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**Re-engineering the semiconductors business
process to focus on Total Service Quality Development Through
People in The Customer Responsiveness Center**

by

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**An Executive Summary
Submitted in Partial Fulfillment of the Requirements for
the Award of Engineering Doctorate**

of

**The University of Warwick
Department of Engineering**

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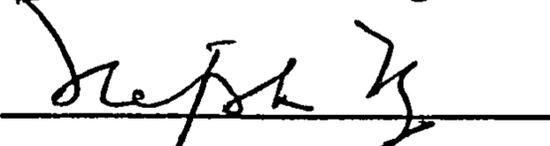
ENGINEERING DOCTORATE PROGRAMME

Submission of Work to the Portfolio

Name : Ng Wai Kwan, Stephen

Company : Motorola Semiconductors Hong Kong Ltd.

The attached document is submitted as part of my Engineering Doctorate Portfolio. Except where acknowledged it is my own work.

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Date : June 30, 1998

I have read the attached work and agree to it being submitted towards the portfolio. Appropriate comments and/or caveats may be listed overleaf. I have made the Research Engineering aware of these.

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June 1998

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ABSTRACT

The research work illustrates the setup of a new and unique cross-functional unit called “The Customer Responsiveness Center” or “the CRC”. The objective of this center is to improve total service quality management through individual employees and teamwork. The ultimate objectives are employee satisfaction and customer loyalty. Forming the CRC in this way is an innovative approach for a traditionally technology focused organization where the fundamental objective is Total Customer Satisfaction. Before, not much work has been done in the organization to understand total service quality, to explore the power of people, and to demonstrate results from real teamwork. The author accepts this challenge.

The Customer Responsiveness Center is a vehicle for promoting Total Service Quality and people involvement. It is crucial to making the company’s Total Customer Satisfaction objective possible. The concept that employee satisfaction precedes customer satisfaction is expanded through this literature research. This is a different belief from the common saying: The customer always comes first. There is no doubt in the author’s mind that when employees come first, they will develop happy customers. The author proves his belief correct with his own Total Service Quality Management (TSQM) model in the CRC.

The Quality and Speed Team (QuST) process initiated by the author creates a positive environment for the CRC team to promote total service quality concepts. “QuST” is an innovative culture development process focusing on Total Quality, Speed of Execution and Teamwork. “QuST” is also a unique process derived from the Total Quality Management concept.

The CRC team also attempts to break the traditional business cycle barriers to re-engineer for better results. This includes: making possible the shipment of China manufactured semiconductors to Taiwan; reducing the total logistics and distribution cycle time; and closing down the customer service department in Hong Kong

(headquarters) for better synergy and productivity.

While promoting the total service quality concept, the CRC team enhanced employee satisfaction and customer satisfaction. The team has started the total service quality drive for the Asia Pacific semiconductor products group in Motorola. However, these are the areas that also need additional attention and require further study.

Times have changed. We no longer live in a manufacturing environment. Total service quality is critical to all service providers. Customers today demand a total-service-quality package and consider that the service quality component is as critical as if not more important than the physical product. We are literally customer-driven.

We are moving into the 21st century. Organizations that fail to master the skill of total service quality management will face difficult times. The CRC TSQM is a change model that can be applied to other industries to benchmark and to master the skills and resources that give an organization competitive advantage in the 21st century.

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- AP7 Motorola's Customer Loyalty, QSR, Subsystem 9, 1998
- AP8 List of Service Quality Quotations from Business Leaders
- AP9 The CRC Book, from the Asia Pacific CRC to the Global CFC, May 1998
- AP10 Motorola East, The CRC and QuST, Summer, 1995
- AP11 Motorola's Voice Magazine, Quality is Everything, March 1998
- AP12 Motorola's Summary Annual Report, 1997; and Motorola's Facts, Asia and the Pacific, 1998

1. INTRODUCTION

1.1 Aim of the Project

Steve Watson, Chairman and CEO of Dayton Hudson says that "*Customer satisfaction starts with the CEO as a role model - talking, listening, responding, expecting, creating, and living the environment and having an open door to all employees at all times.*" The creation of the Customer Responsiveness Center (CRC) in Motorola Semiconductors Hong Kong Limited is a role model. Also, it is a change model to improve total service quality and support people development to achieve total customer satisfaction.

Even though the fundamental objective of Motorola is total customer satisfaction, actions in this direction have proved inadequate. Many customer satisfaction surveys have been done by Motorola's Semiconductor Products Sector, however, employees as well as customers have not encountered effective and consistent actions.

The CRC concept was developed with initial targets to:

- Build a stronger service culture into the organization,
- Implement The Eight Domains of Quality and Speed Team (QuST) process (Table 2.6 in P. 65), and
- Develop service quality cross-functional teams with the one-face policy to customers.

It then evolved to:

- become a re-engineering model to improve total service quality in the company; and
- drive satisfaction while achieving customer loyalty and people development.

The CRC is a service quality change model for the semiconductor industry in which technology means everything.

The message from the author is clear: an organization has to master the skill of total service quality management to win in the 21st century. More customers now perceive that the service quality component is more important than the physical product. This is also what customers are asking for. It is time for a highly technical organization like Motorola to make a major change in service quality improvement through the CRC before it is too late.

Gary Tooker, Chairman of Motorola Inc. said that *“When the alarm bell rings, you’d better get up and realize that the customer expects more from you today than the day before. You’d better find ways to be better.”*^[1] The aim of the CRC project is to ring the bell to upgrade the total service quality level.

The CRC itself provides a blueprint for developing and leading the change in total service quality management.

The author considers this project successful if the following achievements can be made:

- Create the new Customer Responsiveness Center that supported by management,
- Bring in effective training and development programs to the organization,
- Achieve employee satisfaction,
- Achieve higher operational efficiency in cycle time and cost reduction,
- Set the direction to drive total service quality -- the customer loyalty,
- Enable the CRC employees growth through the CRC development and changes, and
- Experience personal growth through the Engineering Doctorate program.

1.2 The Main Themes

The author's two key concepts are:

1. Employee satisfaction precedes customer satisfaction.
2. Employee loyalty and customer loyalty must be built by an organization. Technology can be acquired from the market, but we can not buy loyalty.

The author's CRC Loyalty Growth Cycle (Figure 1.1) and the Total Service Quality Management basic model (Figure 1.2) are the 2 new ideas used to support concepts 1 and 2 above.

The new CRC loyalty growth cycle was based on a loyalty - driven culture that Motorola has supported for the past 70 years. McCarthy (1997)^[2] says that "If you want your customers to be loyal, you must instill in your employees the appropriate attitudes so they are willing to make the commitment If you want loyal customers, you need loyal employees."

The important concept of the loyalty growth cycle is that: First, we must develop loyal and satisfied employees first; Second, we provide customer-friendly system to enable the employees to develop long-term customer loyalty.

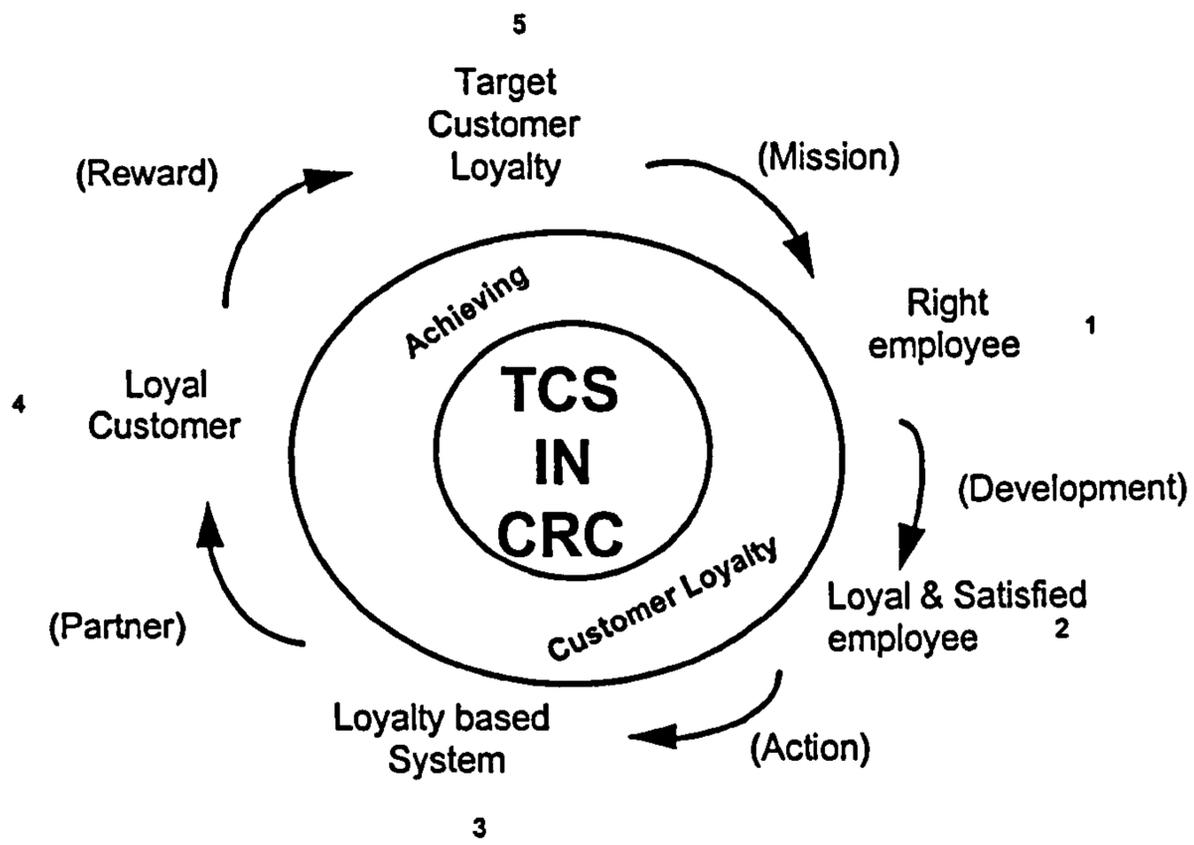


Figure 1.1. The CRC Loyalty Growth Cycle

The author strongly believes that satisfied employees are important to keeping loyal customers. Employees who are not loyal to their company are unlikely to develop and maintain a list of satisfied and loyal customers.

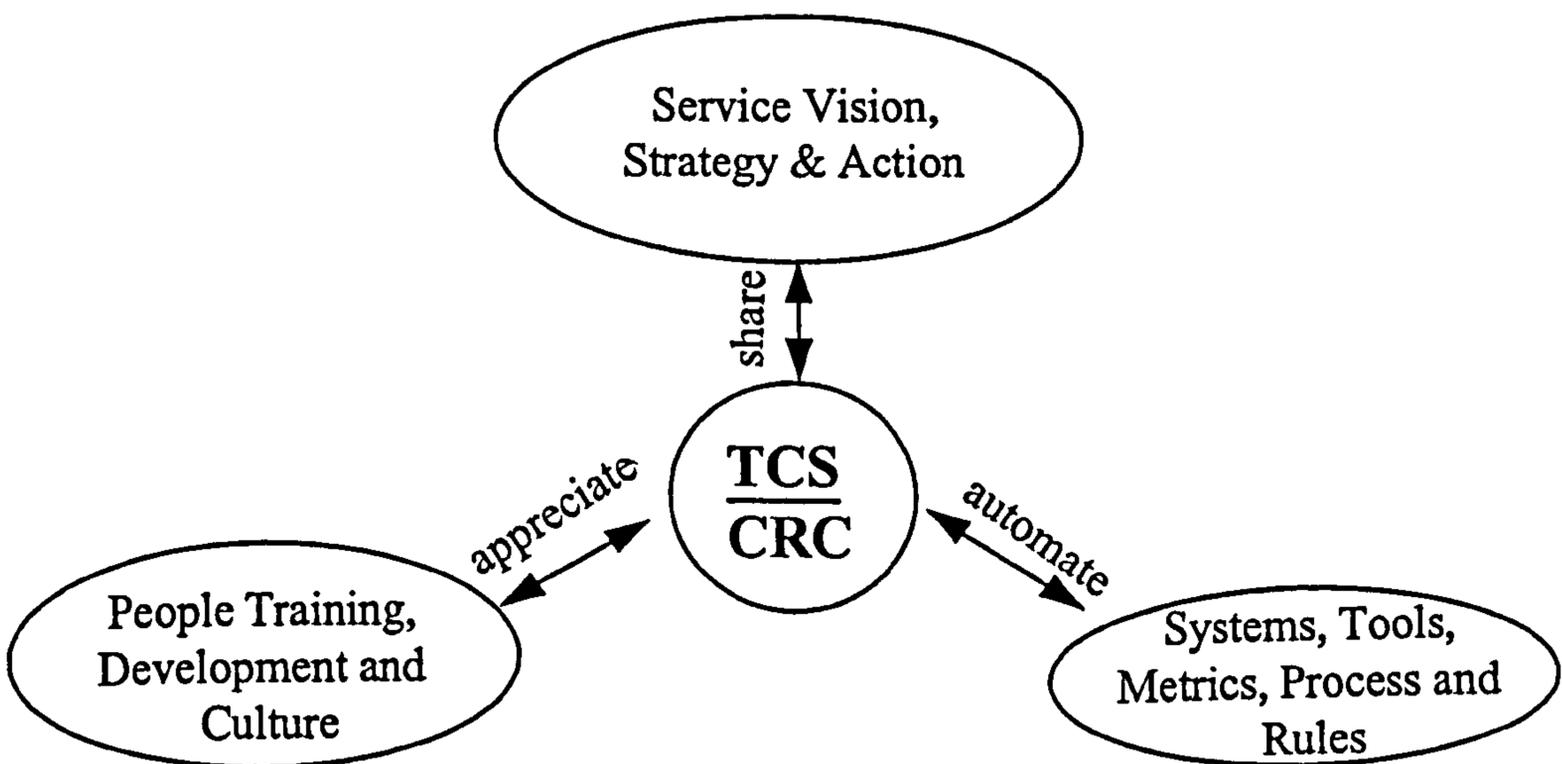


Figure 1.2. The TSQM Basic Model

The TSQM model development was covered in subsection 3.3.7 of Portfolio 3.

The CRC provides an environment to develop employee satisfaction and cultivate service quality excellence. The author believes that people can achieve more in a well-organized environment where there is a clear direction.

1.3 The Structure of the Project

The structure of this project is divided into 5 major portfolios. Each of them has sections and subsections starting with an introduction and ending with a conclusion. Portfolio 6 is a summary of results and contributions. Figure 1.3 illustrates the 6 portfolios in a mindmap.

