250	.5175				
II. Production Engineering	8	4.2500	.7071				
12. Quality Control	13	4.7692	.4385				
13. Park Control	13	4.3646	.8697				
Wiii Groups Total	164	4.3780	.7452				
Between Groups				12	1.0069	.4454	Not Sig.
Developing partnership between organization and suppliers							
1. Personnel and General Affairs	10	3.4000	1.0750				
2. Cost Control	4	3.0000	.8165				
3. Accounts	3	3.0006	.0000				
4. Purchasing	6	4.0000	.8944				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	6	3.6667	1.0328				
7. Value Engineering	2	4.0000	.0000				
8. Engineering	49	3.3265	.9658				
9. Production/ Operations	41	4.6829	1.0109				
10. Production Control	8	4.0000	.7559				
11. Production Engineering	8	3.1250	1.3562				
12. Quality Control	13	3.9231	1.1152				
13. Parts Control	13	3.2308	1.0127				
Within Groups Total	165	3.5273	1.0049				
Between Groups				12	1.1252	.3438	Not sig.

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM Factors / Types of Departments	n	$\bar{x}$*	S D	D F	F	Sig. of F	At alpha Level 0.1
- -							
1. Personnel & General Affairs	10	4.2000	.7888				
2. Cost Control	4	3.5000	1.2910				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	4.0006	.8944				
5. Shipping	3	4.0606	.0000				
6. EDP (Electronic Data Processing)	6	3.6333	.7528				
7. Value Engineering	2	4.0000	.0000				
8. Engineering	48	3.5833	.7945				
9. Production/ Operations	41	43171	.6496				
10. Production Control	8	4.3756	.7440				
11. Production Engineering	8	3.6266	.5175				
12. Quality Control	13	4.4615	.5189				
13. Parts control	13	4.1536	.8987				
Wll Groups Total	164	4.0061	.7421				
Between Groups				12	3.0028	.0009	Sig.
Process Management and Systems							
1. Personnel and General Affairs	9	4.4444	.5270				
2. Cost Control	4	4.0000	1.1547				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	4.1667	.7528				
5. Shipping	3	4.6667	.5774				
6. EDP (Electronic Data Processing)	7	4.4286	.7868				
7. Value Engineering	2	3.5000	.7071				
8. Engineering	46	3.9346	.7718				
9. Production/ Operations	41	4.3639	.6984				
10. Production control	8	4.6250	.5175				
11. Production Engineering	8	4.2500	.7071				
12. Quality Control	13	4.6923	.6304				
13. Parts Control	13	4.3646	.6504				
Within Groups Total	162	4.2654	.7141				
Between Groups				12	1.8978	.0388	Sig.

*Values are mean responses on a 5-point scale on whkh "Nat Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM factors / Types of Departments	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Everyone in the organization is responsible for the continuous process improvement of products and services							
1. Personnel & General Affairs	10	4.5000	.5270				
2. Cost Control	4	3.5000	1.2910				
3. Accounts	2	5.0000	.0000				
4. Purchasing	6	4.5000	.5477				
5. Shipping	3	4.6667	.5774				
6. EDP (Electronic Data Processing)	6	4.0000	1.0954				
7. Value Engineering	2	4.0000	.0000				
8. Engineering	49	4.1224	.6962				
9. Production/ Operations	41	4.4878	.6373				
10. Production Control	8	4.5000	.5345				
11. Production Engineering	8	3.8750	.6409				
12. Quality Control	13	4.6923	.4804				
13. Parts Control	13	4.5385	.7763				
Within Groups Total	165	4.3333	.6789				
Between Groups				12	2.2612	.0108	Sig.
Horizontal Integration							
1. Personnel and General Affairs	9	4.0000	.7071				
2. Cost Control	4	3.0000	.0000				
3. Accounts	1	3.0000	.0000				
4. Purchasing	6	3.6667	.8165				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	3.5000	1.3784				
7. Value Engineering	2	3.0000	.0000				
8. Engineering	48	3.1875	.8162				
9. Production/ Operations	41	3.7317	.8667				
10. Production Control	7	4.m	.7559				
11. Production Engineering	7	3.5714	.7868				
12. Quality Control	12	4.3333	.6513				
13. Parts Control	13	4.0769	.7596				
Within Groups Total	159	3.6289	.8176				
Between Groups				12	3.1806	.0005	Sig.

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

(Cont.)

TQM of Departments / Types of Departments	N	$\bar{X}$*	S D	DF	F	Sig. Bf	At alpha Level 0.1
Policy Deployment (eg. QFD)							
1. Personnel & General Affairs	10	3.7000	.4830				
2. Cost Control	4	3.7500	.5000				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	3.6333	.4082				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	3.5000	1.2247				
7. Value Engineering	2	3.5000	.7071				
6. Engineering	49	3.5510	1.1004				
9. Production/ Operations	40	3.9000	.7442				
10. Production control	7	4.2857	.7559				
11. Production Engineering	7	3.7143	.4880				
12. Quality Control	13	4.1538	.8006				
13. Park Control	13	3.9231	.8623				
Within Groups Total	162	3.7901	.8749				
Between Groups				12	.9602	.4895	Not Sk.
Overall Awareness of TQM							
1. Personnel and General Affairs	9	4.1111	.4387				
2. Cost Control	4	3.6923	.6794				
3. A - k	1	4.0000	.0000				
4. Purchasing	6	4.2051	.2605				
5. Shipping	3	4.2564	.2473				
6. EDP (Electronic Data Processing)	6	3.7949	.6374				
7. Value Engineering	2	4.0000	.1088				
6. Engineering	43	3.1104	.4668				
9. Production/ Operations	36	4.2146	.4000				
10. Production Control	7	4.4666	.5470				
11. Production Engineering	7	3.1132	.4438				
12. Quality Control	11	4.3986	.4416				
13. Parts Control	13	4.0947	.5294				
Within Groups Total	150	4.0513	.4584				
Between Groups				12	2.9161	.0012	Sig.

*Values are mean responses on a 5-point scale on which "Not Important At All" = 1 and "Very Important" = 5.

Mean Score of Managers' Perception of TQM Implementation (Critical Success Factors)

critical success Factors (CSF)	Mean * x	std. Deviation SD	No. of Managers N
Necessary management behaviours	4.16	.85	165
A Strategy for TQM implementation	3.99	.89	165
Communication for TQM	3.99	.91	165
Employee Involvement	3.97	.91	166
Process Management and systems	3.96	.88	165
Quality technologies	3.91	.94	164
Training and education	3.90	.99	166
Organization for TQM	3.87	.85	165
Average mean score of all the CSF (Perception)	3.9739	.6567	163

*Values are mean responses on a 5-point scale on which "Not Critical At All" = 1 and "Very Critical" = 5.

Manager's Perception of TQM Implementation (Critical Success Factors) According to Levels of Management

Critical Success Factors / Levels of Management	Nat Critical At All		Not Critical		Slightly Critical		Critical		Very Critical		Total (Level)	
	NO.	%	NO.	%	No.	%	No.	%	No.	%	NO	%
Necessary management behaviours												
Top			1	a.3		-	5	41.7	6	50.0	12	100
Middle			5	6.5	a	10.3	32	41.6	31	41.6	n	100
Lower			2	2.6	16	21.1	30	39.5	28	36.8	76	100
Total (overall)			8	4.6	24	14.5	67	40.6	66	40.0	165	100
A Strategy for TQM implementation												
Top		-	-	-	1	8.3	4	333	7	58.4	12	100
Middle		-	6	7.8	20	2600	32	41.6	19	24.6	77	100
Lower		-	5	6.6	12	15.8	32	42.1	27	35.5	76	100
Total (overall)		-	11	6.7	33	20.0	68	41.2	53	32.1	165	100
Organization for TQM												
Top		-	1	8.3	2	16.7	6	50.0	3	25.0	12	100
Middle		-	4	5.2	25	32.5	27	35.1	21	27.2	77	100
Lower		-	6	7.9	11	14.3	44	57.9	15	19.7	76	100
Total (overall)		-	11	6.7	38	23.0	n	46.7	39	23.6	165	100
Communication for TQM												
Top	-	-	-	-	1	8.3	8	66.7	3	25.0	12	100
Middle	-	-	6	7.9	23	30.3	27	35.5	20	26.3	76	100
Lower	1	1.3	3	3.9	12	15.6	29	37.6	32	41.6	n	100
Total (overall)	1	.6	9	5.5	36	21.8	64	38.8	55	333	165	100
Training and education												
Top	-	-	1	8.3	2	16.7	5	41.7	4	33.3	12	100
Middle	1	1.3	4	5.2	24	31.2	25	32.5	23	29.8	77	100
Lower	1	1.3	7	9.1	16	20.8	25	32.5	28	36.3	77	100
Total (overall)	1 2	1.2	12	7.2	42	25.3	55	33.1	55	33.1	166	100

(Cont.)