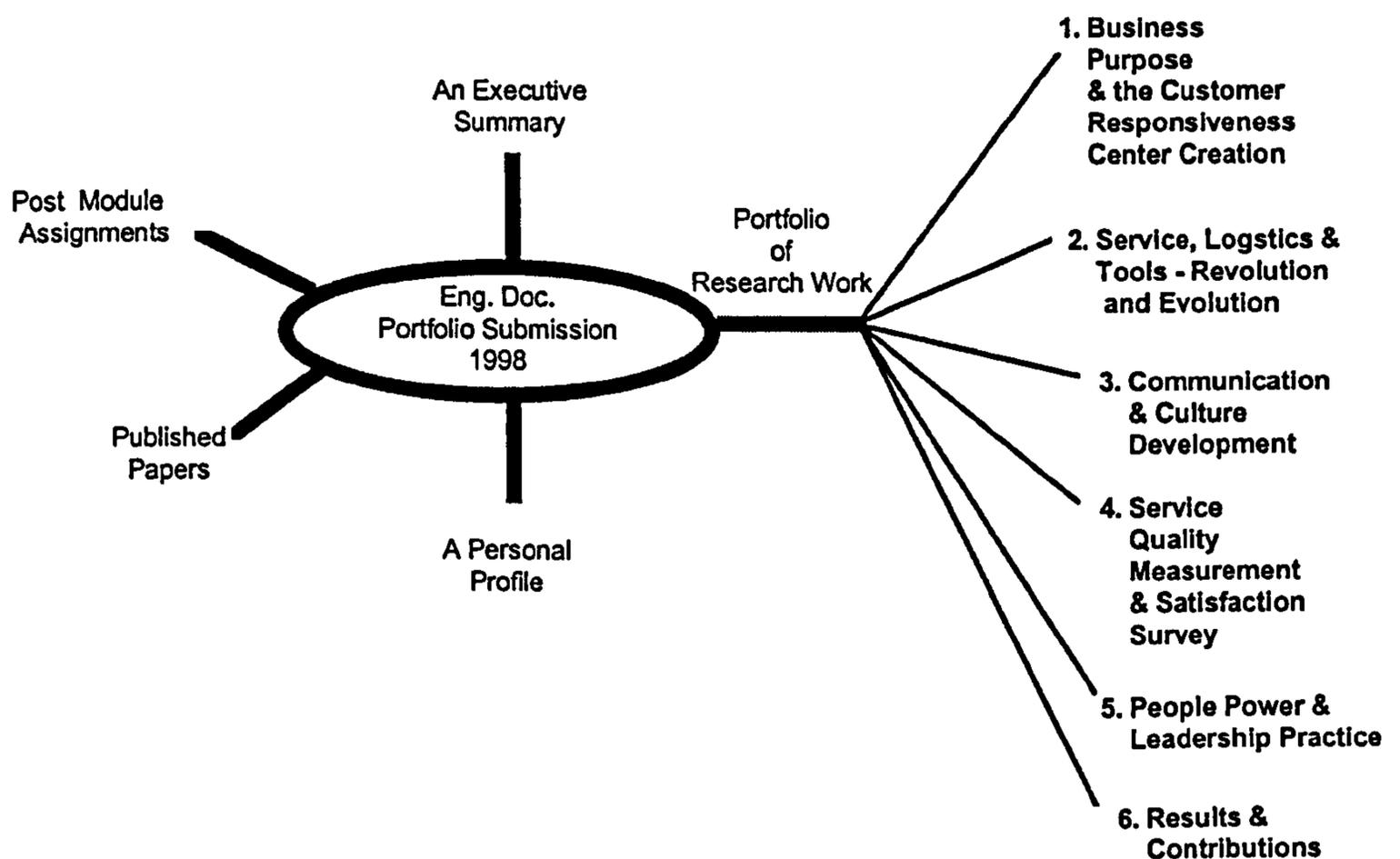


Figure 1.3. The Structure of the Eng. Doc. Project

Portfolio 1 contains seven sections under the title of Business Purpose & Customer Responsiveness Center Creation:

- 1.1 Introduction
- 1.2 Company Background
- 1.3 Vision, Mission, Objectives and Beliefs
- 1.4 Creation of the Customer Responsiveness Center

- 1.5 The CRC Revolution and Evolution
- 1.6 Directions of Research and Areas of Innovation
- 1.7 Conclusion

Portfolio 2 contains six sections under the title of Service Quality Measurement & Satisfaction Survey:

- 2.1 Introduction
- 2.2 A Challenge to Quality Measurement - TQM & TSQM
- 2.3 Customer Requirements and Measurements
- 2.4 Customer Satisfaction Survey
- 2.5 Quality System Review (QSR)
- 2.6 Conclusion

Portfolio 3 contains six sections under the title of Service Logistics & Tools - Revolution & Evolution:

- 3.1 Introduction
- 3.2 Service Teams for Key Accounts
- 3.3 Logistics & Distribution Services
- 3.4 Service Policy, Strategies & Actions
- 3.5 System, Tools, Metrics, Process & Rules
- 3.6 Conclusion

Portfolio 4 has five sections under the title of **Communication & Culture Development**:

- 4.1 Introduction
- 4.2 Quality & Speed Team Evolution - A TQM Plus in Action
- 4.3 Total Customer Satisfaction Team and Cultural Teams Development
- 4.4 Individual Dignity Entitlement - Achieving Personal Communication Excellence and People Power
- 4.5 Conclusion

Portfolio 5 has five sections under the title of **People Power & Leadership Practice**:

- 5.1 Introduction
- 5.2 Service Team Building Training & Development
- 5.3 Seven Habits Drive for People Quality - An Inside Out Learning Process
- 5.4 Total Service Quality Management Challenge - Employee Satisfaction
- 5.5 Conclusion

Portfolio 6 is the closing chapter that looks into the results and contributions. It contains three sections:

- 6.1 Introduction
- 6.2 Review of Achievements
- 6.3 Future Research

Figure 1.4 illustrates the author's project development process from 1994 to 1998:

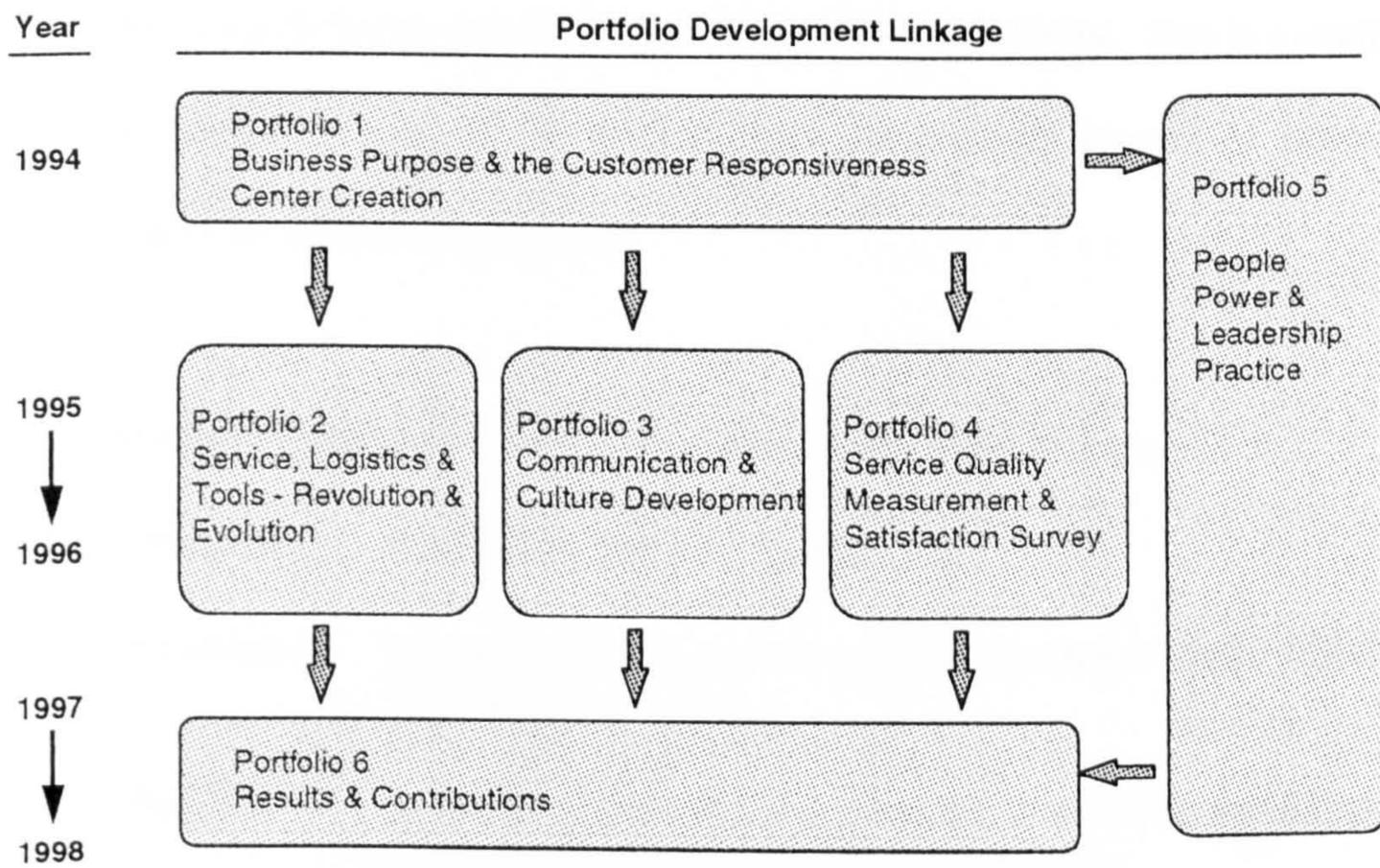


Figure 1.4. The Eng. Doc. Project Development Process

1.4 Overview of the Submissions

The research work relates to the setting up of a new cross-functional unit called "The Customer Responsiveness Center". Its objective is to pioneer the re-engineering efforts in total service quality improvement for Motorola Asia Pacific Semiconductor Products Group.

The ultimate objectives are employee satisfaction and customer loyalty. This requires continuously to break traditional business cycle barriers and form a major do-different approach in the semiconductor industry. This is a challenge to change a company from being only technology-focused to become a customer-focused organization.

The key focuses and the order of reading in the portfolios are:

Portfolio 1 - Creation of the CRC (Section 1.3)

Portfolio 2 - Development of service quality excellence from TQM⁽¹⁾ to TSQM⁽²⁾ (Section 2.1)

Portfolio 3 - Logistics & Distribution Services, and China semiconductor products shipping to Taiwan (Section 3.2)

Portfolio 4 - Quality & Speed Team (QuST) development & implementation (Section 4.1)

Portfolio 5 - Introduction of new education and training programs (Sections 5.1 & 5.2)

Overview of the Submissions

⁽¹⁾ TQM = Total Quality Management

⁽²⁾ TSQM = Total Service Quality Management

Key achievements by the author are listed as follows:

- Created the new Customer Responsiveness Center,
- Developed and implemented the Quality & Speed Team (QuST) process,
- Developed the best-in-class logistics and dropship system in Asia Pacific region,
- Enabled shipment of semiconductor products from China to Taiwan,
- Achieved productivity improvements in the logistics and distribution functions,
- Brought in new education and training programs for employees,
- Achieved better employee satisfaction in the CRC, and
- Eliminated the Customer Service Department in Hong Kong Asia Pacific headquarters.
- Set the direction to achieve Motorola's total customer satisfaction objective.

The CRC is a unique structure. It allows the individual to grow and illustrate that teamwork will contribute to that growth.

2. THE RESEARCH

2.1 Literature Review

2.1.1 Motorola's Approach Towards Service Quality in Asia Pacific

Historical events and disappointments in the organization highlighted the need to explore new knowledge about service quality and its management.

The Motorola internal service strategy task force study in 1987 indicated that service was total quality, on-time delivery, and responsiveness. As a result, the management encouraged everyone to accept the premise of Albrecht and Zemke (1985)^[3] that: *"If you're not serving the customer, your job is to serve somebody who is"*.

George Fisher, CEO of Motorola, communicated the following to his management teams in 1988:

Total Customer Satisfaction = Total Employee Satisfaction

Fisher further challenged the cross-functional teams to deliver the highest service quality product in the least amount of time.

Motorola's service survey published in 1992 highlighted the importance of speed for customers. Over 50% of the customers interviewed considered "speed" as the most crucial factor in service.

A sense of urgency to service quality improvements in Motorola started to

emerge in 1993.

Motorola then subcontracted a third party called the Total Research Corporation to conduct a world-wide customer survey in 1993. Responsiveness was mentioned by most customers as the basis for satisfaction.

The CRC approach was recommended by the author to the Asia Pacific management team to explore more on total service quality.

2.1.2 Total Customer Satisfaction Challenge

Total Customer Satisfaction or “TCS” was identified and adopted by Motorola Corporation in 1987. Total Customer Satisfaction is the fundamental objective of Motorola. It is supported by: two key beliefs, three key goals and five key initiatives.

TCS is the sum of every relationship that a firm has with every customer. It is not just the product but also the services provided with it. It relates not only to today’s sales but also to performance throughout time. It includes all these dimensions because customers evaluate all of them to a lesser or greater extent depending on the product.

TCS also means managing the business to satisfy customers, not management.

Bob Galvin, Chairman of Motorola in 1987, defines TCS *“Our customers want their entire or specific choice of product and service at their earliest opportune time. If we fully satisfy that want of what and when along with operational perfection, we will achieve Total Customer Satisfaction. If we provide the customer our choice of product and service at our time plan along with operational perfection, we will only deserve credit for incomplete, less than total customer satisfaction.”*

Mack Hanan and Peter Karp (1989)^[4] stated that *“Total Customer Satisfaction must originate at the top or it can never become a corporate-wide commitment. It must drive from the top down. It must make an impact on every business operation.”*

The author agrees that the drive of total customer satisfaction must be from the top. It can not be delegated.

2.1.3 Satisfaction Measurement

Richard Oliver (1997)^[5] quoted *“Everyone knows what [satisfaction] is, until asked to give a definition. Then it seems nobody knows.”* He defines satisfaction as *“The customer’s fulfillment response. It is a judgement that a product or service feature or the product or service itself, provided (or is providing) a pleasurable level of consumption - related fulfillment, including levels of under - or overfulfillment.”*

Figure 2.1 illustrates how the interim and final stages of consumption are assessed in the context of attendance at a movie.

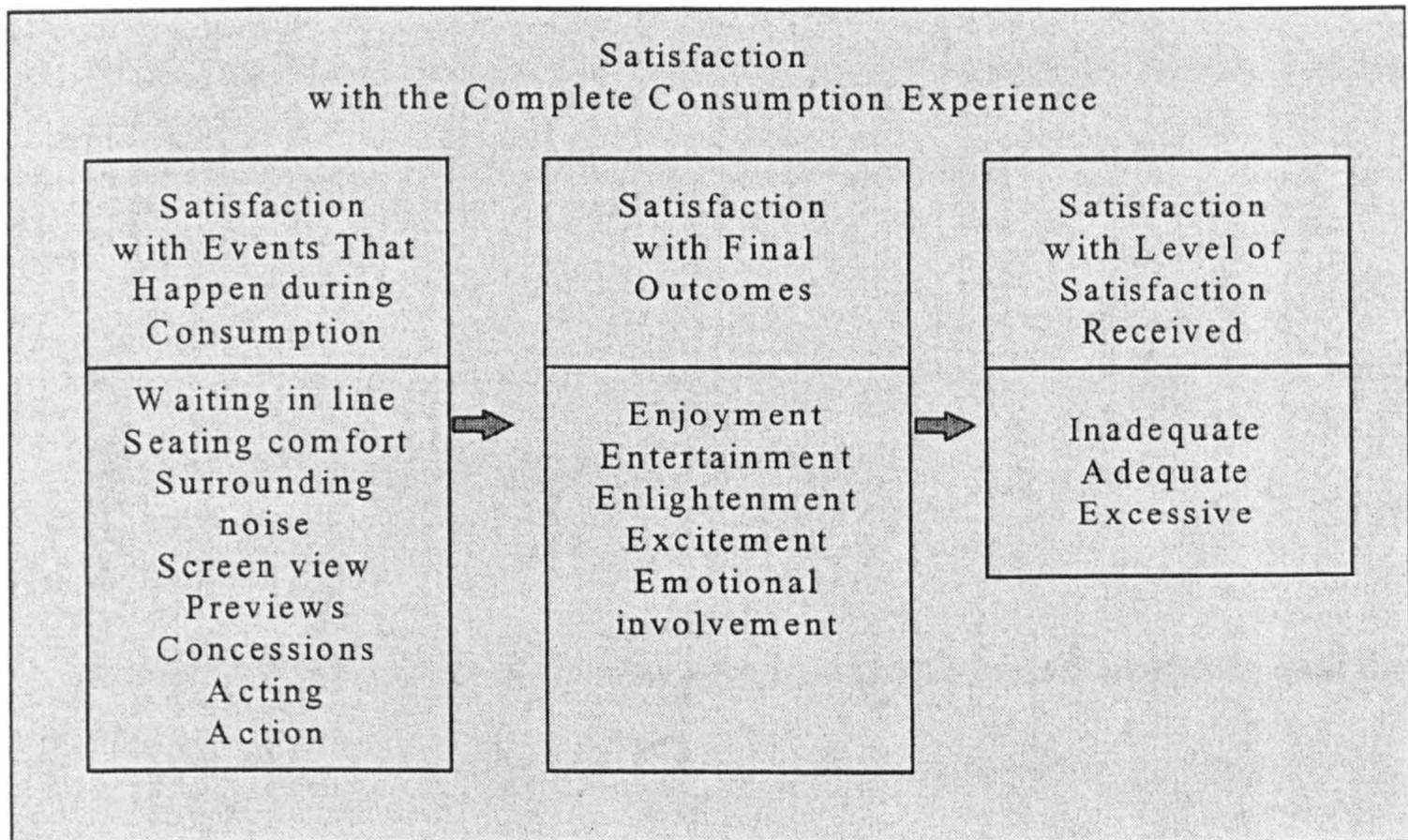


Figure 2.1. Oliver's Variants of "Satisfaction"

Bob Tasca (1996)^[6] reports that a satisfied customer is eight times more likely to repeat his or her purchase than a dissatisfied customer. In Asia, the number of repeated purchases by a satisfied customer could be higher.

Jacques Horovitz (1990)^[7] states that satisfaction measurement may be taken daily, weekly, monthly or annually. Everything depends upon the purchase frequency and the speed with which the company can modify its quality programme.

2.1.4 Service Encounters

Service encounters are personal interactions between the customer and the service provider. The customer must be present and involved in the production process and it is not possible to totally separate production workers or service providers from customers (John Czepiel et al. 1985)^[8].

Ron Kaufman (1993)^[9], in his article Service Encounters of The Third Kind outlined service quality evolution in three stages:-

1. Service Encounters of the first kind approaches the customer with the most basic of all customer service questions: What do you want? The service provider's priorities and service focus are very clear: "Get the customer's order right, and get it right the first time!" Breakdowns in this kind of service encounter are bad news. Slogans used by companies are "100% right, zero defects and Six Sigma Quality."

The objective of service encounters of the first kind is **Customer Satisfaction**.

2. Service encounters of the second kind approaches the customer with a question that goes beyond the offer of a standard product. The questions are more inviting: How do you want it? The service provider's priorities and service focus are changing to meeting customer requests.

This includes special products, unique combinations and odd-hour deliveries. Breakdowns are expected at first and then they are overcome. Responsiveness and flexibility become prime objectives.

The objective of service encounters of the second kind is **Customer Delight**.

3. Service encounters of the third kind, the highest service quality level approaches the customers in a different manner. Some questions are rather strange: What do you want to become? The service provider focuses on dialogue with customers. The providers are concerned not only with more than just overcoming a customer's existing business breakdown or a future requirement, but also to work together with the customer to solve problems that might emerge in the future. To manage the unknown and anticipate future events describes the scope of the service.

The objective of service encounters of the third kind is **Customer Loyalty**.

Table 2.1 illustrates the analysis and comparison of these three service quality levels put forward by the author:

Service Quality Levels	1st Kind Encounter	2nd Kind Encounter	3rd Kind Encounter
Customer Service Objective	<ul style="list-style-type: none"> • Customer Satisfaction • Standardization 	<ul style="list-style-type: none"> • Customer Delight • Customization 	<ul style="list-style-type: none"> • Customer Loyalty • Customerization
Basic Question with Customers	What do you want?	How do you want it?	What do you want to become?
Breakdown management or problem solving	Target zero defects, 6 Sigma quality, etc.	Manage responsiveness and flexibility. Expect breakdowns.	Resolve breakdowns to emerge in the future. Anticipate breakdowns.
Training and Development Focuses	Product knowledge, skill and accuracy.	Creative, problem solving, attitude building and "Find a yes" for the customer approach.	Collaboration, creativity, trust, partnerships, innovation and design.
Slogan used	"Right the first time" and "follow all procedures".	"Find a yes" for the customer and "Be flexible".	"Win - Win" agreements and "building synergy".
Examples: Semiconductor industry	Sell standard products such as discrete components.	Sell custom products such as microprocessor units.	Develop products jointly for future markets, i.e. Motorola's Dragon Kat I.C. ⁽¹⁾ for electronic dictionary in 1980's.
Examples: Fast food industry	McDonald: Offer "Standard Big Mac".	Burger King: Offer "Have it your way!", i.e. more ketchup, no pickles.	Explore future consumer tastes.

Table 2.1. Three Levels of Service Quality Challenge

The challenges to service providers is to reach the service encounters of the 3rd kind.

⁽¹⁾ I.C. = Integrated Circuit

2.1.5 What is Service Quality?

In the broadest sense, customer service is whatever enhances customer satisfaction. Satisfaction is the difference between how a customer expects to be treated and how he or she perceives being treated. The sources of satisfaction or the elements of customer service are diverse and sometimes subtle or surprising (William Davidow and Bro Uttal 1989)^[10]. However, what is service quality?

Service quality, in many cases, is difficult to define. It is because service quality can mean different things to different industries, or to different people. As a result of researching management books and business articles, the author has identified the following service quality related definitions:

- Armistead (1994) & Gronroos (1984)^[11] - *Service quality is made up of technical and functional quality, technical quality being what is received and functional quality the way in which it is received.*
- Spechler (1991)^[12] - *Service quality, in a narrow sense, means the quality of the services delivered to a customer, while in a broader sense, it includes everything done to deliver what a customer is expecting. It can involve a product, a service, or a product and a service combined.*
- Rust and Oliver (1994)^[13] - *Service quality is the consumers' overall impression of the relative inferiority/superiority of the organization and its services.*

- Randall and Senior (1992)^[14] - *Service quality, in marketing, means understanding the customers' needs and identifying ways to meet or exceed them. It is sometimes equated with customer satisfaction, or the degree to which customers' perceptions of the service meet or exceed their expectations of the service transaction.*
- Johns and Olsen et al. (1996)^[15] - *Service quality initiatives also have an impact upon marketing potential and upon the attraction and recruitment of quality personnel in a shrinking skilled labour market. In addition, service quality is generally viewed as a source of customer loyalty and therefore as a means of maintaining market share.*
- Palmer and Cole (1995)^[16] - *Service quality ... can be in the concept of customer perceived quality: Quality can be defined only by customers and occurs when an organization supplies goods or services to a specification that satisfies their needs.*
- Berry and Parasuraman (1991)^[17] - *Service quality is the foundation of services marketing. The essence of services marketing is service.*
- Zeithaml, Parasuraman and Berry (1990)^[18] - *Service quality is the discrepancy between customers' expectations and perceptions. Zeithaml et al. further developed the SERVQUAL - the 22-item instrument for measuring customers' expectations and perceptions along with the five service quality dimensions (tangibles, reliability, responsiveness, assurance and empathy).*

- Milakovich (1995)^[19] supported the new concept of total quality service (TQS) and defined it as *a powerful, yet simple, method of process improvement for achieving customer satisfaction, without the need for substantial additional resources.*
- Albrecht (1992)^[20] put forward the Total Quality Service (TQS) concept to include the entire quality issue. TQS is defined by him as *a state of affairs in which an organization delivers superior value to its stockholders, its customers, its owner, and its employees.*
- Edvardsson et al. (1994)^[21] took a Total Quality Management (TQM) perspective to manage service quality and named it Total Service Quality Management (TSQM). The TSQM approach can link service quality and productivity and describe quality methods to improve both.

The research review indicates that service quality covers the areas of service delivery, service reception, expectation, perception, experience and satisfaction of customers. Even though many of these service elements could be subjective, the final judge will still be the customers. Thus, to study the feelings and perceptions of customers is another way to better understand customers and service quality management.

2.1.6 Service Quality Measurement

“What gets measured gets improved?” is commonly heard from quality

management practitioners. The statement can apply to service quality measurement.

Motorola uses six-sigma to measure and improve customer satisfiers. DSEG Corporation uses the six-sigma as a common metric for customer satisfaction measurement (Gwen Fontenot et al. 1992)^[22]. Xerox applies the customer satisfaction closed loop improvement model and Federal Express conducts customer surveys.

Among other measuring instruments, the best known is SERVQUAL. SERVQUAL, SERVICE QUALITY MODEL OR THE GAP THEORY, was developed by a team of researchers from Texas A&M University led by A. Parasuraman in the early 1980s. Based on their research, particularly focused on delivery, perceptions, expectations and managers' beliefs about customer expectations, they identified five service quality dimensions (tangibles, reliability, responsiveness, assurance and empathy) and 22 items to indicate how good service companies are performing along those dimensions.

SERVQUAL, according to Parasuraman et al. (1990)^[23] is based on the conception of perceived service quality, which is defined as the discrepancy (GAP) between what the customer feels that a service provider should offer and his perception of what the service provider actually offers.

The conceptual model (Figure 2.2) is an effective framework for understanding, measuring and improving total service quality for a service provider. GAP 1 indicates the discrepancy between customers' expectations and managements' perceptions of these expectations; GAP 2 uncovers the discrepancy between managements' perceptions of customers' expectations and service quality specifications; GAP 3 shows the discrepancy between service quality specifications and the actual service delivery; GAP 4 communicates the discrepancy between the actual service delivery and what is committed to the customers; and GAP 5 links customer perceived service quality and customer expected service quality to reveal the service quality shortfalls in the process.

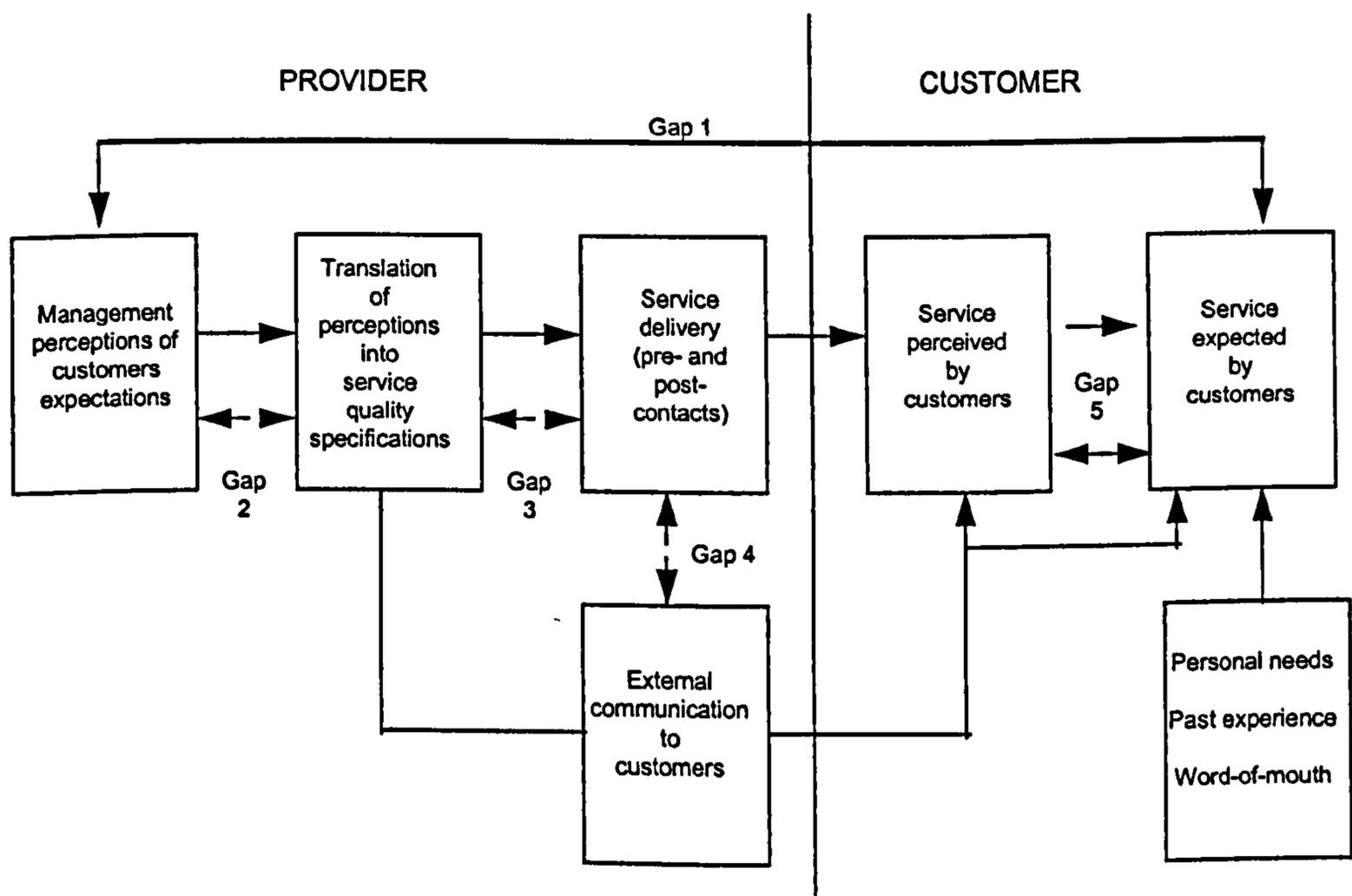


Figure 2.2. Conceptual Model of Service Quality by Zeithaml et al.^[23]

As discussed, the ultimate objective of measuring service quality is to understand the internal shortfalls and external customer concerns. SERVQUAL methodology, among others, can help determine where the service quality gaps are, why they are there and provide good visibility for the management to take corrective actions.