Critical Success Factors / Levels of Management	Not Critical At All		Not Critical		Slightly Critical		Critical		Very Critical		Total (Level)	
	NO.	%	NO.	%	NO.	%	No.	%	NO.	%	No	%
Employment Involvement												
Top					1	8.3	9	75	2	16.7	12	100
Middle	1	1.3	5	6.5	17	22.1	31	40.3	23	29.8	77	100
Lower			4	5.2	20	26.0	24	31.2	29	37.6	77	100
Total (overall)	1	.6	9	5.4	38	22.9	64	38.6	54	32.5	166	100
Process Management and Systems												
Top	-	-	-	-	3	25.0	4	33.3	5	41.7	12	100
Middk			6	7.9	16	21.1	33	43.4	21	27.6	76	100
Lower	1	1.3	3	3.9	14	18.2	37	48.1	22	28.5	77	100
Total (overall)	1	.6	9	5.5	33	20.0	74	44.8	48	29.1	165	100
Quality technologies												
Top					2	16.7	1	I.3	3	25.0	12	100
Middk			9	11.8	18	23.7	29	38.2	20	26.33	76	100
Lower		-	6	7.9	15	19.7	28	36.8	27	35.5	76	100
Total (overall)			15	9.1	35	21.3	64	39.0	50	30.5	164	100

Group (Levels of Management) differences in Managers' Perception of TQM Implementation (Critical Success Factors) - ANOVA

Critical Success Factors / Levels of Management	n	x	SD	DF	F	Sig. of F	At alpha Level 0.1
Necessary Management behaviors							
Top	12	4.3333	.8876				
Middle	77	4.1818	.8695				
Lower	76	4.1053	.8259				
Within Groups Total	165	4.1576	.8508				
Between Groups				2	.4309	.6507	Not Sig.
A Strategy for TQM implementation							
Top	12	4.5000	.6742				
Middle	77	3.8312	.8945				
Lower	76	4.0658	.8845				
Within Groups Total	165	3.9879	.8766				
Between Groups				2	3.5787	.0301	Sig.
Organization for TQM							
Top	12	3.9167	.9003				
Middle	77	3.8442	.8895				
Lower	76	3.8947	.8096				
Within Groups Total	165	3.8727	.8542				
Between Groups				2	0.0842	.9193	Not sip.
Communication for TQM							
Top	12	4.1667	.5774				
Middle	76	3.8026	.9240				
Lower	77	4.1429	.9136				
Within Groups Total	165	3.9879	.8997				
Between Groups				2	2.9902	.0531	Sig.
Training and education							
Top	12	4.0000	.9535				
Middle	77	3.8442	.9606				
Lower	77	3.9351	1.0303				
Within Groups Total	166	3.8976	.9932				
Between Groups				2	.2300	.7948	Not sig.

*Values are mean responses on a 5-point scale on which 'Not Critical At All' = 1 and 'Very Critical' = 5

(Cont.)

Critical Success Factors Levels of Management	n	x	S D	D F	F	Sig. of F	Al alpha Level 0.1
Employee Involvement							
Top	12	4.0833	.5149				
Middle	77	3.9091	.9484				
Lower	77	4.0130	.9247				
Within Groups Total	166	3.9699	.9143				
Between Groups				2	.3481	.7065	Not Sig.
Process Management and Systems							
Top	12	4.1667	.8348				
Middle	76	3.9079	.8971				
Lower	77	3.9870	.8659				
Within Groups Total	165	3.9636	.8784				
Between Groups				2	.5008	.6070	Nut Sig.
Quality Technologies							
Top	12	4.0833	.6686				
Middle	76	3.78%	.9704				
Lower	76	4.0000	.9381				
Within Groups Total	164	3.9085	9376				
Between Groups				2	1.1828	.3091	Not sig.
Perception of CSF							
Top	12	4.1563	.4495				
Middle	76	3.8964	.6884				
Lower	75	4.0233	.6478				
Within Groups Total	163	3.9739	.6558				
Between Groups				2	1.2078	.3016	Nat rig.

*Values are mean responses on a 5-point scale on which "Not Critical At All" = 1 and 'Very Critical" = 5

Group (Types of Departments) Differences in Managers' Perception of TQM Implementation (Critical Success Factors) - ANOVA

Critical Success Factors / Types of Departments	n	$\bar{X}$*	SD	D F	F	slg. of F	At alpha Level 0.1
N - = - V - -							
1. Personnel & General Affairs	10	3.8000	1.0328				
2. Cost Control	4	3.5000	1.2910				
3. A - t . 5	2	4.0000	.0000				
4. Purchasing	6	4.6667	.8165				
5. Shipping	3	4.0000	.0000				
6. EDP (Electronic Data Processing)	6	3.3333	1.2111				
7. Value Engineering	2	4.5000	.7071				
8. Engineering	49	4.0612	.9221				
9. Production/ Operations	41	4.1463	.7925				
10. Production Control	8	4.3750	.5175				
11. Production Engineering	8	4.3750	.6175				
12. Quality Control	13	4.5385	.6602				
13. Parts Control	13	4.5385	.5189				
Within Groups Total	165						
Between Groups				12	1.7049	.0707	Sig.
A Strategy for TQM Implementation							
1. Personnel and General Affairs	10	3.9000	.9944				
2. Cost Control	4	3.7500	1.2583				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	4.5000	.8367				
5. Shipping	3	3.3333	.5774				
6. GDP (Electronic Data Processing)	7	3.8571	.6901				
7. Value Engineering	2	3.5000	2.1213				
8. Engineering	49	3.7551	.9902				
9. Production/Operations	40	4.1000	.7779				
10. Production Control	8	4.3750	.5175				
11. Production Engineering	8	4.0000	1.0690				
12. Quality Control	13	4.3077	.7511				
13. Parts Control	13	4.0769	.7596				
Within Groups Total	165	3.9879	.8882				
Between Groups				12	1.0642	.3943	Not sig.

*Values are mean responses on a 5-point scale on which "Not Critical At All" = 1 and "Very Critical" = 5.

(Cont.)

Critical Success Factors / Types of Departments	n	$\bar{x}$*	S D	D F	F	Sig. of F	At alpha Level 0.1
Organization for TQM							
1. Personnel & General Affairs	10	3.6000	.8433				
2. Cost Control	4	3.2500	1.2583				
3. Accounts	2	4.0000	.0000				
4. Purchasing	6	4.0000	1.0954				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	3.3333	6165				
7. Value Engineering	2	4.0000	1.4142				
8. Engineering	49	3.7551	.8787				
9. Production/ Operations	41	3.9024	.7002				
10. Production C d	8	4.5000	.5345				
II. Production Engineering	8	4.0000	.9258				
12. Quality Control	13	4.0769	.9541				
13. Parts Control	13	4.1538	.8987				
Within Groups Told	165	3.8727	.8446				
Between Groups				12	1.1554	.3204	Not sig.
Communication for TQM							
1. Personnel and General Affairs	10	3.9000	.9944				
2. Cost Control	4	3.2500	1.2583				
3. Accounts	2	4.5000	.7071				
4. Purchasing	6	4.1667	.7528				
5. Shipping	3	3.6567	.5774				
6. EDP (Electronic Data Processing)	7	3.2857	.7559				
7. Value Engineering	2	3.0000	1.4142				
8. Engineering	48	3.7083	.8495				
9. Production/Operations	41	4.1220	1.0534				
10. Production Control	8	4.6250	.5175				
11. Production Engineering	8	4.2500	.4629				
12. Quality Control	13	4.3846	.6504				
13. Parts Control	13	4.3846	.6504				
Within Groups Total	165	3.9879	.8695				
Between Groups				12	2.3215	.0094	Sig.

*Values are mean responses on a 5-point scale on which "Not Critical At AU" = 1 and "Very Critical" = 5.

(Cont.)

Critical Success Factors / Types of Departments	n	$\bar{X}$*	S D	DF	F	St. of F	At alpha Level 0.1
Training and Education							
1. Personnel & General Affairs	10	3.9000	.8756				
2. Cost Control	4	3.5000	1.2910				
3. Accounts	2	4.0000	.0000				
4. Purchasing	6	4.5000	.8367				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	7	2.8571	.6901				
7. Value Engineering	2	3.5000	2.1213				
8. Engineering	49	3.7143	1.0000				
9. Production/ Operations	41	4.0488	.9988				
10. Production Control	8	4.2500	1.0351				
11. Production Engineering	8	4.0000	.9258				
12. Quality Control	13	4.0769	.9541				
13. Parts Control	13	4.0769	.8623				
Within Groups Total	166	3.8976	.9769				
Between Groups				12	1.3326	.2058	Not Sig.
Employee Involvement							
1. Personnel and General Affairs	10	4.1000	.7379				
2. Cost Control	4	3.m	1.2910				
3. Accounts	2	4.0000	.0000				
4. Purchasing	6	4.3333	.8165				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	7	3.7143	1.6036				
7. Value Engineering	2	3.5000	.7071				
8. Engineering	49	3.7755	.9846				
9. Production/Operations	41	4.0244	.8800				
10. Production Control	8	4.5000	.5345				
11. Production Engineering	8	3.6250	.5175				
12. Quality Control	13	4.3077	.7511				
13. Parts Control	13	4.1538	.8006				
Within Groups Total	166	3.9699	9111				
Between Groups				12	.9883	.4626	Nat Sig.

*Values are mean responses on a 5-point scale on which "Not Critical At All" = 1 and "Very Critical" = 5.

(Cont.)

Critical Success Factors / Types of Departments	n	$\bar{X}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Process Management and Systems							
1. Personnel & General Affairs	10	3.8000	.9189				
2. Cost Control	4	3.7500	.9574				
3. Accounts	2	3.5000	.7071				
4. Purchasing	6	4.5000	.5471				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	7	3.1429	1.3452				
7. Value Engineering	2	2.5000	.7071				
8. Engineering	48	3.6667	.9070				
9. Production/ Operation	41	4.21%	.6524				
10. Production Control	8	4.5000	.5345				
11. Production Engineering	8	4.2500	.7071				
12. Quality Control	13	4.3077	.7511				
13. Parts Control	13	4.0769	.8623				
Within Groups Total	165	3.9636	.8215				
Between Groups				12	2.8634	.0014	sii.
Quality Technologies							
1. Personnel and General Affairs	10	3.8000	.7888				
2. Cost Control	4	2.7500	.9574				
3. Accounts	2	3.5000	.7071				
4. Purchasing	6	4.3333	.5164				
5. Shipping	3	4.3333	1.1947				
6. EDP (Electronic Data Processing)	6	3.5000	1.0488				
7. Value Engineering	2	2.5000	.7071				
Il. Engineering	48	3.7300	.9785				
9. Production/Operations	41	4.0244	.7902				
10. Production Control	8	4.2500	.7071				
11. Production Engineering	8	3.8750	A.345				
12. Quality Control	13	4.2308	1.0127				
13. Parts control	13	4.2308	1.1659				
Within Groups Total	164	3.9085	.9128				
Between Groups				12	1.7815	.0559	sii.

*Values are mm responses on a 5-point scale on rhii "Not Critical At All" = 1 and "Very Critical" = 5.

(Cont.)

Critical Success Factors / Types of Departments	n	$\bar{X}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Perception of Critical Success Factors (CSF)							
1. Personnel & General Affairs	10	3.8500	.7701				
2. Cost Control	4	3.4063	1.091s				
3. Accounts	2	4.0000	.3536				
4. Purchasing	6	4.3750	.6892				
5. Shipping	3	3.8750	.6614				
6. EDP (Electronic Data Processing)	6	3.4167	.6055				
7. Value Engineering	2	3.3750	1.0607				
8. Engineering	48	3.7839	.6507				
9. Production/ Operations	40	4.0688	.5828				
10. Production Control	8	4.4219	.4378				
11. Production Engineering	8	4.0469	.4861				
12. Quality Control	13	4.2788	.5356				
13. Parts Control	13	4.2115	.6003				
Within Groups Total	163	3.9739	.6280				
Between croup				12	2.2617	.0116	Sig.

*Values are mean responses on a 5-point scale on which "Not Critical At All" = 1 and "Very Critical" = 5.

Mean Score of Managers Perception of Difficulties in Getting Commitment to TQM

Difficulties/ Barriers	Mean $\bar{x}$*	Standard Deviation SD	No. of Managers N
Lack of communication	3.74	1.12	160
Barriers between departments	3.58	1.07	163
Lack of expertise in Quality Management	3.58	1.04	164
Changing behaviour and attitudes	3.55	1.02	163
A lack of top management commitment	3.54	1.14	160
Employees are not source of what is required of them	3.51	1.05	162
A tendency to cure symptoms of a problem and not the root cause	3.50	1.12	162
Conflict between production and quality department	3.49	1.13	162
Quality system based on detection not prevention	3.48	1.15	162
Lack of training and education	3.48	1.08	161
Managers are not sure what is required of them	3.46	1.32	162
Lack of objectives and strategies	3.44	1.13	163
Uncertainty about what to do next	3.37	1.14	161
Quality improvement is the concern of production	3.34	1.08	161
Lack of intellegent thought given to the subject	3.31	.93	162
Production schedules and costs are treated as main priorities	3.29	1.08	163
Fear	3.27	1.13	160
Quality improvement is the convern production	3.25	1.12	161
Quality Management tools are seen as an end in themselves	3.18	1.02	161
A lack of resources	3.16	1.06	163
Over reliance on the quality manual	3.04	.95	161
Emphasis on a short term objectives	3.00	1.03	162
Stastical Process Control (SPC) is the answer to all the problems	2.92	1.03	158
Overall mean score of Perception of Difficulties	3.3804	.7153	156

*Values are mean responses on a 5-point scale on which "Not A Serious Problem" = 1 and "A Very Serious Problem" = 5.

Managers' Perceptions of Difficulties in Getting Commitment to TQM

Difficulties/Barriers	Not a problem		Not a serious problem		Fairly serious problem		A serious problem		A very serious problem		Total	
	No.	%	No.	%	No	%	No	%	No	%	No	%
Changing behaviour and attitudes	3	1.8	26	16.0	41	25.2	64	39.3	29	17.8	163	100
Emphasis on short term objectives	12	7.4	36	22.2	67	41.4	34	21.0	13	8.0	162	100
A tendency to cure symptoms of a problem and not the root cause	5	3.1	29	17.9	45	27.8	46	28.4	37	22.8	162	100
Production schedules and costs are treated as main priorities	9	5.5	32	19.6	43	26.4	61	37.4	la	11.0	166	100
Employees are not sure of what is required of them	1	.6	32	19.8	46	28.4	50	30.9	33	20.4	162	loo
Barriers between departments	4	2.1	23	14.1	49	30.1	49	30.1	38	23.3	163	loo
Managers are not sure what is requested of them	11	6.1	37	22.8	31	19.1	33	20.4	50	36.9	162	100
Lack of objectives and strategies	5	3.1	34	20.9	42	25.8	48	29.4	34	20.9	163	100
Quality system based on detection not prevention	6	3.7	33	20.4	36	22.2	52	32.1	35	21.6	162	100
Lack of expertise in Quality Management	3	1.8	25	15.2	44	26.8	58	35.4	34	20.7	164	100
A lack of resources	7	4.3	41	25.2	52	31.9	45	27.6	18	11.0	163	loo
A lrk of intellectual thought given to the subject	3	1.9	28	17.3	63	38.9	52	32.1	16	9.9	162	loo
Quality management tools are seen as an end in themselves	6	3.7	34	21.1	65	40.4	37	23.0	19	11.8	161	100
Uncertainty about what to do next	7	4.3	33	20.5	47	29.2	42	26.1	32	19.9	161	100
Fear	6	3.8	40	25.0	46	28.8	40	25.0	28	17.5	160	100
Quality improvement is the concern of the quality department	7	4.3	37	23.0	52	32.3	38	23.6	27	16.1	161	100
Quality improvement is the concern of production	3	1.9	38	23.6	49	36.4	43	26.7	28	17.4	161	100
A lack of top management commitment	7	4.4	27	16.9	34	21.3	57	3S.6	35	21.9	160	100
Conflict between production and quality department	5	3.1	32	19.8	39	2d.l	so	39.9	36	22.2	162	100
Over reliance on the quality Manual	5	3.1	45	28.0	60	37.3	41	25.5	10	6.2	161	100
SPC is the answer to all the problems	12	7.6	43	27.2	60	3a.0	32	20.3	11	7.0	158	loo
Lack of training and education	4	2.5	27	16.8	52	32.3	43	26.7	35	21.7	161	100
Lack of communication	3	1.9	25	15.6	34	21.3	47	29.4	51	31.9	160	100

Managers' Perception of Difficulties/Barriers in Getting Commitment to TQM According to Levels of Management

Difficulties/ Barriers / Levels of Management	Not A Problem		Not A Serious Problem		Fairly Serious Problem		A Serious Problem		A Very Serious Problem		Total (Level)	
	No	%	No	%	No	%	No	%	No	%	No	%
Changing Behaviour and attitudes												
Top			4	33.3	3	25.0	3	25.0	2	16.7	12	100
Middle	3	3.9	13	17.1	22	28.9	26	34.3	12	15.8	76	100
Lower			9	12.0	16	21.3	35	46.7	15	20.0	75	100
Total (overall)	3	1.8	26	16.0	41	25.2	64	39.3	29	17.8	163	100
Emphasis on short-term objectives												
Top		-	3	25.0	6	50.0	3	25.0			12	100
Middle	5	6.6	20	26.3	29	38.2	17	22.3	5	6.6	76	100
Lower	7	9.5	13	17.6	32	43.2	14	18.9	8	10.8	74	100
Total (overall)	12	7.4	36	22.2	67	41.4	34	21.0	13	8.0	162	100
A tendency to cure symptoms of a problem and not the root cause												
Top	2	16.7	3	25.0	3	25.0	3	25.0	1	a.3	12	100
Middle	3	3.9	12	15.8	18	23.7	27	35.5	16	21.1	76	100
Lower			14	18.9	24	32.4	16	21.6	20	27. I	74	100
Total (overall)	5	3.1	29	17.9	45	27.8	46	28.4	31	22.8	162	100
Production schedules and costs are treated as main priorities												
Top		-	3	25.0	4	33.3	3	25.0	2	16.7	12	100
Middle	3	3.9	15	19.7	18	23.7	34	44.1	6	8.0	76	100
Lower	6	8.0	14	18.7	21	28.0	24	32.0	10	13.3	75	100
Total (overall)	9	5.5	32	19.6	43	26.4	61	31.4	18	11.0	163	100
Employees are not sure of what is required of them												
Top		-	2	16.7	3	25.0	5	41.6	2	16.7	12	100
Middle		1.3	18	23.7	21	27.6	21	27.6	15	19.7	76	100
Lower			12	16.2	22	29.8	24	32.4	16	21.6	74	100
Total (overall)		.6	32	19.8	46	28.4	so	30.9	33	20.4	162	100

(Cont.)

Difficulties/ Barriers / Levels of Management	Not A Problem		Not A Serious Problem		Fairly Serious Problem		A Serious Problem		A Very Serious Problem		Total (Level)	
	NO	%	NO	%	NO	%	NO	%	NO	%	No	%
Barriers between departments												
Top	1	8.3	-	-	1	58.4	3	25.0	1	8.3	12	100
Middle	2	2.6	14	18.2	21	27.2	20	26.0	20	26.0	77	100
Lower	1	1.4	9	12.2	21	28.4	26	35.1	17	22.9	74	100
Total (overall)	4	2.5	23	14.1	49	30.1	49	30.1	38	23.3	163	100
Managers are not sure what is required of them												
Top	3	25.0	2	16.7	1	8.3	4	33.3	2	16.7	12	100
Middle	5	6.6	18	23.7	15	19.7	14	18.4	24	31.6	76	100
Lower	3	4.1	17	22.9	15	20.3	15	20.3	24	32.4	74	100
Total (overall)	11	6.8	37	22.8	31	19.1	33	20.4	50	30.9	162	100
Lack of objectives and strategies												
Top	1	8.3	4	33.3	2	16.7	4	33.3	1	8.3	12	100
Middle	3	3.9	18	23.7	17	22.4	21	27.6	17	22.4	76	100
Lower	1	1.3	12	16.0	23	30.7	23	30.7	16	21.3	75	100
Total (overall)	5	3.1	34	20.9	42	25.8	48	29.4	34	20.9	163	100
Quality system based on detection not prevention												
Top	1	8.3	3	25.0	3	25.0	2	16.7	3	25.0	12	100
Middle	4	5.3	19	24.9	16	21.1	23	30.3	14	18.4	76	100
Lower	1	1.4	11	14.9	17	22.9	27	36.5	18	24.3	74	100
Total (overall)	6	3.7	33	20.4	36	22.2	52	32.1	35	21.6	162	100
Lack of expertise in Quality Management												
Top			4	33.3	3	25.0	4	33.3	1	8.3	12	100
Middle	1	1.3	14	18.2	24	31.1	19	24.7	19	247	77	100
Lower	2	2.7	7	9.3	17	22.9	35	46.4	14	18.7	75	100
Total (overall)	3	1.8	25	15.2	44	26.8	58	35.4	34	20.7	164	100

(Cont.)