Hayes (1991)^[24] introduces a simple model for the development and use of customer satisfaction questionnaires. Table 2.2 displays the different service quality dimensions used.

1.	<i>availability of support</i> : the degree to which the customer can contact the provider
2.	<i>responsiveness of support</i> : the degree to which the provider reacts promptly to the customer
3.	<i>timeliness of support</i> : the degree to which the job is accomplished within the customer's stated time frame and/or within the negotiated time frame
4.	<i>completeness of support</i> : the degree to which the total job is finished
5.	<i>pleasantness of support</i> : the degree to which the provider uses suitable professional behavior and manners when working with the customer

Table 2.2. Quality Dimensions by Hayes^[24]

Even though the author takes a slightly different approach by using key performance measurement criteria provided by his customers, the Hayes' simple model is a good model for other customers. The 5 key measurement criteria used in Motorola for key customers are responsiveness, delivery, quality, price and service.

2.1.7 Service Strategy and Culture Development

The service strategy as defined by Albrecht (1985)^[25] is “*a distinctive formula for delivering service; such a strategy is keyed to a well-chosen benefit premise that is valuable to the customer and that establishes an effective competitive position.*” The service triangle (Figure 2.3), developed by Albrecht, places the customer at the center of the triangle. Then, the customer is aligned with the strategy, the people and the systems.

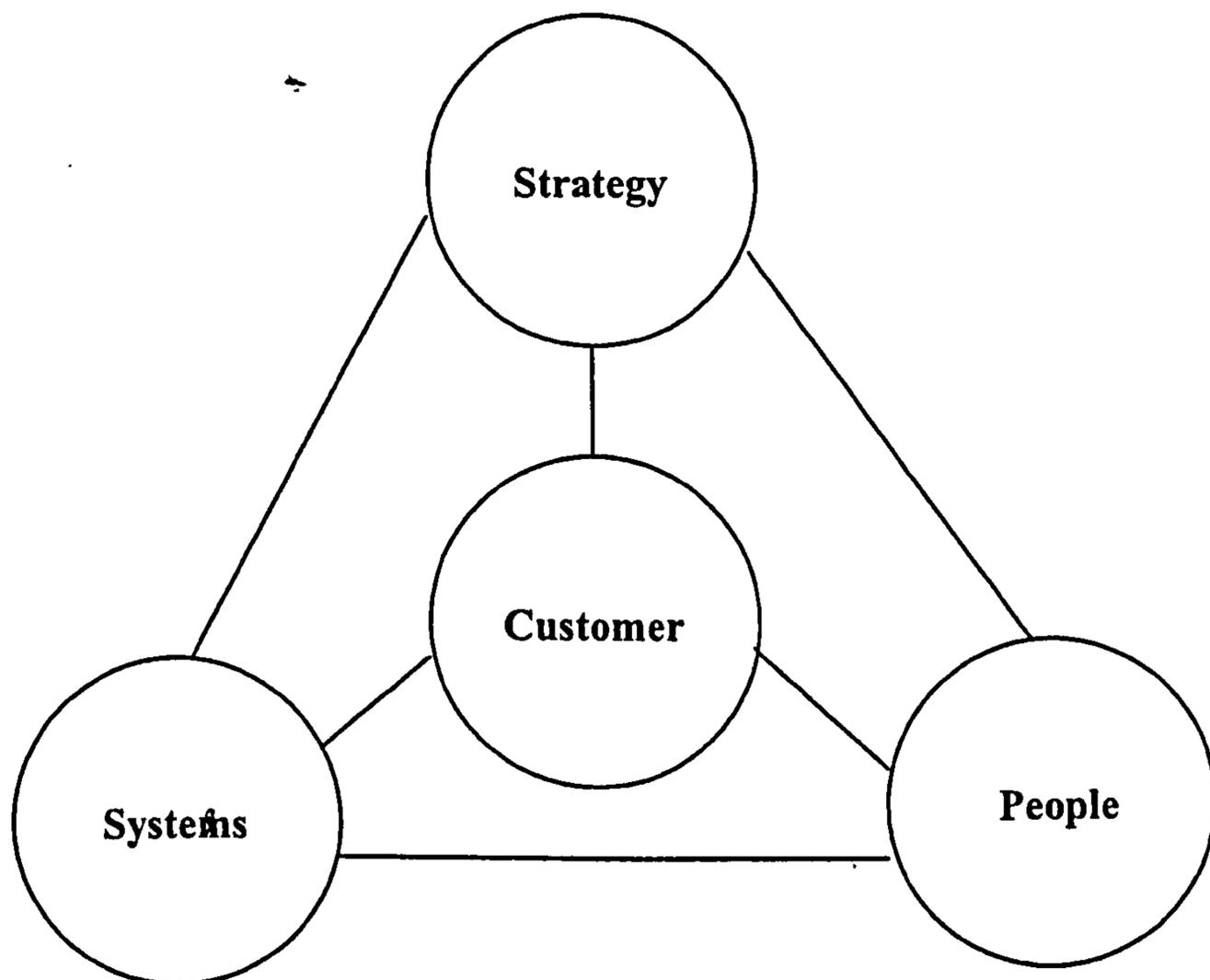


Figure 2.3.. The Service Triangle - Albrecht^[25]

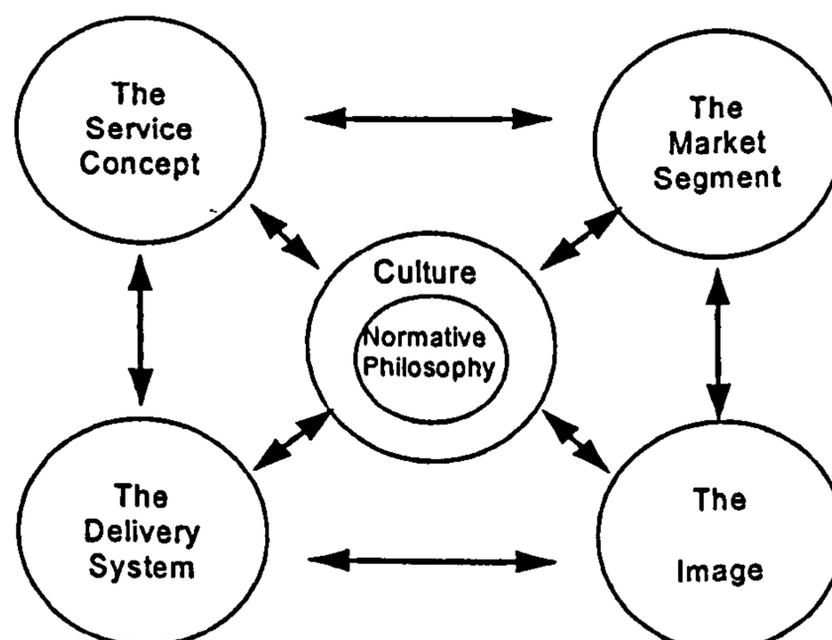
Heskett (1986)^[26] and Jones (1989)^[27] advocate a strategic service vision and service strategy. The comparison between Albrecht, Heskett and Jones appears in Table 2.3.

Service Quality Gurus	Themes	Strategic Elements
Albrecht (1985)	The Service Triangle	Strategy, systems, people, and customers
Heskett (1986)	Basic Elements of a Strategic Service Vision	Target market segments, service concept, operating strategy, and service delivery system
Jones (1989)	The Elements of a Service Strategy	Company, delivery system, competitors, customers, and service concept

Table 2.3. Service Strategy Comparison, A, H and J

The service vision and strategic elements of all three gurus are quite similar. However, the cultural aspect is missing.

Normann (1984)^[28] took a different approach to characterize the culture and management philosophies of a successful, service-oriented business today. He believes that the culture and normative guiding principles are the crucial success factors of any service organization. Normann puts culture at the center of the service management system as depicted in Figure 2.4.

Figure 2.4. Philosophy As Part of The Service Management System^[28]

Normann's system is more comprehensive and brings in the important culture element, but the service direction - the service vision and strategy, is unclear.

The author considers that a better service quality model must consist of a direction, a process, people, and customers, all of which are supported by a positive culture. The author's total service quality management (or TSQM) model (Figure 2.5) is built on these concepts.

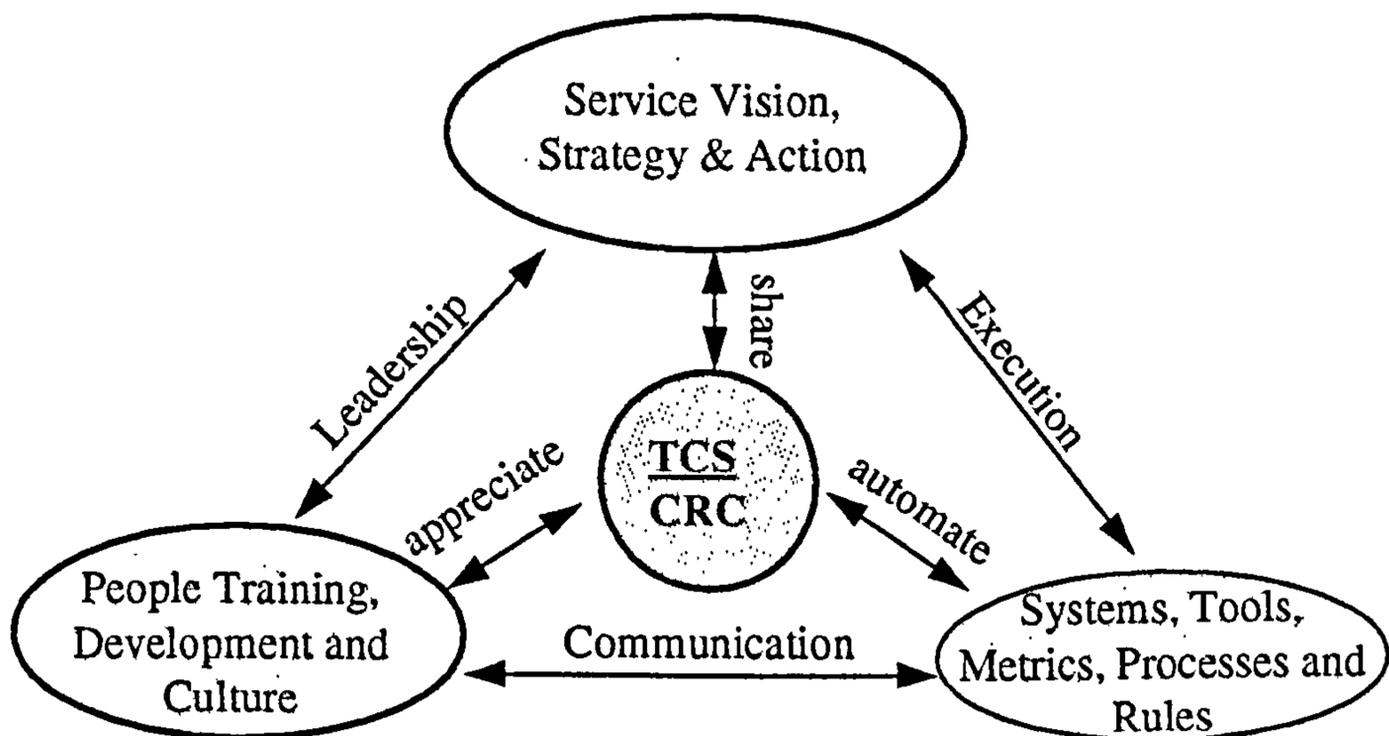


Figure 2.5. The CRC TSQM Model

The service triangle developed by KIA Management Consultant (1982)^[29] has a number of fundamental strategic implications for both the structure and management of a service organization. Figure 2.6 illustrates the necessity to achieve the balance and to take account of both internal culture and the demands of a market place.

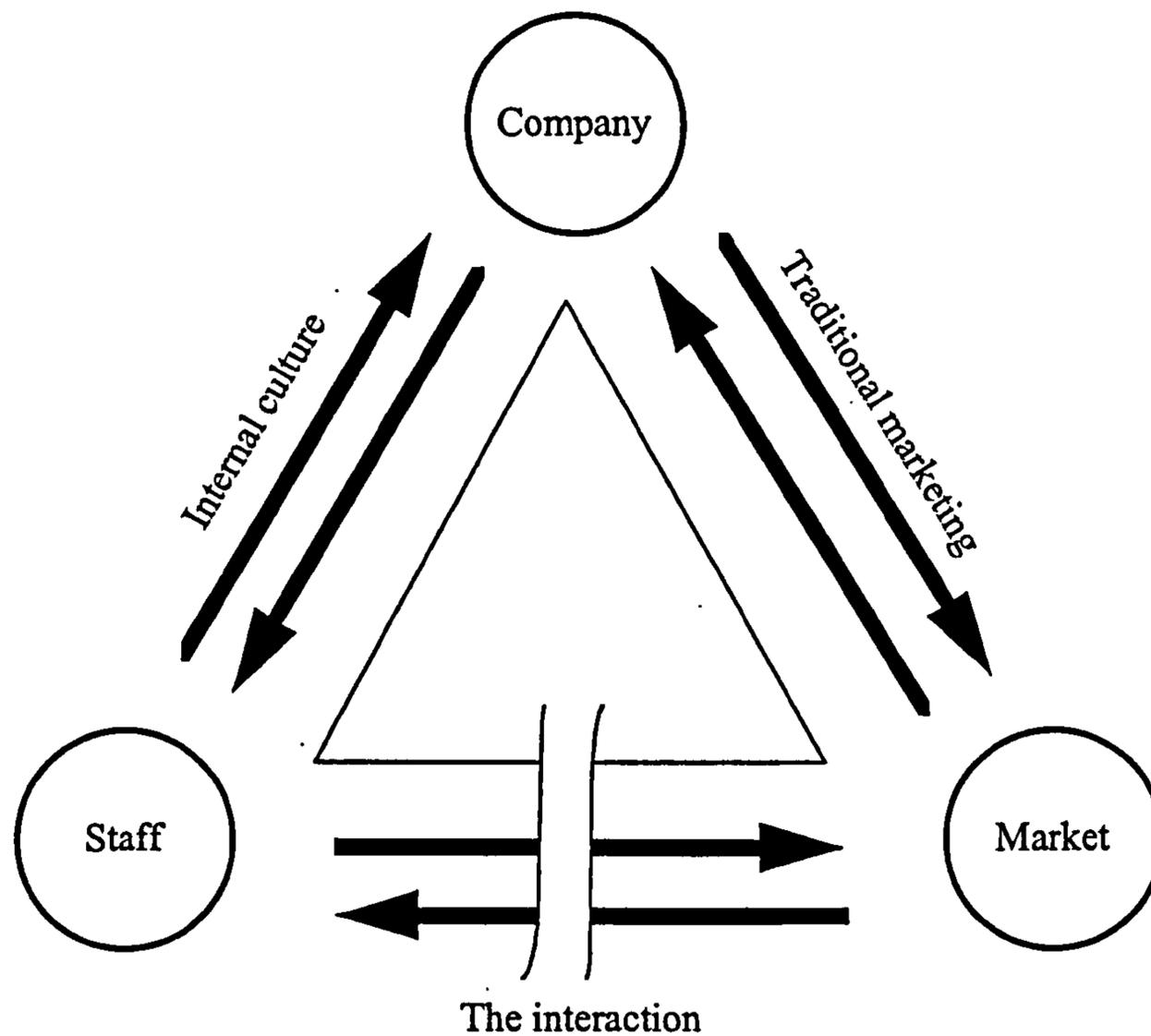


Figure 2.6. The Service Triangle - KIA^[29]

This means:

- the internal culture and the external culture cannot be dissociated,
- power must be devolved,
- the values of the organization are critical,
- management must lead, and
- be customer focused, not function focused.

The focus of this model is more on a macro aspect (market) than customers (as individuals). Compared with Normann's system, both of them have culture elements. However, the service and customer elements are not clear in both cases. The TSQM model is a better model.

2.1.8 Employee, Customer, Satisfaction and Loyalty

Thomas Golisano, Chairman of Paychex, Inc.^[30] says that *“the hiring and training of people that have the capacity and skill set to deliver quality service is the first step to customer satisfaction.”*

Beer and Walton in Harvard Business Review^[31] say that *“Gaining an employee’s satisfaction with the rewards given is not a simple matter. Rather, it is a function of several factors that organizations must learn to manage. Feelings of satisfaction or dissatisfaction arise when individuals compare their input - job skills, education, effort, and performance - to output - the mix of extrinsic and intrinsic rewards they receive.”* The Individual Dignity Entitlement (IDE) spirit in Motorola is to allow employees to compare and get full returns for what they invest in Motorola during his or her employment. The basic idea is the same. However the approach in IDE is unique in that it focuses on effective one-to-one communication.

Desatnick (1987)^[32] says that *“The need for service superiority is sold to the individual employee in terms of what it does for that employee. McDonald for instance, effectively sells what is essentially a minimum-wage job, with no tipping, by emphasizing the tremendous benefits and personal satisfaction that come from serving the customers.”*

James Heskett et al. (1990)^[33] says that *“Customer loyalty is the cornerstone*

of a successful service. It influences employee and supplier loyalty. And it produces the profits that induce shareholder loyalty." The author notes that loyalty must be built within the organization first. Then customer loyalty can be built in time.

For example, Nordstrom, the America's No. 1 customer service company sets employees free at their work place. Employees do not need to ask for anyone's permission to do what they do for customers.

Jim Nordstrom^[34] says that *"People will work hard, when they are given the freedom to do the job the way they think it should be done, when they treat customers the way they like to be treated. When you take away their incentive and start giving them rules, boom, you've killed their creativity."*

You cannot have loyal customers when employees are unhappy. Nordstrom's way is to create an environment where employees can be happy, then to deliver the best service quality to their customers.

Reichheld (1996)^[35] says that *"If you wonder what getting and keeping the right employees has to do with getting and keeping the right customers, the answer is everything. Employees who are not loyal are unlikely to build an inventory of customers who are."*

The author believes that we must build employee loyalty first. Then it will develop customer loyalty eventually.

Stephen Covey (1989)^[36] points out that *“there are organizations that talk a lot about the customer and then completely neglect the people that deal with the customer - the employees.”*

Buchanan (1996)^[37] says that *“Organizations do not fail because of outside forces. They are put out of business by their own employees who produce barriers that drive customers away.”* The power of people is elaborated in this statement.

It is important to recruit the right employees and develop them to become effective service providers. Griffin (1995)^[38] believes that *“When the service attitude is not present, even the best-conceived system can break down.”*

Zanzotto, President of American Express Travel, says that *“When you want to increase customer satisfaction, technical training - how to write a letter to a card member, for example -- is easy. The quantum leap comes from improving employees' attitudes.”*

The Stephen Covey's 7 Habits training introduced to Motorola by the author is an attempt to improve employee satisfaction by addressing personal

effectiveness.

The 7 Habits Maturity continuum (Figure 2.7)^[39] illustrates how employees must learn self-mastery and self-discipline in order to achieve the Private Victory (employee satisfaction) first before moving to master the Public Victory (customer loyalty).

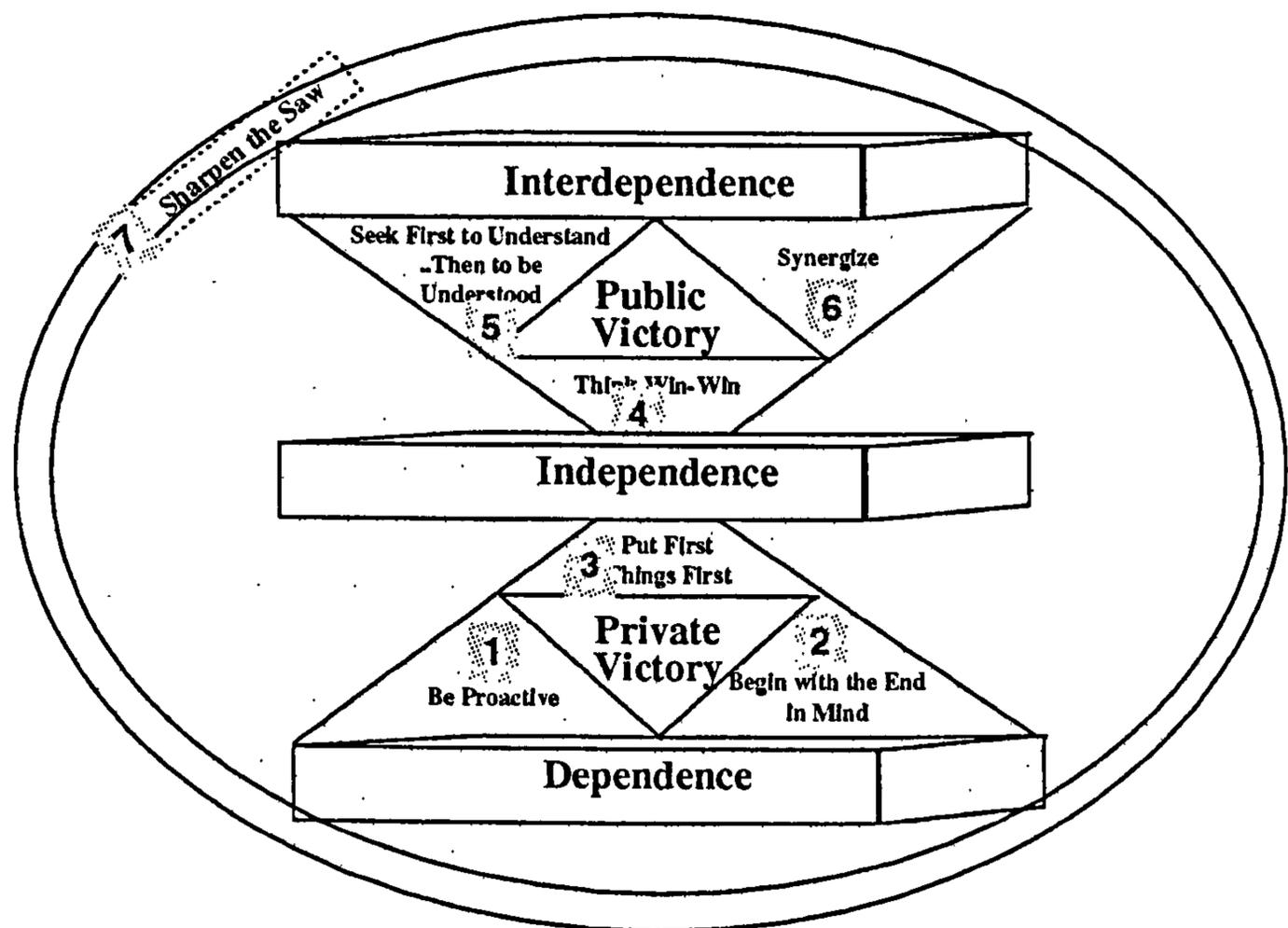


Figure 2.7. Stephen Covey's Maturity Continuum^[39]

Nordstrom's inverted pyramid^[40] (Figure 2.8) puts customers and employees first. The inverted organizational pyramid (Figure 2.9) created by Thomson (1990)^[41] also puts customers at the top and individual employees next to it. The ideas of both Nordstrom and Thomson are very similar.

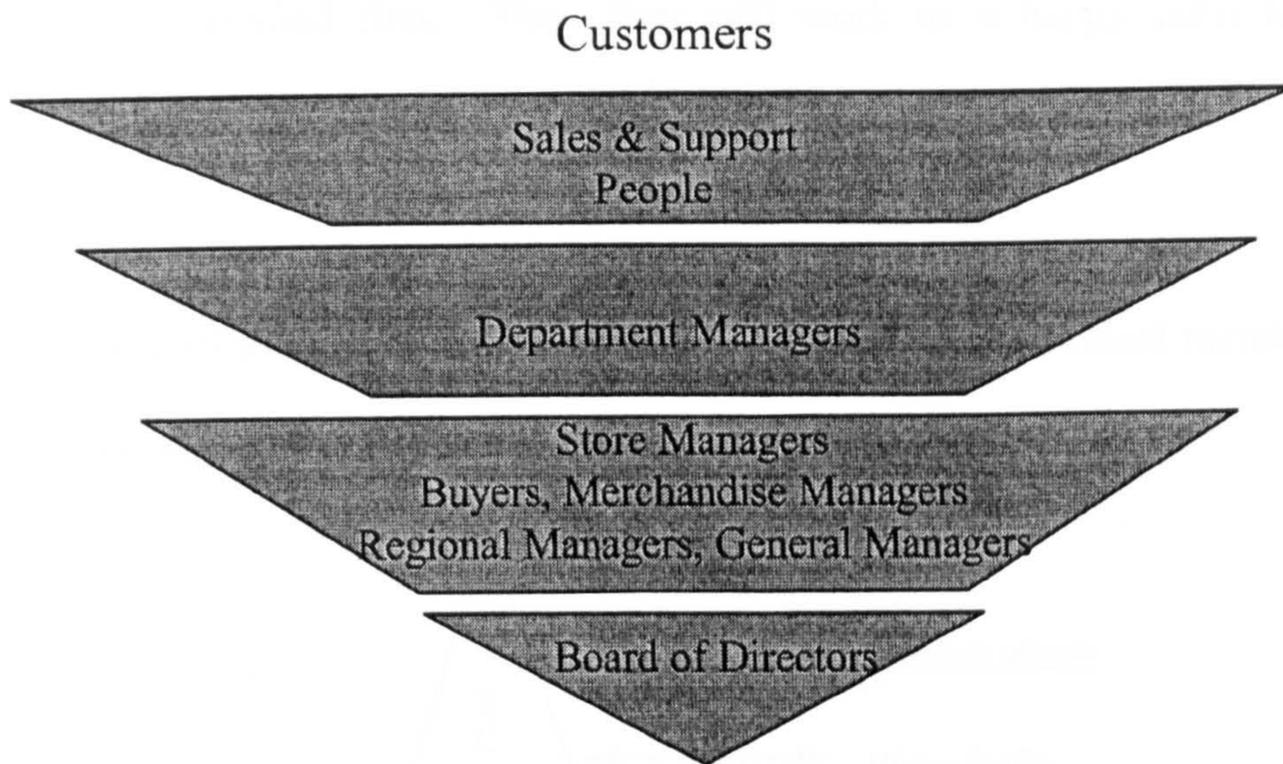


Figure 2.8. The Inverted Pyramid of Nordstrom^[40]