Difficulties/ Barriers	Not A Problem		Not A Serious Problem		Fairly Serious Problem		A Serious Problem		A very Serious Problem		Total (Level)	
Lewis of Management	NO	%	NO	%	NO	%	NO	%	NO	%	No	%
A lack of resources												
Top			6	50.0	3	25.0	3	25.0			12	100
Middle	4	5.2	20	26. I	23	29.8	23	29.8	7	9.1	77	100
Lower	3	4.1	L5	20.3	26	35.1	19	25.6	II	14.9	74	100
Total (overall)	7	4.3	41	25.2	52	31.9	45	27.6	la	11.0	163	loo
Lack of intellectual thought given to the subject												
Top			3	25.0	4	33.3	S	41.7			12	100
Middle	2	2.6	141	la.4	27	35.5	24	31.6	9	11.8	76	100
Lower	I	1.4	I	14.9	32	43.2	23	31.1	7	9.4	74	100
Total (overall)	3	1.9	28	17.3	63	38.9	52	32.1	16	9.9	162	100
Quality management tools are seen as an end in themselves												
Top	I	a.3	4	33.3	3	25.0	3	25.0	I	8.3	12	100
Middle	2	2.7	20	26.7	26	34.7	19	25.3	a	10.6	75	100
Lower	3	4.1	10	13.5	36	48.6	15	20.3	10	13.5	74	loo
Total (ovenll)	6	3.7	34	21.1	65	40.4	37	23.0	19	11.8	161	loo
Uncertainty about what to do next												
Top	1	a.3	2	16.7	4	33.3	4	33.3	1	a.3	12	100
Middle	5	6.7	17	22.9	19	25.3	18	23.8	16	21.3	75	100
Lower	1	1.4	14	la.9	24	32.4	m	27.0	15	20.3	74	100
Total (overall)	7	4.3	33	20.5	47	29.2	42	26.1	32	19.9	161	100
Fear												
Top	I	a.3	4	33.3	4	33.3	3	25.0			12	loo
Middle	I	1.3	23	30.7	13	17. I	17	22.9	21	28.0	75	loo
Lower	4	5.5	13	17.8	29	39.7	20	27.4	7	9.6	73	100
Total (ovenll)	6	3.8	40	25.0	46	28.8	40	25.0	28	17.5	160	loo

(Cont.)

Difficulties/ Barriers	Not A Problem		Not A Serious Problem		Fairly Serious Problem		A Serious Problem		A Very Serious Problem		Total (Level)	
Levels of Management	No	%	NO	%	NO	%	NO	%	NO	%	No	%
Quality improvement is the concern of the Quality department												
Top			3	25.0	5	41.7	4	33.3	▪		12	100
Middle	3	4.0	17	22.9	25	33.3	12	16.0	18	23.8	75	100
Lower	4	5.4	17	22.9	22	29.7	22	29.7	9	12.2	74	100
Total (overall)	7	4.3	37	23.0	52	32.3	38	23.6	27	16.8	161	100
Quality improvement is the concern of production												
Top	1	8.3	4	33.3	2	16.7	4	33.3	1	8.3	12	100
Middk	2	2.7	20	26.7	21	28.0	19	25.3	13	17.3	75	100
Lower			14	18.9	26	35.1	20	27.1	14	18.9	14	100
Total (overall)	3	1.9	38	23.6	49	30.4	43	26.7	28	17.4	161	100
A lack of top management commitment												
Top	2	16.7	4	33.3	2	16.7	2	16.7	2	16.7	12	100
Middle	3	4.0	12	16.0	17	22.6	29	38.6	14	18.7	75	100
Lower	2	2.7	11	15.1	15	20.5	26	35.6	19	26.0	73	100
Total (overall)	7	4.4	27	16.9	34	21.3	57	35.6	35	21.9	160	100
Conflict between **production and** quality **department**												
Top	1	8.3	4	33.3	4	33.3	2	16.7	1	8.3	12	100
Middk	2	2.6	18	23.7	17	12.4	24	31.6	15	19.1	76	100
Lower	2	2.7	10	13.5	18	24.3	24	32.4	20	27.1	74	100
Total (overall)	5	3.1	32	19.8	39	24.1	50	30.9	36	22.2	162	100
over **reliance on** the **quality manual**												
Top	1	8.3	4	33.3	5	41.7	2	16.7	▪		12	100
Middk	2	2.7	25	33.3	24	32.0	19	25.3	5	6.7	75	100
Lower	2	2.7	16	21.6	31	41.9	20	27.1	S	6.7	74	100
Total (overall)	5	3.1	45	28.0	60	37.3	41	25.5	10	6.2	161	100

(Cont.)

Difficulties/ Barriers / Levels of Management	Not A Problem		Not A Serious Problem		Fairly serious Problem		A Serious Problem		A Very Serious Problem		Total (Level)	
	No	%	No	%	No	%	NO	%	NO	%	NO	%
Statistical Process Control (SPC) is the **answer** to **all** the **problems**												
Top	.	.	4	33.3	6	50.0	1	a.3	1	a.3	12	100
Middle	7	9.6	23	31.5	24	32.9	16	21.9	3	4.1	73	100
Lower	5	6.8	16	21.9	30	41.1	I5	20.5	1	9.6	73	100
Total (overall)	12	7.6	43	27.2	60	38.0	32	20.3	II	7.0	158	100
Lack of **training and education**												
Top			3	25.0	5	41.7	2	16.7	2	16.7	I2	100
Middle	3	3.9	15	19.7	25	33.0	16	21.1	17	22.3	76	100
Lower	1	1.4	9	12.3	22	30.1	25	34.3	16	21.9	73	100
Total (overall)	4	2.5	27	16.8	52	32.3	43	26.7	35	21.7	161	loo
Lack of **communication**												
Top			4	33.3	l	a.3	5	41.7	2	16.7	12	loo
Middle	l	1.3	13	17.1	16	21.3	20	27.0	25	33.3	75	100
Lower	2	2.7	a	10.9	17	23.4	22	30.1	24	32.9	73	la,
Total (overall)	3	1.9	25	15.6	34	21.3	47	29.4	51	31.9	160	loo

Group (Levels of Management) Differences in Managers' Perception of Difficulties/Barriers in Getting Commitment to TQM

Difficulties/ Barriers Levels of Management	n	$\bar{x}$*	SD	DF	F	sii. of F	At alpha Level 0.1
Changing behaviour and attitudes							
Top	12	3.2500	1.1382				
Middle	76	3.4079	1.0730				
Lower	75	3.7467	.9167				
Within Groups Total	163	3.5521	1.0067				
Between Groups				2	2.7101	.0696	Sig.
Emphasis on short-term objectives							
Top	12	3.0000	.7385				
Middk	76	2.9605	1.0125				
Lower	74	3.0405	1.0909				
Within Groups Total	162	3.0006	1.0333				
Between Groups				2	.1124	.8937	Not sig.
A tendency to cure symptoms of a problem and not the root cause							
Top	12	2.8333	1.2673				
Middle	76	3.5395	1.1128				
h e r	74	3.5676	1.0864				
Within Groups Total	162	3.5000	1.1123				
Between Groups				2	2.3398	.0997	sii.
Production schedules and costs are treated as							
Top	12	3.3333	1.0731				
Uiddk	76	3.3289	1.0118				
Lower	75	3.2400	1.1469				
Within Groups Total	163	3.2883	1.0814				
Between Groups				2	.1389	.8704	Nut sig.
Employees are not sure of what is required of them							
Top	12	3.5833	.9962				
Middle	76	3.4079	1.0976				
Lower	74	35946	1.0057				
Within Groups Total	162	3.5062	1.0494				
Between Groups				2	.6284	.5348	Nat sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Levels of Management	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Top	12	3.2500	.9653				
Middk	77	3.5455	1.1419				
Lower	74	3.6622	1.0106				
Within Groups Total	163	3.5767	1.0721				
Between Groups				2	.8250	.4401	Not Sig.
Managers are not sure what is required of them							
Top	12	3.0000	1.5374				
Middk	76	3.4474	1.3306				
Lower	74	3.5405	1.2734				
Within Groups Total	162	3.4568	1.3203				
Between Groups				2	.8690	.4214	Not Sig.
Lack of objectives and Strategies							
Top	12	3.0000	1.2060				
Middk	76	3.4079	1.1906				
Lower	75	3.5467	1.0436				
Within Groups Total	163	3.4417	1.1262				
Between Groups				2	1.2829	.2801	Not Sig.
Quality system based on detection not prevention							
Top	12	3.2500	1.3568				
Middle	76	3.3158	1.1912				
Lower	74	3.6767	1.0483				
Within Groups Total	162	3.4753	1.1407				
Between Groups				2	2,1188	.1236	Not Sig.
Lack of expertise in Quality Management							
Top	12	3.1667	1.0299				
Middk	77	3.5325	1.0953				
Lower	75	3.6933	.9722				
Within Groups Total	164	3.5793	1.0359				
Between Groups				2	1.4850	.2296	Not sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Levels of Management	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
A lack of resources							
Top	12	2.7500	.8660				
Middle	75	3.1169	1.0634				
Lower	74	3.2793	1.0765				
Within Groups Total	163	3.1595	1.0571				
Between Groups				2	1.3692	.2573	Nd Sii.
Lack of intelectual thought gives the subject							
Top	12	3.1667	.8348				
Middle	76	3.3158	.9961				
Lower	74	3.3243	.8930				
Within Groups Total	162	3.3086	.9394				
Between Groups				2	.1496	.8612	Nd Sig.
Quality management tools are seen as an end in themselves							
Top	12	2.9167	1.1645				
Middk	75	3.1467	1.0226				
Lower	74	3.2568	.9940				
Within Groups Total	161	3.1801	1.0201				
Between Groups				2	.6493	.5238	Not Sig.
Uncertainty about what to do next							
Top	12	3.1661	1.1146				
Middk	75	3.3067	1.2300				
Lower	74	3.4595	1.0623				
Within Groups Total	161	3.3663	1.1473				
Between Groups				2	.5269	.5915	Not Sig.
Fear							
Top	12	2.7500	.9653				
Middk	75	3.4533	1.2333				
Lower	73	3.1781	1.0185				
Within Groups Total	160	3.2750	1.1217				
Between Groups				2	2.5349	.0825	Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/Barriers Levels of Management	n	* X	SD	DF	F	Sig. of F	At alpha Level 0.1
Quality improvement is the concern of the quality department							
Top	12	3.0833	.7930				
Middle	75	3.3333	1.1893				
Lower	74	3.2027	1.0977				
Within Groups Total	161	3.2547	1.1238				
Between Groups				2	.4023	.6694	Not Sig.
Quality improvement k the concern of production							
Top	12	3.0000	1.2060				
Middle	75	3.2800	1.1218				
Lower	74	3.45%	1.0094				
Within Groups Total	161	3.3416	1.0777				
Between Groups				2	1.1679	.3137	Not Sig.
A lack of top management commitment							
Top	12	2.6333	1.4035				
Middle	75	3.5200	1.0950				
Lower	73	3.6712	1.1062				
Within Groups Total	160	3.5375	1.1244				
Between Groups				2	2.8786	.0592	Sig.
Conflict betweet production and quality department							
Top	12	2.8333	1.1146				
Middle	76	3.421 I	1.1345				
Lower	74	3.6757	1.0993				
Within Groups Total	162	3.4938	1.1171				
Between Groups				2	3.2394	.0418	Sig.
Over reliance on the quality manual							
Top	12	2.6667	.8876				
Middle	75	3.0000	.9864				
Lower	74	3.1351	.9264				
Within Groups Total	161	3.0373	.9524				
Between Groups				2	1.3566	.2605	Not sig.