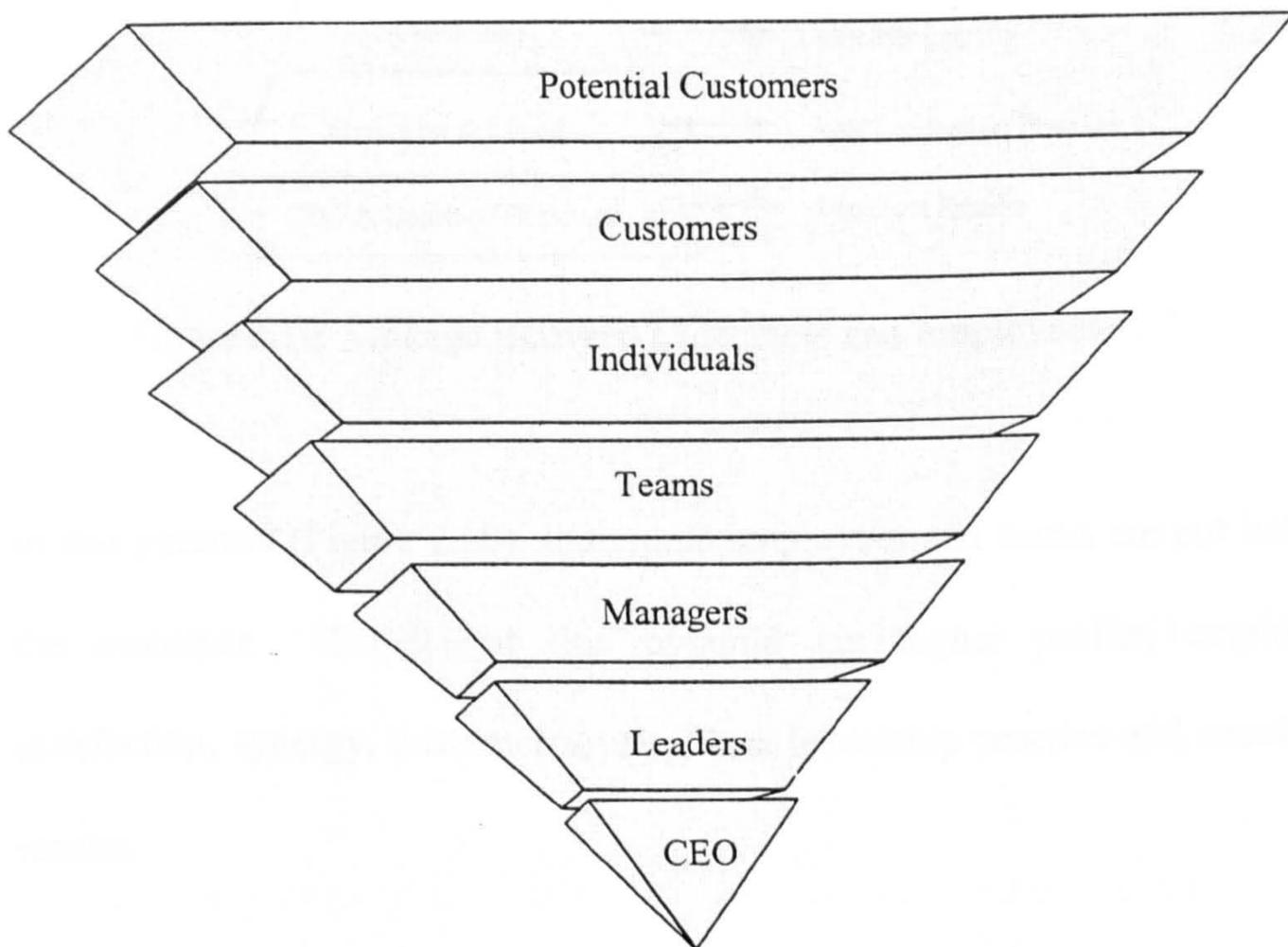


Figure 2.9. Thomson's Inverted Organizational Pyramid^[41]

However, the author has a different opinion on the inverted pyramids. He believes that employees have to come first. Employees are the persons who

must be satisfied first. Then they will work as a happy team to serve customers.

Figure 2.10 illustrates the author's idea and how organizational members can link to customers.

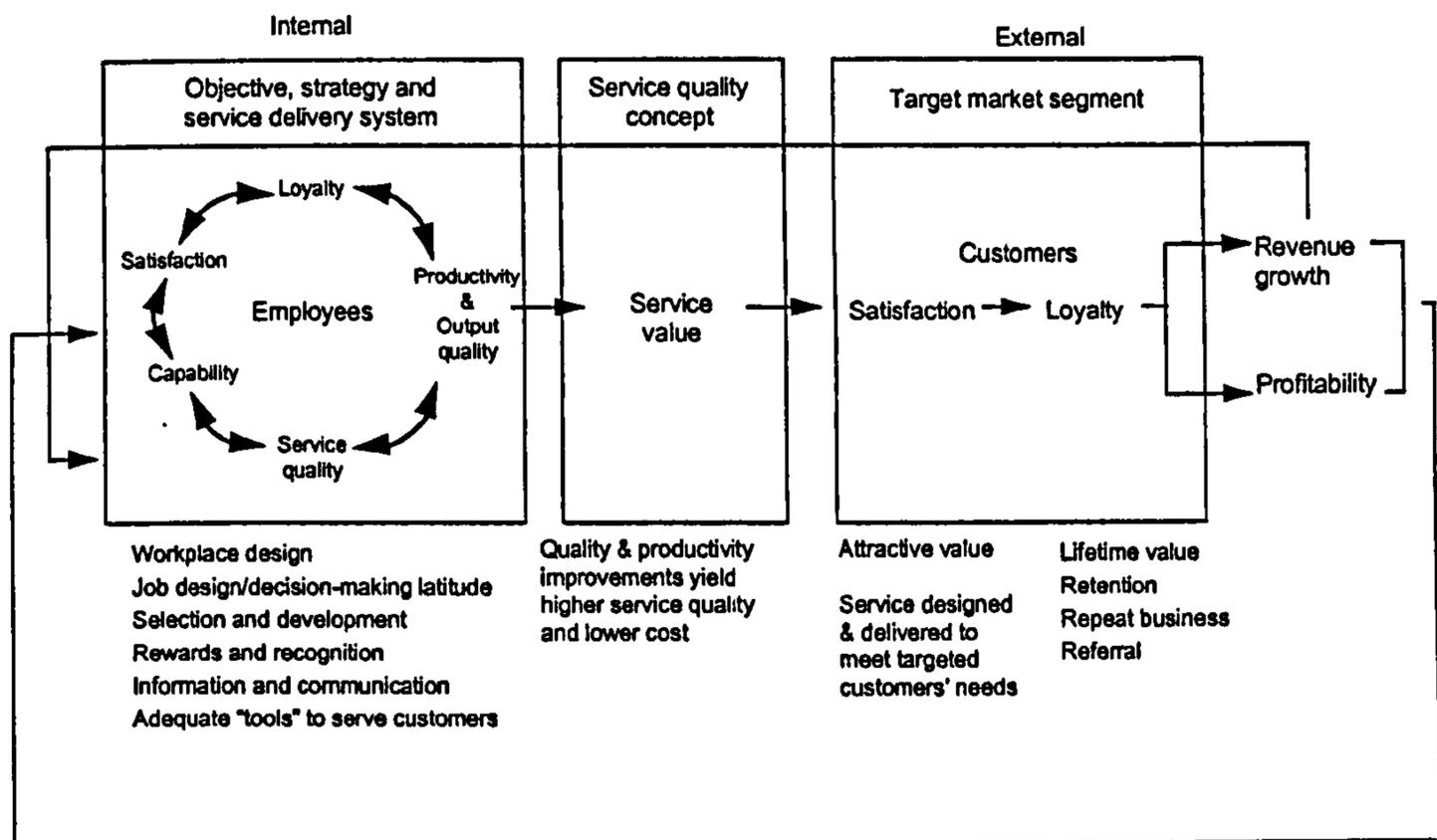


Figure 2.10. Linkage Between Customers and Employees

In this pyramid (Figure 2.10), individual employees and teams are put before the customer. Targets of this pyramid are higher profits, employee satisfaction, synergy, customer loyalty, best leadership practice and excellent results.

Haskett's (1990)^[42] service profit chain (Figure 2.11) illustrates the linkage between employee satisfaction & loyalty, customer satisfaction & loyalty and revenue growth & profitability for an organization.

(1) TCS = Total Customer Satisfaction

Figure 2.11. Haskett's Service Profit Chain^[42]

2.1.9 Ideas from the Literature Review

The author has gone through hundreds of management books and articles in the areas of quality, service quality and customer service. The review attempts to find out the current practices in service and manufacturing industries.

The findings and the knowledge built helped the author assess the applicability of existing service quality theories and/or best practice in various industries.

The literature review also enabled the author to further develop new models and new practices that suits his organization and employees. For example, the TSQM model is a combination of service concepts and models derived from Albrecht and Normann explained in subsection 2.1.7.

Traditionally, manufacturing industries focus more on productivity, cycle time and cost than on employees' satisfaction and service quality excellence. The semiconductor industry, without exception, focuses on total costs and technology. The concern for people power and service quality culture is almost neglected. The literature review offers an opportunity to the author to explore, to testify and to implement the related concepts in a high technology organization. This is the environment where service quality has never been perceived as a strategic issue. People power has never been fully explored.

2.1.10 Summary of the Literature Review

The following are key points from the literature review:

- The author has identified the related concepts to support his beliefs -- employees are put first before customers. The creation of the CRC provides opportunities for the author to strengthen these beliefs and to apply his TSQM model.
- The leadership and execution to improve total service quality in Motorola Semiconductors Asia Pacific operation were inadequate. This inadequacy gives the author an opportunity to address the critical issues relating to service quality through the new CRC structure.
- Service Quality is different from product quality. Service quality is basically intangible and therefore difficult to evaluate. It is, on the one hand, a study of experience, expectation and perception of customers who receive the services. On the other hand, it is a study of employees'

behaviors and attitudes of the service providers. Overall, it is a study of the process of service delivery and how well that the service delivery is performed from the customers' viewpoint. The author believes that service quality excellence is a powerful competitive advantage in every manufacturing organization. Motorola is not an exception. The author committed himself to promote this important concept to his management team.

- The SERVQUAL or the Gap Theory is more applicable to consumer products than industrial products. The SERVQUAL has identified the factors that influence customers' expectations and revealed five service quality dimensions that customers use to assess service quality. The author uses different service quality dimensions to assess customer satisfaction in an industrial environment. A different perception between consumer buyers and industrial buyers is highlighted by the author.
- Service quality culture and employee satisfaction are important. However, not many authors address the importance of employee satisfaction to an organization and how a people oriented service quality culture can be built. The CRC is a concept realization in these areas.
- The 7 Habits training is a great process to achieve personal effectiveness, and then employee satisfaction. This is a powerful tool to lay the foundation for a service quality culture development. The author has started this process.

2.2 Direction of Research

Times have changed. We no longer live in a manufacturing environment. Total service quality is critical to all service providers. Customers' expectations rise every year, every month or even every day. Whoever knows how to manage customer expectations well and develop good customer loyalty will win. Customers today demand a total-service-quality package.

In responding to the rapid changing customer expectations, Motorola Asia Pacific Semiconductor Products Group, Hong Kong committed to search for a better and more efficient way to operate its business. The author's decision was fully supported at that time to build a unique structure called: The Customer Responsiveness Center (CRC). The challenge of the CRC is to re-engineer current business processes and to become a creative, creditable and responsive cross-functional team to serve the fast growing demands of future customers in the 21st century.

The author believes that we must master the skill to win by developing loyal employees, and then loyal customers. If we don't, our competitors will. The CRC setup earmarks the starting of this long, never-ending service quality journey towards Motorola's fundamental objective of Total Customer Satisfaction.

The research study describes the creation of the CRC as a foundation to affect

changes in the organization. For example, the author eliminated the entire customer service department in Hong Kong (Asia Pacific headquarters); he developed the Eight Domains of Quality and Speed Team (QuST) process; he also identified a do-different approach to enable semiconductor products to be shipped from China to Taiwan in 1997.

The author believes that service direction and people power are major limiting factors to achieve the long-term objective of total customer satisfaction.

The research covers:

- a) The setup of a new CRC - The author notes that people can achieve much more under a well-organized environment.
- b) QuST culture development & implementation - People need a better environment to give contribution and obtain rewards.
- c) Introduction of new education and training programs for employees - People demand education and training to upgrade their abilities to perform better.
- d) Apply the new total service quality management (TSQM) model.
- e) Development of a logistics and distribution network - Total cycle time reduction means faster services.
- f) Service direction setup - Service vision, strategy and actions are critical to achieve total customer satisfaction.

- g) Setup of new service policies - Policies and rules provide guidelines for people to execute.

In summary, the direction of research and project implementation are to achieve better employee satisfaction as well as long-term total customer satisfaction. The direction of research, methods and approaches are illustrated in Figure 2.12:

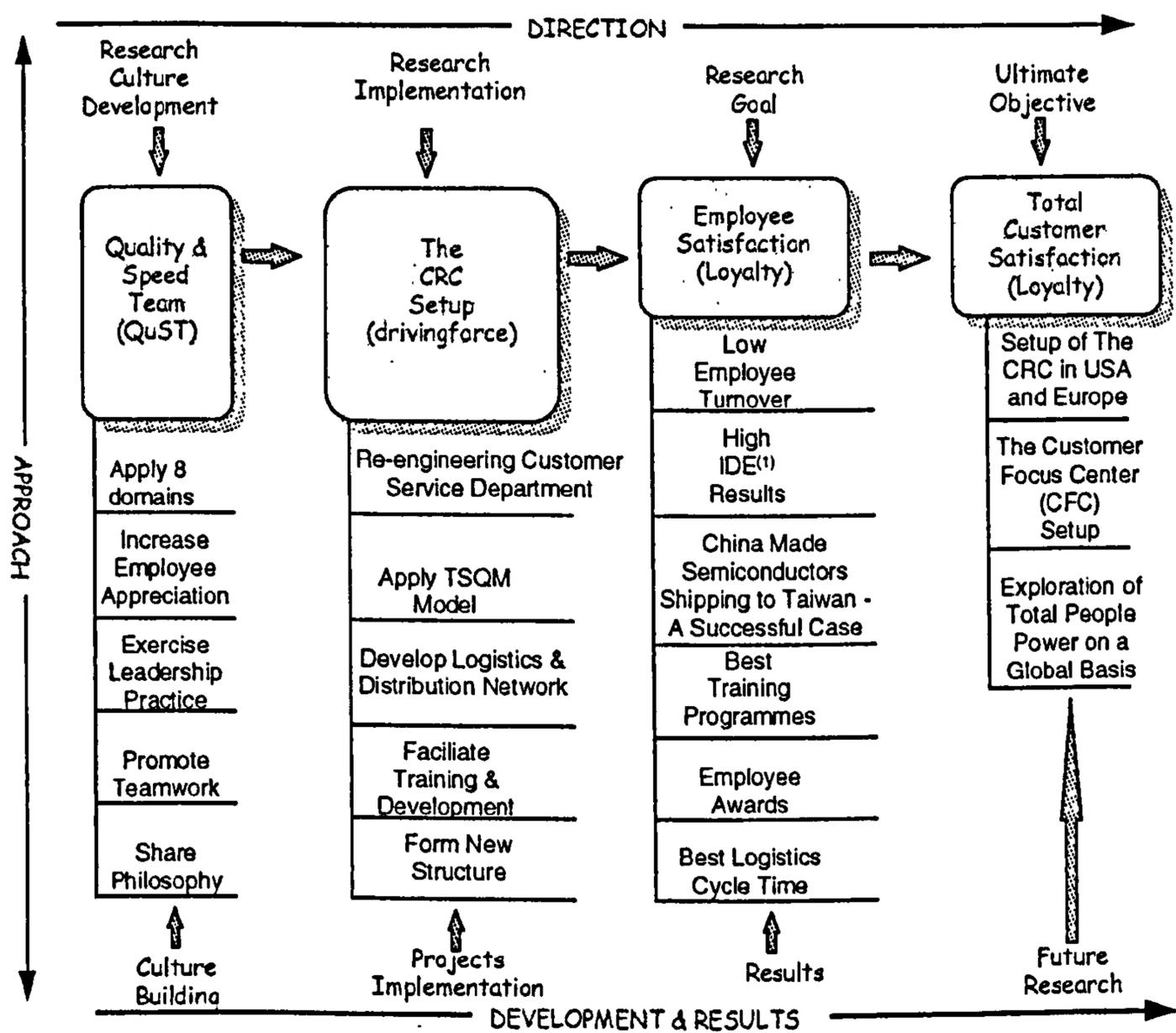


Figure 2.12. Research Direction, Approach, Development & Results

⁽¹⁾ IDE = Individual Dignity Entitlement

Direction of Research

The author also considered the following research methods:

- Expand the Quality & Speed Team (QuST) process to cover the service quality area. This idea was dropped because the service quality concept was not strong enough under QuST. The QuST process drives internal changes whereas service quality targets to achieve customer loyalty.
- Expand the total quality management (TQM) technique. Motorola implemented the quality system review (QSR) method for 17 years. The QSR is a TQM approach that also focuses on customer satisfaction assessment. However, it is not adequate to drive people development and to build customer long term loyalty, and
- Set up a service quality council to achieve customer loyalty. Since there were too many councils in the organization that did not demonstrate good results, this idea was rejected.

Finally, the author took the CRC approach to promote employee satisfaction as well as customer satisfaction.

2.3 Creation of the Customer Responsiveness Center (or CRC)

2.3.1 Historical Events

The following historical events led to the idea of having the CRC in Asia Pacific:

- The research study of the Motorola internal service strategy task force in 1987 indicated that “Responsiveness” was the key differentiator among competitors. The management study team encouraged everyone to accept the premise that “If you’re not serving the customer, your job is to serve somebody who is.”
- The message from ex-Chief Executive Officer, George Fisher in 1988 was:
$$\text{Total Customer Satisfaction} = \text{Total Employee Satisfaction}$$
- The 1992 service survey highlighted the importance of speed for customers. Over 50% of the customers interviewed considered “speed” as the most crucial factor in service.
- The customer survey in 1993 reported that “Responsiveness” was mentioned by most customers as the main reason for satisfaction and dissatisfaction with Motorola.
- Literature search defined service quality and its importance to customers. For example, Forum’s Research^[43] found that almost 70% of the identifiable reasons why customers left typical companies had nothing to do with the product. The recurring justification for switching was poor quality of service.

- A series of brainstorming sessions on service improvements was conducted and employees accepted that “Everyone working under one roof” has a duty to improve total service quality.

2.3.2 The CRC Title

There were many internal discussions about the right title of the service center. The author spent about six weeks to consult all employees. Finally, the title of Customer Responsiveness Center or the CRC was adopted. The process of creating the CRC title is covered in subsection 1.3.2. of Portfolio 1.

The Chinese version of the CRC “顧客端意中心” was born through employee participation and recommendation in the middle of 1994.

2.3.3 Challenges to the CRC

The setup of the Customer Responsiveness Center or the CRC was adopted in order to support the following beliefs and customer survey findings:

- Customers need “one face” communication with Motorola.
- A cross-functional team approach will improve the total service quality more effectively and efficiently.
- The management team believes that the concept of “Everyone working under one roof” is crucial. Process management is more preferable to task management.
- Employee satisfaction is important to achieve customer satisfaction.

- Customer satisfaction surveys indicate that “Responsiveness” is critical and of prime concern as a service attribute.
- Responses to customers’ requests are slow and indecisive.
- Communication and responsiveness among strategic business units, customer service, marketing & sales and customers are not good enough.
- Visibility on business related information is not adequate for employees to serve external customers better.
- A change for a stronger service quality culture is a must.
- Tools to serve customers are poor.

Overall, the author decided that Motorola Asia Pacific Semiconductor Products Group must become a more responsive organization. “RESPONSIVENESS” can and will represent the goal to serve customers better and the commitment to make a change.

2.3.4 The CRC Structure and Actions

Development of the CRC was structured in three phases. Figures 2.13 to 2.14 illustrate graphically the different development phases in Asia Pacific.

Phase I - Startup the first CRC in Hong Kong Headquarters (Figure 2.13)

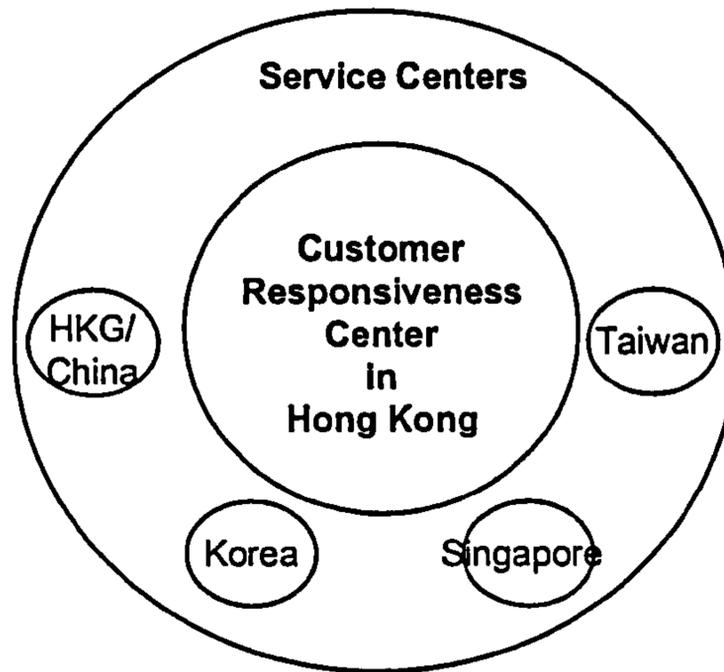


Figure 2.13. Phase I of the CRC in 1994

Phase II - Startup the 2nd CRC in Singapore for South East Asia Region (Figure 2.14).

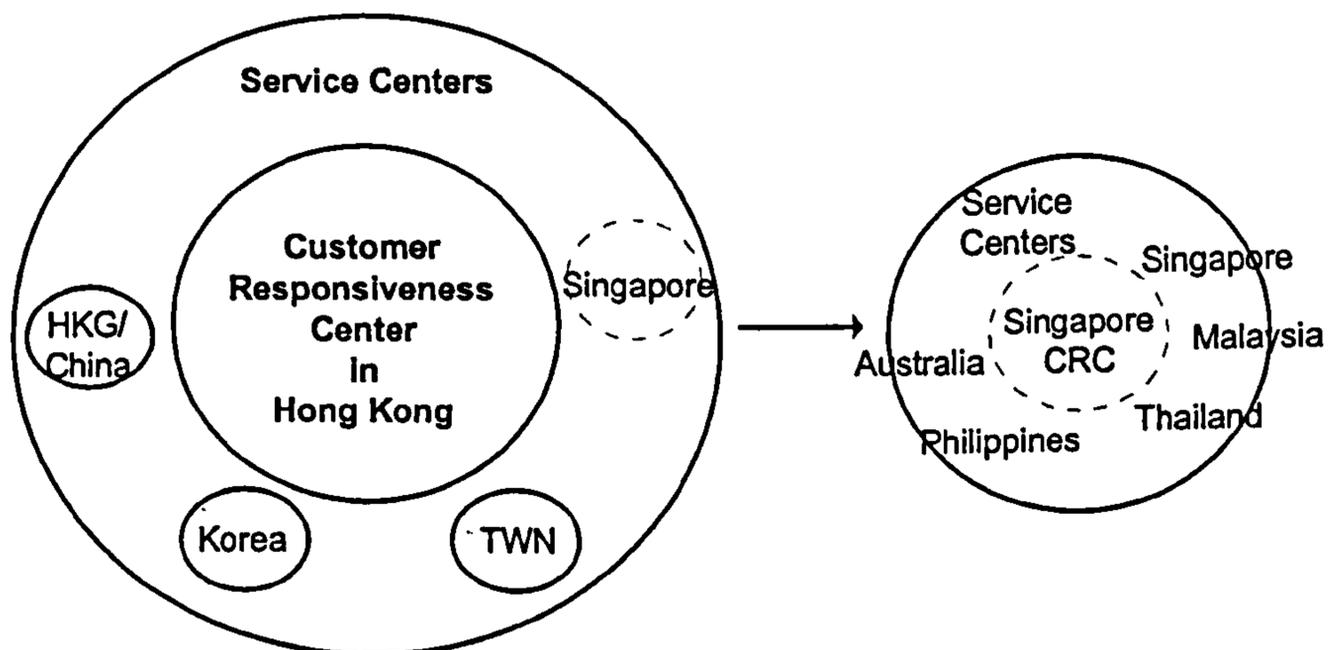


Figure 2.14. Phase 2 of the CRC in 1995

Phase III - The CRC Functions established in Sales Offices in 1997 and beyond (Figure 2.15).

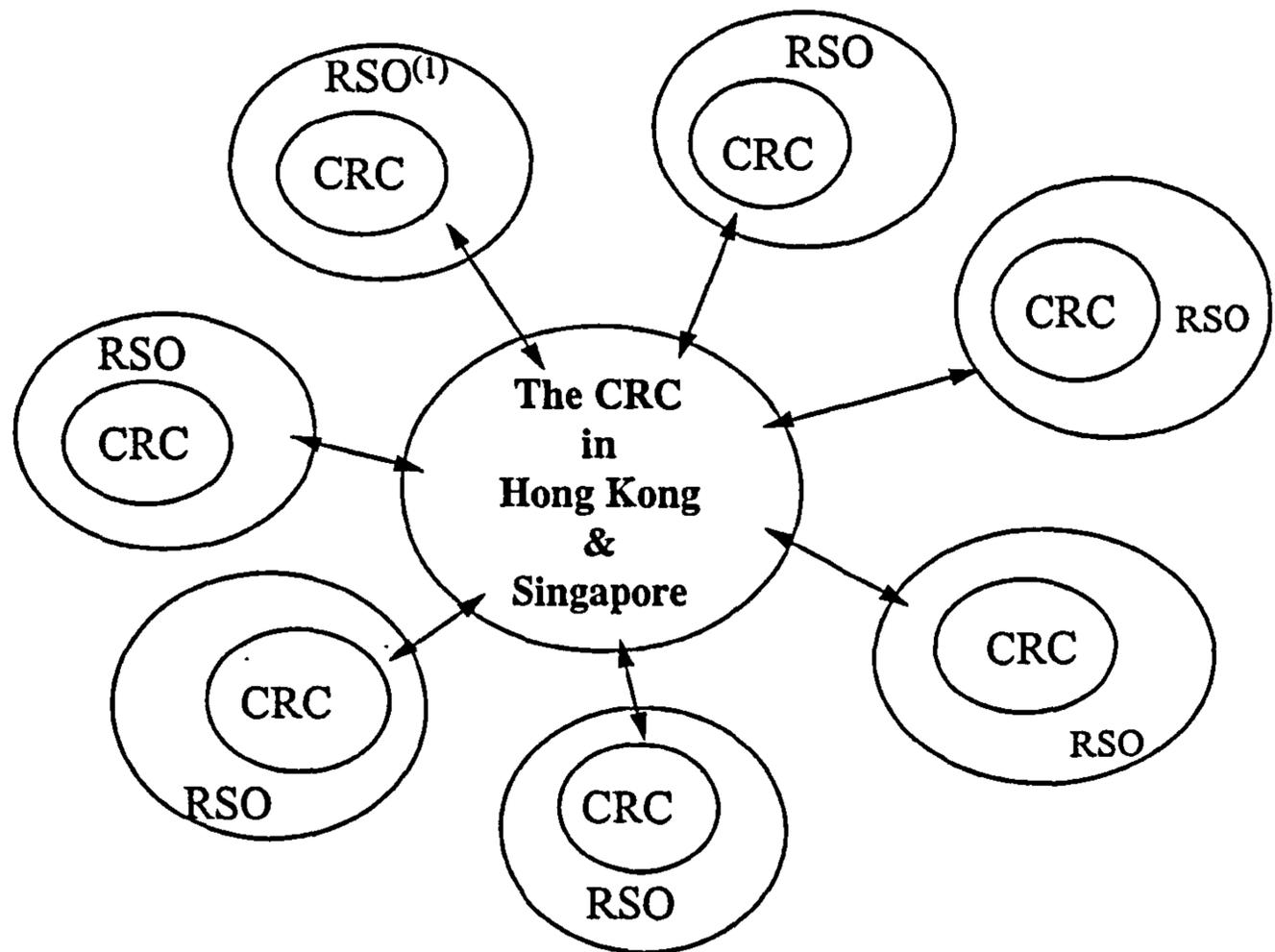


Figure 2.15. Phase 3 of the CRC in 1997 and beyond

Master Action Plans to support Phase I Implementation in early 1994 were agreed and prioritized as follows:

- A) Decide a Name.
- B) Recommend the general physical layout/environment.
- C) Define information needs of Profit Building⁽²⁾.
- D) Determine what information system support will be needed to make jobs of various people/groups more effective/efficient within the CRC.
- E) Define video conferencing needs.