*Values are mean responses on a S-point scale on which 'Not A Problem = 1 and 'A Very Serious Problem' = 5.

(Cont.)

Difficulties/Barriers Levels of Management	n	* x	SD	DF	F	Sig. of F	At alpha Level 0.1
Statistical . Process control **(SPC)** is **the answer** to **all** the **problems**							
Top	12	2.9167	.9003				
Middle	73	2.75%	1.0268				
Lower	73	3.0411	1.0467				
Within **Groups** Total	158	2.9177	/.0277				
Between Groups				2	1.0506	.3522	Not Sig.
Lack of training and education							
Top	12	3.2500	1.0553				
Middle	76	3.3816	1.1543				
Lower	73	3.6301	1.0070				
Within **Groups Total**	161	3.4845	1.0827				
Between **Groups**				2	1.2854	0.2794	Not sig.
Lack of communication							
Top	12	3.4167	I . 1 6 4 5				
Middle	75	3.7333	1.1429				
Lower	73	3.7945	1.1050				
Within Groups **Total**	160	3.7375	1.1273				
Between Groups				2	.5799	.561I	Not Sig.
Overall Perception of Difficulties							
Top	12	3.0616	.7670				
Middle	72	3.3587	.7498				
Lower	72	3.4553	.6634				
Within Groups Total	156	3.3804	.7123				
Between Groups				2	1.6333	.1987	Not **Sig.**

"Values are mean **responses on** a S-point scale on **which "Not** A **Problem"** = 1 ad 'A Very Serious **Problem" =** 5.

Group (Types of departments) differences in Managers' Perception of Difficulties/Barriers in Getting Commitment to TQM

Difficulties/Barriers Types of Departments	n	x	SD	DF	F	Sig.of F	At alpha Level 0.1
Changing behaviour and attitudes							
1. Personnel & General Affairs	10	3.7000	1.3375				
2. cost Control	4	3.7500	.9574				
3. Accounts	2	2.5000	.7071				
4. Purchasing	6	3.1661	.7528				
5. Shiiittg	3	3.3333	.5774				
6. EDP (Electronic Data Processing)	7	3.42%	1.2724				
7. Value Engineering	2	3.5000	.7071				
8. Engineering	47	3.2128	1.1216				
9. Production/ Operations	40	3.8500	.8930				
10. Production Control	8	3.7500	.0351				
11. Production Engineering	8	4.0000	.7559				
12. Quality Control	13	3.5385	.9674				
13. Parts Control	13	3.7692	.8321				
Within Groups Total	163	3.5521	1.0102				
Between Groups				12	1.2438	.2585	Not rig.
Emphasis on short-term objectives							
1. Personnel and General Affairs	10	3.0000	1.1547				
2. cost Control	4	3.2500	.5000				
3. Accounts	2	2.0000	1.4142				
4. Purchasing	6	2.8333	.9832				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	6	2.6667	1.0328				
7. Value Engineering	2	2.5000	.7071				
8. Engineering	47	2.7660	.9827				
9. Production/ Operations	40	3.3000	1.1140				
10. Production Control	8	2.8750	.6409				
11. Production Engineering	8	3.0000	.9258				
12. Quality Control	13	3.3077	.9473				
13. Parts Control	13	2.8462	1.1435				
Within Groups Total	162	3.0000	1.0218				
Between Groups				12	1.1510	.3240	Not sig.

*Values are mean responses on a S-point scale on which 'Not A Problem" = 1 and 'A Very Serious Problem = 5

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha level 0.1
A tendency to cure symptoms of a problem and not the root cause							
1. Personnel & General Affairs	10	3.1660	1.4491				
2. Cost Control	4	3.5000	1.0000				
3. Accounts	2	3.0000	1.4142				
4. Purchasing	6	3.1667	.9832				
5. Shipping	3	4.0000	1.0006				
6. EDP (Electronic Data Processing)	6	3.6667	1.2111				
7. Value Engineering							
8. Engineering	2	3.0000	1.4142				
9. Production/ Operations	47	3.3464	1.1661				
10. Production Control	40	3.9250	1.0473				
11. Production Engineering	8	3.1250	1.1260				
12. Quality Control	8	2.8750	.9910				
13. Parts Control	13	3.76-92	1.0919				
Within Groups Total	13	3.5385	.8771				
Between Groups	162	3.5000	1.1133				
				12	1.1979	.2896	Not sig.
Production Schedules and costs are treated as main priorities							
1. Personnel and General Affairs	10	2.9666	.9944				
2. Cost Control	4	3.5000	1.0000				
3. Accounts	2	2.0000	1.4142				
4. Purchasing	6	3.3333	1.2111				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	7	2.7143	.9512				
7. Value Engineering	2	3.0000	.0000				
8. Engineering	47	3.1915	1.0138				
9. Production/ Operations	40	3.5000	1.1094				
10. Production Control	8	3.1256	.8345				
11. Production Engineering	8	3.5000	1.3093				
12. Quality Control	13	3.3846	1.1209				
13. Parts Control	13	3.5385	1.3301				
Within Groups Total	163	3.2883	1.0826				
Between Groups				12	.8291	.6203	Not Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{X}$*	S D	DF	F	Sig.of F	At alpha Level 0.1
Employees are not sure of what is required of them							
1. Personnel & General Affairs	10	3.1000	.8756				
2. Cost Control	4	2.7500	.9574				
3. Accounts	2	4.0000	1.4112				
4. Purchasing	6	3.6667	.8165				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	2.5000	1.0488				
7. Value Engineering	2	3.0000	.0000				
8. Engineering	47	3.5957	.9704				
9. Production/ Operation	40	3.6500	1.2517				
10. Production Control	a	3.2500	.8864				
11. Production Engineering	a	4.0000	.7559				
12. Quality Control	13	3.5385	1.1266				
13. Parts Control	13	3.4615	.9674				
Within Groups Total	162	3.5062	1.0412				
Between Groups				12	1.1502	.3245	Not Sig.
Barriers between departments							
1. Personnel and General Affairs	10	3.8000	.9189				
2. Cost Control	4	2.2500	.5000				
3. Accounts	2	1.5000	.7071				
4. Purchasing	6	3.5000	.8367				
5. Shipping							
6. EDP (Electronic Data Processing)	3	3.6667	1.1547				
7. Value Engineering	6	3.1667	1.4720				
8. Engineering	2	3.0000	.0000				
9. Production/ Operations	48	3.3542	1.1576				
10. Production Control	40	3.8750	.9920				
11. Production Engineering	a	4.2500	.8864				
12. Quality Control	a	3.6250	.7440				
13. Parts Control	13	3.6154	1.0439				
Within Groups Total	13	3.8462	.8006				
Between Groups	163	3.5767	1.0242	12	2.2596	.0117	Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers / Types of Departments	n	$\bar{X}$*	SD	DF	F	Sig.of F	At alphael 0.1
Managers are not sure what is required of them							
1. Personnel & General Affairs	10	3.4000	1.4298				
2. Cost Control	4	2.5000	1.0000				
3. Accounts	2	3.5000	2.1213				
4. Purchasing	6	3.8333	1.1690				
5. Shipping	3	3.3333	.5774				
6. EDP (Electronic Data Processing)	6	2.1667	.7528				
7. Value Engineering	2	2.0000	.0000				
8. Engineering	47	3.4043	1.3619				
9. Production/ Operations	40	3.8000	1.4178				
10. Production Control	8	3.1250	.6409				
11. Production Engineering	8	3.8750	1.1260				
12. Quality Control	13	3.5385	1.2659				
13. Parts Control	13	3.4615	1.3914				
Within Groups Total	162	3.4.w	13061				
Between Groups				12	1.2718	.2409	Not Sig.
Lack of objectives and strategies							
1. Personnel and General Affairs	10	3.5000	1.1785				
2. Cost Control	4	2.5000	1.0000				
3. Accounts	2	3.5000	.7071				
4. Purchasing	6	3.5000	1.3784				
5. Shipping	3	3.3333	1.1547				
6. EDP (Electronic Data Processing)	7	2.7143	1.1127				
7. Value Engineering	2	2.5000	.7071				
8. Engineering	47	3.4043	1.1356				
9. Production/ Operations	40	3.6250	1.1916				
10. Production Control	8	3.3750	.7440				
11. Production Engineering	8	3.7500	.7071				
12. Quality Control	13	3.6154	1.3253				
13. Parts Control	13	3.4615	1.1266				
Within Groups Total	163	3.4417	1.1386				
Between Groups				12	.7536	.6969	Not Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Quality system based on detection not prevention							
1. Personnel and General Affairs	10	3.6000	1.0750				
2. Cost control	4	4.0000	.0000				
3. Accounts	2	4.0000	1.4142				
4. Purchasing	6	3.3333	1.5055				
5. Shipping	3	4.3333	.5774				
6. EDP (Electronic Data Processing)	6	2.6667	.8165				
7. Value Engineering	2	2.5000	.7071				
a. Engineering	47	3.4043	1.1646				
9. Production/ Operations	40	3.6750	1.0952				
10. Production Control	a	3.2500	1.2817				
11. Production Engineering	a	3.1250	1.43-n				
12. Quality Control	13	3.4615	1.4500				
13. Parts control	13	3.5385	.9674				
Within Groups Total	162	3.4753	1.1561				
Between Groups				12	.8253	.6243	Not sig.
Lack of expertise in Quality [redacted]							
1. Personnel and General Affairs	10	3.5000	.5270				
2. Cost Control	4	3.5000	.5774				
3. Accounts	2	4.0000	1.4142				
4. Purchasing	6	3.5000	1.3764				
5. Shipping	3	4.0000	.0000				
6. EDP (Electronic Data Processing)	7	2.4286	1.1339				
7. Value Engineering	2	2.5000	.7071				
a. Engineering	48	3.7917	.9666				
9. Production/ Operations	40	3.6250	.9524				
10. Production Control	a	3.5000	1.1952				
11. Production Engineering	a	3.0000	.9258				
12. Quality Control	13	3.4615	1.4500				
13. Parts Control	13	3.6154	.1929				
Within Groups Total	164	3.5793	1.0326				
Between Groups				12	1.1859	.2980	Not sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{X}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
A lack of resources							
1. Personnel and General Affairs	10	3.4000	.8433				
2. Cost control	4	2.7500	.9574				
3. Accounts	2	2.5000	.7071				
4. Purchasing	6	3.3333	1.0328				
5. Shipping	3	3.3333	.5774				
6. EDP (Electronic Data Processing)	6	2.1667	.4082				
7. Value Engineering	2	2.0000	.0000				
8. Engineering	48	3.1667	.9964				
9. Production/ Operation	40	3.4250	1.2586				
10. Production Control	8	2.8750	.9910				
11. Production Engineering	8	3.3750	1.0607				
12. Quality Control	13	3.1538	.9871				
13. Parts Control	13	2.9231	1.1152				
Within Groups Total	163	3.1595	1.0529				
Between Groups				12	1.1696	.3097	Not Sig.
Lack of intellectual thought given to the subject							
1. Personnel and General Affairs	10	3.5000	.9718				
2. cost Control	4	3.5000	.5774				
3. Accounts	2	2.5000	.7071				
4. Purchasing	6	3.1667	1.1690				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	3.0000	.6325				
7. Value Engineering	2	3.5000	.7071				
8. Engineering	47	3.4466	1.07%				
9. Production/ Operations	40	3.3500	.9753				
10. Production Control	8	3.2500	.8864				
11. Production Engineering	8	3.1250	.3536				
12. Quality Control	13	2.8462	.8987				
13. Parts Control	13	3.3077	.7511				
Within Groups Total	162	3.3086	.9467				
Between Groups				12	.6521	.7944	Not Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{X}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Quality Management Tools are seen as an end in themselves							
1. Personnel and General Affairs	9	3.2222	.9718				
2. Cost Control	4	3.2500	.9574				
3. Accounts	2	3.0000	1.4142				
4. Purchasing	6	3.0000	1.0954				
5. shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	7	2.7143	.7559				
7. Value Engineering	2	3.0000	1.4142				
8. Engineering	47	3.2128	1.1764				
9. Production/ Operations	40	3.4500	.9594				
10. Production Control	7	2.5714	.7868				
11. Production Engineering	8	3.0000	.9258				
12. Quality Control	13	3.2303	1.0919				
13. Parts Control	13	2.8462	.8006				
Within Groups Total	161	3.1801	1.0263				
Between Groups				12	.7824	.6679	Not sig.
Uncertainty about what to do next							
1. Personnel and General Affairs	9	3.5556	1.2360				
2. Cost control	4	2.7500	.5000				
3. Accounts	2	3.5000	2.1213				
4. Purchasing	6	3.3333	1.0328				
5. Shipping	3	4.0000	.0000				
6. EDP (Electronic Data Processing)	6	2.8333	1.3292				
7. Value Engineering	2	2.5000	.7071				
8. Engineering	47	3.3404	1.2385				
9. Production/ Operations	40	3.7500	1.1266				
10. Production Control	8	2.8750	.8345				
11. Production Engineering	8	2.7500	1.0351				
12. Quality Control	13	3.2308	1.0919				
13. Parts Control	13	3.3846	1.6439				
Within Groups Total	161	3.3665	1.1388				
Between Groups				12	1.1197	.3484	Not sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{X}$*	S D	DF	F	Sig. of F	At alpha Level 0.1
Fear							
1. Personnel and General Affairs	10	2.9000	3676				
2. Cost Control	4	2.7500	.5000				
3. Accounts	1	2.0006	.0000				
4. Purchasing	6	3.3333	1.0328				
5. Shipping	3	3.3333	.5774				
6. EDP (Electronic Data Processing)	6	3.1667	.7528				
7. Value Engineering	2	2.0000	.oooo				
a. Engineering	46	3.4130	1.3429				
9. Production/ Operations	40	3.3500	1.0754				
10. Production Control	a	3.3750	1.4079				
11. Production Engineering	a	3.3750	1.0607				
12. Quality Control	13	3.3077	1.1821				
13. Parts Control	13	3.1538	1.2142				
Within Groups Total	160	3.2730	1.1516				
Between Groups				12	.5626	.8691	Nat sig.
Quality improvement is the concern of the Quality							
1. Personnel and General Affairs	10	3.1000	.9944				
2. cm control	4	2.7500	.5000				
3. Accounts	1	3.0006	.0000				
4. Purchasing	6	3.0006	.8944				
5. Shipping	3	3.666-1	.5774				
6. EDP (Electronic Data Processing)	7	2.5714	.9759				
7. Value Engineering	2	3.0000	.0000				
a. Engineering	46	3.2609	1.1630				
9. Production/ Operations	40	3.3500	1.2720				
10. Production Control	a	3.0000	1.1952				
11. Production Engineering	a	3.0000	.7559				
12. Quality Control	13	3.5385	1.2659				
13. Pats Control	13	3.6923	1.0316				
Within Groups Total	161	3.2547	1.1336				
Between Groups				12	.6854	.7636	Nat sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{x}$*	S D	D F	F	Sig. of F	Al alpha Level 0.1
Quality improvement is the concern of production							
1. Personnel and General Affairs	10	3.1000	.7379				
2. Cost Control	4	2.7500	.5000				
3. Accounts	1	2.0000	.0000				
4. Purchasing	6	3.1667	.9832				
5. Shipping	3	3.3333	.5774				
6. EDP (Electronic Data Processing)	7	3.4286	1.6183				
7. Value Engineering	2	3.0000	.0000				
8. Engineering	46	3.0217	1.0433				
9. Production/ Operations	40	3.7500	1.1036				
10. Production Control	8	3.1250	.8345				
11. Production Engineering	8	3.6250	.9161				
12. Quality Control	13	3.6154	1.2609				
13. Parts control	13	2.4615	1.1166				
Within Groups Total	161	3.3416	1.0667				
Between Groups				12	1.3044	.2216	Not Si.
A lack of top management							
1. Personnel and General Affairs	10	3.7000	I.1595				
2. Cost Control	4	2.7500	.5000				
3. A-	1	2.0000	.0000				
4. Purchasing	6	3.3333	1.6330				
5. Shipping	3	3.6667	.5774				
6. EDP (Electronic Data Processing)	6	26333	1.4'120				
7. Value Engineering	2	2.5000	.7071				
8. Engineering	46	3.4348	1.1086				
9. Production/ Operations	40	3.8500	.9213				
10. Production Control	8	3.5000	1.3093				
11. Production Engineering	8	3.7500	.8864				
12. Quality Control	13	3.7692	1.3634				
13. Parts Control	13	3.3646	1.3868				
Within Groups Total	160	3.5375	1.1353				
Between Groups				12	1.0540	.4033	Not sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{x}$*	S D	DF	F	sii. of F	At alpha Level 0.1
Conflict between production and quality department							
1. Personnel and General Affairs	10	3.1000	.9944				
2. Cost Control	4	2.5000	1.0000				
3. Accounts	1	2.0000	.0000				
4. Purchasing	6	3.8333	1.1690				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	7	2.7143	1.1127				
7. Value Engineering	2	3.0000	.0000				
8. Engineering	47	3.4253	1.1562				
9. Production/ Operations	40	3.8250	1.1522				
10. Production Control	8	3.1250	.8345				
11. Production Engineering	8	3.6256	.7440				
12. Quality Control	13	3.4615	1.3914				
13. Parts Control	13	2.8462	.9871				
Within Groups Total	162	3.4936	1.1146				
Between Groups				12	1.4352	.1559	Not sig.
Over reliance on the quality assurance							
1. Personnel and General Affairs	10	3.1000	.7379				
2. Cost Control	4	3.0000	.8165				
3. Accounts	1	2.0000	.0000				
4. Purchasing	6	2.8333	1.1690				
5. shlppiig	3	3.3333	.5774				
6. EDP (Electronic Data Processing)	7	2.1429	.3780				
7. Value Engineering	2	3.0600	.0000				
8. Engineering	46	3.1087	.9482				
9. Production/ Operations	40	3.3250	1.0473				
10. Production Control	8	2.6250	.7440				
11. Production Engineering	8	2.6250	.7440				
12. Quality Control	13	2.9231	1.1152				
13. Parts Control	13	3.0769	.9541				
Within Groups Total	161	3.0373	.9447				
Between Groups				12	1.2784	.2370	Not Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{x}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Statistical Process Control (SPC) is the answer to all the problems							
1. Personnel and General Affairs	10	2.7000	.6749				
2. Cost Control	4	2.7500	.5000				
3. Accounts	1	2.0000	.0000				
4. Purchasing	6	33333	1.0328				
5. Shipping	3	3.0000	1.0000				
6. EDP (Electronic Data Processing)	7	2.2837	.7559				
7. Value Engineering	2	2.5000	.7071				
8. Engineering	45	2.6889	1.0834				
9. Production/ Operations	39	3.4359	1.0462				
10. Production Control	7	2.8571	.6901				
11. Production Engineering	a	2.3750	.7440				
12. Quality Control	13	3.1538	1.1433				
13. Parts Control	13	2.7692	1.0127				
Within Groups Total	158	2.9177	.9968				
Between Groups				12	1.8327	.0480	Sig.
Lack of training and education							
1. Personnel and General Affairs	10	3.4000	1.1738				
2. Cost Control	4	3.5000	1.0000				
3. Accounts	1	2.0000	.0000				
4. Purchasing	6	3.5000	.8367				
5. Shipping	3	4.0000	1.0000				
6. EDP (Electronic Data Processing)	6	2.6667	.5164				
7. value Engineering	2	2.5000	.7071				
8. Engineering	47	3.3617	1.2411				
9. Production/ Operations	40	3.8000	1.0908				
10. Production Control	a	3.6296	.9161				
11. Production Engineering	8	3.3750	.9161				
12. Quality Control	13	3.5385	1.0500				
13. Parts Control	13	3.4615	.8771				
Within Groups Total	161	3.4845	1.0849				
Between Groups				12	.9923	.4591	Not Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

(Cont.)

Difficulties/ Barriers Types of Departments	n	$\bar{X}$*	SD	DF	F	Sig. of F	At alpha Level 0.1
Lack of Communication							
1. Personnel and General Affairs	10	4.0000	1.1547				
2. Cost Control	4	3.7500	.5000				
3. Accounts	1	1.0000	.0000				
4. Purchasing	6	3.5000	1.0488				
5. Shipping	3	4.3333	.5774				
6. EDP (Electronic Data Processing)	6	3.1667	1.1690				
7. Value Engineering	2	3.5000	.7071				
8. Engineering	46	3.5870	1.1270				
9. Production/ Operations	40	3.8750	1.2234				
10. Production Control	8	3.7500	1.2817				
11. Production Engineering	8	3.8750	.9910				
12. Quality Control	13	3.8462	1.1435				
13. Parts Control	13	3.9231	.9541				
Within Groups Total	160	3.7375	1.1272				
Between Groups				12	.9319	.5171	Not Sig.
Overall Perception of [redacted]							
1. Personnel and General Affairs	9	3.3726	.7045				
2. Cost Control	4	3.0543	.2978				
3. Accounts	1	2.3043	.0000				
4. Purchasing	6	3.3261	.8841				
5. Shipping	3	3.6812	.3085				
6. EDP (Electronic Data Processing)	6	2.7356	.6317				
7. Value Engineering	2	2.7669	.3382				
8. Engineering	45	3.3198	.6730				
9. Production/ Operations	39	3.6410	.7515				
10. Production Control	7	3.1988	.7183				
11. Production Engineering	8	3.3533	.3779				
12. Quality Control	13	3.4281	.8723				
13. Pam Control	13	3.4047	.7158				
Within Groups Total	156	3.3804	.7057				
Between Groups				12	1.3532	.1954	Not Sig.

*Values are mean responses on a 5-point scale on which "Not A Problem" = 1 and "A Very Serious Problem" = 5.

```
SPSS/PC+ The Statistical Package for IBM PC
8/16/93
*No profile for tutorial.

INCLUDE 'A:TQM'.
DATA LIST / SN 1-3 AGE 4 GEND 5 LGTH 6 LEVEL 7 DPT 8-9
EXTCUS 10 RECOST 11 ORGCUS 12 EI 13 INTCUS 14 TEAM 15
WORKP 16 CONTPI 17 QWL 18 ORGSS 19 PARTMGMT 20
PROMGMT 21 PERSRES 22 HI 23 QFD 24 MGMTBEH 25 SRAT 26
ORG 27 COMM 28 TRAIN 29 EIN 30 PROMGSYS 31 QTECH 32
BEHATT 33 STOBJ 34 SYMP 35 SCHCOST 36 EMP 37 BARR 38
MGRS 39 LACOBJ 40 QSYS 41 QMGMT 42 RES 43 THOUG 44
TOOLS 45 UNCERT 46 FEAR 47 QDPT 48 QIPROD 49 COMIT 50
CONF 51 QMANU 52 SPS 53 EDU 54 TQM 55 LACCOM 56.
MISSING VALUE AGE, GEND, LGTH, LEVEL, DPT, EXTCUS, RECOST,
              ORGCUS, EI, INTCUS, TEAM, WORKP, CONTPI, QWL,
              ORGSS, PARTMGMT, PROMGMT, PERSRES, HI, QFD,
              MGMTBEH, SRAT, ORG, COMM, TRAIN, EIN,
              PROMGSYS, QTECH, BEHATT, STOBJ, SYMP,
              SCHCOST, EMP, BARR, MGRS, LACOBJ, QSYS,
              QMGMT, RES, THOUG, TOOLS, UNCERT, FEAR,
              QDPT, QIPROD, COMIT, CONF, QMANU, SPS,
              EDU, TQM, LACCOM (9).
BEGIN DATA.
END DATA.
     14 cases are written to the compressed active file.

This procedure was completed at 10:16:22

RELIABILITY /VARIABLES EXTCUS TO QFD /SCALE (REL)
EXTCUS TO QFD /MODEL ALPHA /SUMMARY ALL /STATISTICS ALL.

 METHOD 2 (COVARIANCE MATRIX) WILL BE USED FOR THIS ANALYSIS

 3248 BYTES OF SPACE REQUIRED FOR RELIABILITY
```

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L)

1. RECOST
2. ORGCUS
3. EI
4. INTCUS
5. TEAM
6. WORKP
7. CONTPI
8. QWL
9. ORGSS
10. PARTMGMT
11. PROMGMT
12. PERSRES
13. HI
14. QFD
15. EXTCUS

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L)

		MEAN	STD DEV	CASES
1.	RECOST	3.9167	.9003	12.0
2.	ORGCUS	3.4167	1.2401	12.0
3.	EI	4.2500	.6216	12.0
4.	INTCUS	4.1667	.7177	12.0
5.	TEAM	4.7500	.6216	12.0
6.	WORKP	4.3333	.7785	12.0
7.	CONTPI	4.5000	.5222	12.0
8.	QWL	4.5833	.6686	12.0
9.	ORGSS	3.4167	1.3114	12.0
10.	PARTMGMT	4.1667	.8348	12.0
11.	PROMGMT	4.1667	1.0299	12.0
12.	PERSRES	4.5833	.7930	12.0
13.	HI	3.6667	.8876	12.0
14.	QFD	3.9167	.9003	12.0
15.	EXTCUS	5.0000	.0000	12.0

* * * EXTCUS HAS ZERO VARIANCE * * *

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L)

ITEM-TOTAL STATISTICS

	SCALE MEAN IF ITEM DELETED	SCALE VARIANCE IF ITEM DELETED	CORRECTED ITEM-TOTAL CORRELATION	SQUARED MULTIPLE CORRELATION	ALPHA IF ITEM DELETED
RECOST	53.9167	42.4470	.1227		.8318
ORGCUS	54.4167	36.6288	[illegible]		.8133
EI	53.5833	39.7197	.5860		.8029
INTCUS	53.6667	36.2424	.9187		.7799
TEAM	53.0833	40.9924	.2350		.8116
WORKP	53.5000	41.7273			.8221
CONTPI	53.3333	43.5152	.1319		.8246
QWL	53.2500	39.6591	.5452		.8042
ORGSS	54.4167	37.5379	.3385		.8251
PARTMGMT	53.6667	38.4242	.5387		.8022
PROMGMT	53.6667	34.7879	.7284		.7842
PERSRES	53.2500	43.6591	.0390		.8343
HI	54.1667	34.8788	.8613		.7765
QFD	53.9167	36.8106	.6477		.7933

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L)

RELIABILITY COEFFICIENTS 14 ITEMS

ALPHA = .8199 STANDARDIZED ITEM ALPHA = .8326

This procedure was completed at 10:22:07

RELIABILITY /VARIABLES MGMTBEH TO QTECH /SCALE (RELPERC)

MGMTBEH TO QTECH /MODEL ALPHA /SUMMARY ALL /STATISTICS ALL.

METHOD 2 (COVARIANCE MATRIX) WILL BE USED FOR THIS ANALYSIS

1064 BYTES OF SPACE REQUIRED FOR RELIABILITY

RELIABILITY ANALYSIS - SCALE (RELPER C)

1. MGMTBEH
2. SRAT
3. ORG
4. COMM
5. TRAIN
6. EIN
7. PROMGSYS
8. QTECH

		MEAN	STD DEV	CASES
1.	MGMTBEH	4.6429	.4972	14.0
2.	SRAT	4.2143	.6993	14.0
3.	ORG	3.7857	1.0509	14.0
4.	COMM	4.2143	.8018	14.0
5.	TRAIN	4.4286	.6462	14.0
6.	EIN	4.5714	.6462	14.0
7.	PROMGSYS	4.7857	.4258	14.0
8.	QTECH	4.2857	.7263	14.0

RELIABILITY ANALYSIS - SCALE (RELP

E R C)

ITEM-TOTAL STATISTICS

	SCALE MEAN IF ITEM DELETED	SCALE VARIANCE IF ITEM DELETED	CORRECTED ITEM-TOTAL CORRELATION	SQUARED MULTIPLE CORRELATION	ALPHA IF ITEM DELETED
MGMTBEH	30.2857	10.3736	.2127	.7222	.7415
SRAT	30.7143	8.2198	.6468	.7300	.6644
ORG	31.1429	7.9780	.3739	.6007	.7392
COMM	30.7143	8.5275	.4553	.9152	.7036
TRAIN	30.5000	9.1923	.4319	.4066	.7085
EIN	30.3571	9.1703	.4380	.4299	.7074
PROMGSYS	30.1429	10.1319	3648	.4339	.7238
QTECH	30.6429	8.2473	: 6059	.9200	.6716

RELIABILITY COEFFICIENTS 8 ITEMS

ALPHA = .7356 STANDARDIZED ITEM ALPHA = .7401

This procedure was completed at 10:27:41

RELIABILITY /VARIABLES BEHATT TO LACCOM /SCALE (RELDIF)
BEHATT TO LACCOM /MODEL ALPHA /SUMMARY ALL / STATISTICS ALL.

METHOD 2 (COVARIANCE MATRIX) WILL BE USED FOR THIS ANALYSIS

7784 BYTES OF SPACE REQUIRED FOR RELIABILITY

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L D
I F)

1. BEHATT
2. STOBJ
3. SYMP
4. SCHCOST
5. EMP
6. BARR
7. MGRS
8. LACOBJ
9. QSYS
10. QMGMT
11. RES
12. THOUG
13. TOOLS

14. UNCERT
15. FEAR
16. QDPT
17. QIPROD
18. COMIT
19. CONF
20. QMANU
21. SPS
22. EDU
23. TQM
24. LACCOM

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L D I F)

		MEAN	STD DEV	CASES
1.	BEHATT	3.9167	.6686	12.0
2.	STOBJ	3.4167	.9003	12.0
3.	SYMP	4.3333	.7785	12.0
4.	SCHCOST	4.0000	1.3484	12.0
5.	EMP	4.3333	.8876	12.0
6.	BARR	4.5833	.6686	12.0
7.	MGRS	4.6667	.6513	12.0
8.	LACOBJ	4.2500	.8660	12.0
9.	QSYS	4.1667	.9374	12.0
10.	QMGMT	4.0000	1.1282	12.0
11.	RES	3.5000	1.5667	12.0
12.	THOUG	3.7500	1.2154	12.0
13.	TOOLS	3.8333	1.3371	12.0
14.	UNCERT	3.9167	1.3114	12.0
15.	FEAR	3.6667	1.3707	12.0
16.	QDPT	3.0833	1.5050	12.0
17.	QIPROD	4.2500	1.2154	12.0
18.	COMIT	4.7500	.4523	12.0
19.	CONF	4.6667	.6513	12.0
20.	QMANU	3.4167	1.0836	12.0
21.	SPS	3.0833	1.2401	12.0
22.	EDU	3.8333	1.2673	12.0
23.	TQM	4.2500	.9653	12.0
24.	LACCOM	4.0833	1.2401	12.0

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L D

I F)

ITEM-TOTAL STATISTICS

	SCALE MEAN IF ITEM DELETED	SCALE VARIANCE IF ITEM DELETED	CORRECTED ITEM-TOTAL CORRELATION	SQUARED MULTIPLE CORRELATION	ALPHA IF ITEM DELETED
BEHATT	91.8333	201.9697	.3237		.8991
STOBJ	92.3333	192.2424	.6214		.8937
SYMP	91.4167	199.5379	.3830		.8982
SCHCOST	91.7500	178.7500	.2111	.7766	.8881
EMP	91.4167	202.4470	.4850		.9012
BARR	91.1667	200.8788	.3822		.8983
MGRS	91.0833	198.4470	.5784		.8964
LACOBJ	91.5000	199.0000	.3609		.8985
QSYS	91.5833	194.9924	.3746	.4850	.8962
QMGMT	91.7500	195.4773	.5121		.8987
RES	92.2500	169.2955	.9021		.8833
THOUG	92.0000	182.7273	.6576	.7414	.8896
TOOLS	91.9167	182.9924	.5555		.8916
UNCERT	91.8333	177.6061	.2860	.8366	.8865
FEAR	92.0833	195.7197	.4883		.9021
QDPT	92.6667	186.2424	.5129		.8970
QIPROD	91.5000	189.9091	.3093		.8955
COMIT	91.0000	204.3636	.3772		.8996
CONF	91.0833	201.1742	.6184		.8984
QMANU	92.3333	188.9697	.0942		.8931
SPS	92.6667	203.6970	.4555		.9059
EDU	91.9167	191.1742	.2763	.4505	.8972
TQM	91.5000	200.0909	.8280		.9003
LACCOM	91.6667	179.5152	.8280		.8872

R E L I A B I L I T Y A N A L Y S I S - S C A L E (R E L D I F)

RELIABILITY COEFFICIENTS 24 ITEMS

ALPHA = .8998 STANDARDIZED ITEM ALPHA = .9018

This procedure was completed at 10:30:38

```
SAVE /OUTFILE 'A:TQM.SYS' /QUICK /COMPRESSED.
The SPSS/PC+ system file is written to
    file  A:TQM.SYS
     56 variables (including system variables) will be saved.
      0 variables have been dropped.

The system file consists of:

          432 Characters for the header record.
         1792 Characters for variable definition.
           16 Characters for labels.
          904 Characters for data.
         3144 Total file size.

     14 out of      14 cases have been saved.


This procedure was completed at 10:31:35

FINISH.

End of Include file.
```

```
SPSS/PC+ The Statistical Package for IBM PC
9/15/93

GET /FILE 'b:kaur.sys'.
The SPSS/PC+ system file is read from
    file b:kaur.sys
The file was created on 9/15/93 at 9:20:48
and is titled                    SPSS/PC+
The SPSS/PC+ system file contains
    166 cases, each consisting of
     56 variables (including system variables).
     56 variables will be used in this session.


RELIABILITY /VARIABLES = EXTCUS To QFD /SCALE (awa) = extcus to qfd.

****** METHOD 1 (SPACE SAVER) WILL BE USED FOR THIS ANALYSIS ******

******      656 BYTES OF SPACE REQUIRED FOR RELIABILITY ******


  R E L I A B I L I T Y   A N A L Y S I S   - S C A L E   (A W A)

  1.      EXTCUS
  2.      RECOST
  3.      ORGCUS
  4.      EI
  5.      INTCUS
  6.      TEAM
  7.      QWL
  8.      ORGSS
  9.      PARTMGMT
 10.      PROMGMT
 11.      PERSRES
 12.      HI
 13.      QFD


R E L I A B I L I T Y   A N A L Y S I S   -  S C A L E
(A W A)

RELIABILITY  COEFFICIENTS

N OF CASES =    150.0                    N OF ITEMS = 13

ALPHA  =  .8532
```

reliability /variables = MGMTBEH **TO QTECH /SCALE** (csf)
= mgmtbeh to qtech.

METHOD 1 (SPACE SAVER) WILL BE USED FOR THIS ANALYSIS

******416 **BYTES OF SPACE REQUIRED FOR RELIABILITY** ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (C S F)

1. **MGMTBEH**
2. **SRAT**
3. **ORG**
4. COMM
5. **TRAIN**
6. **EIN**
7. **PROMGSYS**
8. **QTECH**

RELIABILITY COEFFICIENTS

N OF CASES = 163.0 **N OF ITEMS = 8**

ALPHA = .8771

```
reliability /variables = BEHATT TO LACCOM /SCALE (prob)
= behatt to laccom.

 METHOD 1 (SPACE SAVER) WILL BE USED FOR THIS ANALYSIS
******1136 BYTES OF SPACE REQUIRED FOR  RELIABILITY  ******


 R E L I A B I L I T Y   A N A L Y S I S   - S C A L E   (P R 0 B)

  1.      BEHATT
  2.      STOBJ
  3.      SYMP
  4.      SCHCOST
  5.      EMP
  6.      BARR
  7.      MGRS
  8.      LACOBJ
  9.      QSYS
 10.      QMGMT
 11.      RES
 12.      THOUG
 13.      TOOLS
 14.      UNCERT
 15.      FEAR
 16.      QDPT
 17.      QIPROD
 18.      COMIT
 19.      CONF
 20.      QMANU
 21.      SPS
 22.      EDU
 23.      LACCOM


RELIABILITY  COEFFICIENTS

N OF CASES =    156.0                    N OF ITEMS = 23

ALPHA   =   .9408

FINISH.

End of Include file.
```