(1) RSO = Regional Sales Office

(2) Profit Building = A different Motorola site in Hong Kong

- F) Define an overall implementation schedule.
- G) Write the vision and mission of the CRC.
- H) Define the roles of people/organizations within the CRC.
- I) Define the rules under which the CRC will operate.
- J) Define what policies already exist that are NOT the day to day business of the CRC. Make sure this is well communicated.
- K) Determine what training/orientation/team building will be needed as the CRC starts up, and how to communicate it to the people involved.
- L) Define the next step: How do we do functional mapping of the Product Marketing/Production Control/Customers Service/Field Sales Assistant to become more efficient in these areas.
- M) Another next step: Better define the role of the Singapore Service Center as it relates to the CRC.

2.3.5 The CRC Service Direction

To support the vision, mission and objectives (Figure 2.16) of the Asia Pacific Semiconductor Products Group (APSPG), the Customer Responsiveness Center (CRC) developed its own set of new vision, mission and key objectives to drive the total service quality re-engineering efforts in early 1996.

In order to ensure adequate buy-in from the management team, three brainstorming sessions were conducted with the entire first line management

team in Q1 1996. The new direction took another three months to disseminate to employees and to get them to understand this communication.

The vision, mission and key objectives of the CRC were:

VISION: The CRC will enable APSPG to become the customer's first choice business partner.

MISSION: Develop customer loyalty by proactively assuring best-in-class services, planning & logistics.

KEY OBJECTIVES

1. Delivery -- drive step improvements in OTD⁽¹⁾ to CRD⁽²⁾.
2. Responsiveness -- respond proactively with speed and quality in addressing customers' changing demands.
3. Customer Satisfaction -- upgrade quality service through customer driven metrics based on customer satisfaction surveys.

The CRC vision, mission and objectives communicate a clear service direction to all employees. It directs the attention of employees in the CRC towards the needs and wants of future customers.

Creation of the Customer Responsiveness Center

⁽¹⁾ OTD = On Time Delivery

⁽²⁾ CRD = Customer Requested Date

Vision:	We power the world, making the impossible possible.
Mission:	<p>Asia Pacific group shall be perceived by customers (external and internal) and employees as the world's most responsive and trustworthy semiconductor company</p> <ul style="list-style-type: none"> • By consistently providing the highest quality products and services faster than any of our competitors; • By committing to all employees the best training in the industry; • By creating an environment for growth opportunities and the most satisfying job experience; and • By achieving a good financial return to the sector, corporation and shareholders.
Objectives:	<ol style="list-style-type: none"> 1. To reach and maintain the best-in-class level in people, marketing, technology, manufacturing, environmental, product and services; 2. To increase the market share; and 3. To maintain superior financial results.

Figure 2.16. Vision, Mission and Objective of APSPG

2.3.6 Roadmap of the CRC Leading Changes - Revolution and Evolution

Rummler & Brache (1990)^[44] define a business process as *“a series of steps designed to produce a product or service. Some processes (such as a programming process) may be contained wholly within a function. However, most processes (such as order processing) are cross-functional, spanning the white space between the boxes on the organization chart.”* The challenge to the CRC is to lead the cross-functional business process activities to win.

Michael Hammer's (1993)^[45] business process re-engineering is "*the fundamental rethinking and radical redesign of business process to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed.*"

The major re-engineering move in the CRC is to eliminate non-value added processes. The close down of the customer service department in the Asia Pacific headquarters, according to Hammer's definition, is a good example.

Key business changes are shown in Table 2.4. Many activities are process evolution and others are revolutionary in nature. The table also illustrates the complexities of the changes in the CRC.

Table 2.4. 1/4 ROADMAP OF THE CRC LEADING CHANGES - REVOLUTION AND EVOLUTION

Year	1993	1994	1995	1996	1997	2000 & beyond
Challenges						
Vision	<ul style="list-style-type: none"> Achieve the best-in-class services, business visibility and decision making process 	<ul style="list-style-type: none"> Achieve the best-in-class services, business visibility and decision making process 	<ul style="list-style-type: none"> Achieve the best-in-class services, business visibility and decision making process 	<ul style="list-style-type: none"> Become the customer's first choice business partner 	<ul style="list-style-type: none"> Become the customer's first choice business partner 	<ul style="list-style-type: none"> Power the world, making impossible possible by empowered teams
Mission	<ul style="list-style-type: none"> Transform the organization's mindset towards service quality orientation and achieve customer loyalty Be a focal point for business information Communicate effectively across the SBU's & regions Improve the visibility of business information i.e. Booking/Billing 	<ul style="list-style-type: none"> Sharing the 1993 mission 	<ul style="list-style-type: none"> Sharing the 1993 mission 	<ul style="list-style-type: none"> Develop customer loyalty by proactively assuring the best-in-class services, planning & logistics 	<ul style="list-style-type: none"> Sharing the 1996 new mission 	<ul style="list-style-type: none"> Achieve customer advocate, market share gain and high RONA Walk-the-talk to all customers
Strategies	<ul style="list-style-type: none"> Set up the CRC in SHC to manage changes Manage flexibilities in the start-up phase Manage potential confusions 	<ul style="list-style-type: none"> Develop a strong service quality culture Build CRC Service Teams by customer group Tier customer bases by partnership, Tier 1, Japan and others. 	<ul style="list-style-type: none"> Start Mission 730 in the CRC Eliminate the customer service function Change the reporting structure for field sales assistants. 	<ul style="list-style-type: none"> Drive the service differentiation strategy Develop the first service policy for APSPG 	<ul style="list-style-type: none"> Determine the APSPG customer list to support over 80% business Fan out the CRC to other regions Manage changes in line with the sector new direction 	<ul style="list-style-type: none"> Build the structure to support over US\$6.5 billion business level in 2001 Maintain the best in class in total service quality and total supply chain management Maximize assets utilization to achieve over 20% RONA
Team Formation	<ul style="list-style-type: none"> Test everyone working under one roof Put right people together 	<ul style="list-style-type: none"> Put CS., SBU, central marketing, I.S., logistics together Attract best people to lead the CRC teams Develop 5 cultural teams 	<ul style="list-style-type: none"> Start 4 Service Teams and 5 Cultural Teams Support QuST teams sharing 	<ul style="list-style-type: none"> Streamline Cultural Teams to become 4 Teams Start up the Japan Service Team 	<ul style="list-style-type: none"> Redefine the team reporting structure Build the CRC teams in Regional Sales Offices 	<ul style="list-style-type: none"> Develop small Cultural Teams everywhere Put multi-skill, service quality teams with every single target customer

Note - See key to abbreviations at end of table.

Table 2.4. 2/4 ROADMAP OF THE CRC LEADING CHANGES - REVOLUTION AND EVOLUTION

Year	1993	1994	1995	1996	1997	2000 & beyond
Challenges						
Communication	<ul style="list-style-type: none"> Group meetings chaired by senior management staff Share the CRC vision Start daily briefing sessions 	<ul style="list-style-type: none"> Communicate through in-house magazines (i.e. Motorola East) Support the Dragon boat team work promotion 	<ul style="list-style-type: none"> Share experiences about service quality in DBS Share the need to change, the need to involve cross function teams 	<ul style="list-style-type: none"> Communicate the new vision and mission Promote the S&OP process 	<ul style="list-style-type: none"> Encourage everyone to build a high trust organization in the world together Promote the worldwide Meridian program (planning tools) implementation Communicate worldwide changes - major challenge to become market/customer focus Instead of technology focus Communicate new sector quality policy 	<ul style="list-style-type: none"> Communicate on customer focus, employee care and synergy Focus on sharing employee satisfaction
Changes	<ul style="list-style-type: none"> Initiate discovery process on service improvements Appoint the CRC Director 	<ul style="list-style-type: none"> Start CRC Re-engineering efforts in SHC Adopt the Chinese name for the CRC 	<ul style="list-style-type: none"> Start the CRC in Singapore Re-engineer the CS & FSA and streamline the operations 	<ul style="list-style-type: none"> Implement the worldwide CSS/OP system Start the demand management process Announce the first service policy 	<ul style="list-style-type: none"> Develop the CRC teams in Korea, Tianjin, Hong Kong and China Restructure to add a global headquarter of the Consumer System Group in Asia Pacific. A new market/customer focused organization is born, the first time in Motorola Semiconductors business history Replace leaders in worldwide semiconductors sector 	<ul style="list-style-type: none"> Build dedicated/multi-skills teams to partner with customers Enable one face policy to customers Understand that changes are needed continuously for any organization
Training & Development	<ul style="list-style-type: none"> Focus on the Speed & Quality Training Expand the advanced leadership training & education - Micro model (Hersey & Blanchard's Situational Leadership) & Macro model (Kouzes & Posner's Leadership Practices) 	<ul style="list-style-type: none"> Pioneer Service Teambuilding Training by Ron Kaufman, and start the service quality drive 	<ul style="list-style-type: none"> Start Steven Covey's 7 Habits training Start the Service Skill Training for 320 employees Conduct the BPR training for 84 CRC employees 	<ul style="list-style-type: none"> Make the 7 Habits Training available for all indirect employees Develop the Service Team Building Training in local language 	<ul style="list-style-type: none"> Enable the 7 Habits Training as the Core program for APSPG Conduct the Productivity Class for managers - share the sense of urgency to change Start training on work diversity 	<ul style="list-style-type: none"> Develop the advanced leadership, 7 Habits, service team building and performance management as core training programs for all indirect employees develop/support individual mission and values.

Note - See key to abbreviations at end of table.

Table 2.4. 3/4 ROADMAP OF THE CRC LEADING CHANGES - REVOLUTION AND EVOLUTION

Year	1993	1994	1995	1996	1997	2000 & beyond
Challenges Process Reengineering 8	<ul style="list-style-type: none"> Perform work when considered important, a review of business process 	<ul style="list-style-type: none"> Start the customer demand forecast (CDF) process Restructure the Customer Service Team Complete the Process Mapping for cross functional teams 	<ul style="list-style-type: none"> Eliminate the customer service function in APSPG 	<ul style="list-style-type: none"> Focus the total order fulfillment process Start the S&OP process alignment 	<ul style="list-style-type: none"> Implement the Meridian Program, a major process change Implement the worldwide S&OP Process 	<ul style="list-style-type: none"> Implement the new sector service policy in full Target process improvement review every 6 months
Service Quality ownership 9	<ul style="list-style-type: none"> Customer Service & Field Sales Assistant 	<ul style="list-style-type: none"> Customer Service & Field Sales Assistant 	<ul style="list-style-type: none"> C.S., FSA & CP CRC Leaders 	<ul style="list-style-type: none"> FSA, logistics, CP & PC 	<ul style="list-style-type: none"> ASA, CP, PC, logistics 	<ul style="list-style-type: none"> Every employee
Challenges 10	<ul style="list-style-type: none"> Understand the cross functional team work Understand the total supply chain management 	<ul style="list-style-type: none"> Manage across, not up and down - horizontal organization Develop the service quality mindset change Counteract resistance to change 	<ul style="list-style-type: none"> Restructure FSA teams Build the CRC team in Singapore Identify best employees for CRC teams Redeploy 25 C.S. employees 	<ul style="list-style-type: none"> Miss market share and sales budget goals Lead MRPII Process work for worldwide Uncover the disconnection between APSPG and worldwide operations, mainly with U.S.A. 	<ul style="list-style-type: none"> Make the Meridian program work Streamline processes after worldwide re-organization Strengthen the CRC teams in all Sales Regions 	<ul style="list-style-type: none"> Merge the service quality process with logistics services to become the best-in-class responsive organization
Sector Actions 11	<ul style="list-style-type: none"> Respond to 1987 Service Survey Drive Sector imperatives i.e. 2X2000 	<ul style="list-style-type: none"> Respond to the 93 Customer Survey (Total Research) 	<ul style="list-style-type: none"> Communicate the Sector's drive on "Focused on total success" Appoint Gary Johnson as Director of S.P. &L 	<ul style="list-style-type: none"> Start the Sector wide service quality drive Appreciate the APSPG's CDF and service differentiation strategy Apply the APSPG service differentiation strategy worldwide 	<ul style="list-style-type: none"> Start the Sector Meridian Program Drive global logistics, i.e. set up SNP GDC Lead the worldwide restructure and Business Process Re-engineering 	<ul style="list-style-type: none"> Achieve customer delight, market share gain and high RONA Develop future leaders for continued success Encourage think local, act global
Reward & recognition 12	<ul style="list-style-type: none"> Expand the small-win program 	<ul style="list-style-type: none"> Start the best CRC employee award 	<ul style="list-style-type: none"> Grant Motorola share options to best employees 	<ul style="list-style-type: none"> Develop service quality award in the TCS process Recognize Logistics & I.S. teams as 1996 TCS winner 	<ul style="list-style-type: none"> Expand the strategic bonus award for employees Additional option shares for good performers 	<ul style="list-style-type: none"> Envision Win Win, Job Satisfaction and more pay for better performers Expand celebration by employees

Note - See key to abbreviations at end of table.

2.4 Development of Total Service Quality Management (TSQM) Model

The traditional concept of quality management began and ended with the product itself. The Total Quality Management (TQM) concept started later to cover the aspect of delivering ... not only a quality product but also a quality service.

The challenge of successfully implementing TQM is, on the one hand, to deliver consistently beyond Six-Sigma quality products and, on the other hand, to ensure that service quality is built into the system and can be sustained throughout the organization. The traditional wisdom of TQM is, however, more associated with product quality and there is less understanding of service quality.

The TSQM model (Figure 2.5 in P. 28) was created by the author in subsection 2.1.7 to communicate the needs to achieve service quality excellence. Key related activities are listed in the Table 2.5.

Key Elements in TSQM	Activities in the CRC
• Leadership	• Vision sharing, leadership workshop, people development, leadership practice and culture development.
• Execution	• Strategies planning, project management, re-engineering process, new rules & policies and measurement/benchmarking.
• Communication	• Daily Briefing Session (DBS), monthly Employee Dialogue, half-yearly Mass Communication, weekly Shark Fin Soup Communication, and monthly Operation Review Sharing, Motorola East House Magazine.
• Share	• Peer sharing, achievements sharing, team sharing and the CRC philosophy sharing.
• Appreciate	• Small win process, operation review appreciation moment, excellent employee award and strategic bonus.
• Automate	• Customer order processing system, RF ⁽¹⁾ locator system, electronic commerce (EC) drive and customer information system.

Table 2.5. Elements of the TSQM Model

(1) RF = Radio Frequency

Development of Total Service Quality Management (TSQM) Model

By using the TQM concept as a base, the author develops the inside-out chart (Figure 2.17). This chart exhibits the evolution from the basic quality control to customer advocacy and the position of TSQM. Customer advocacy is the highest level of total service quality management in any organization.

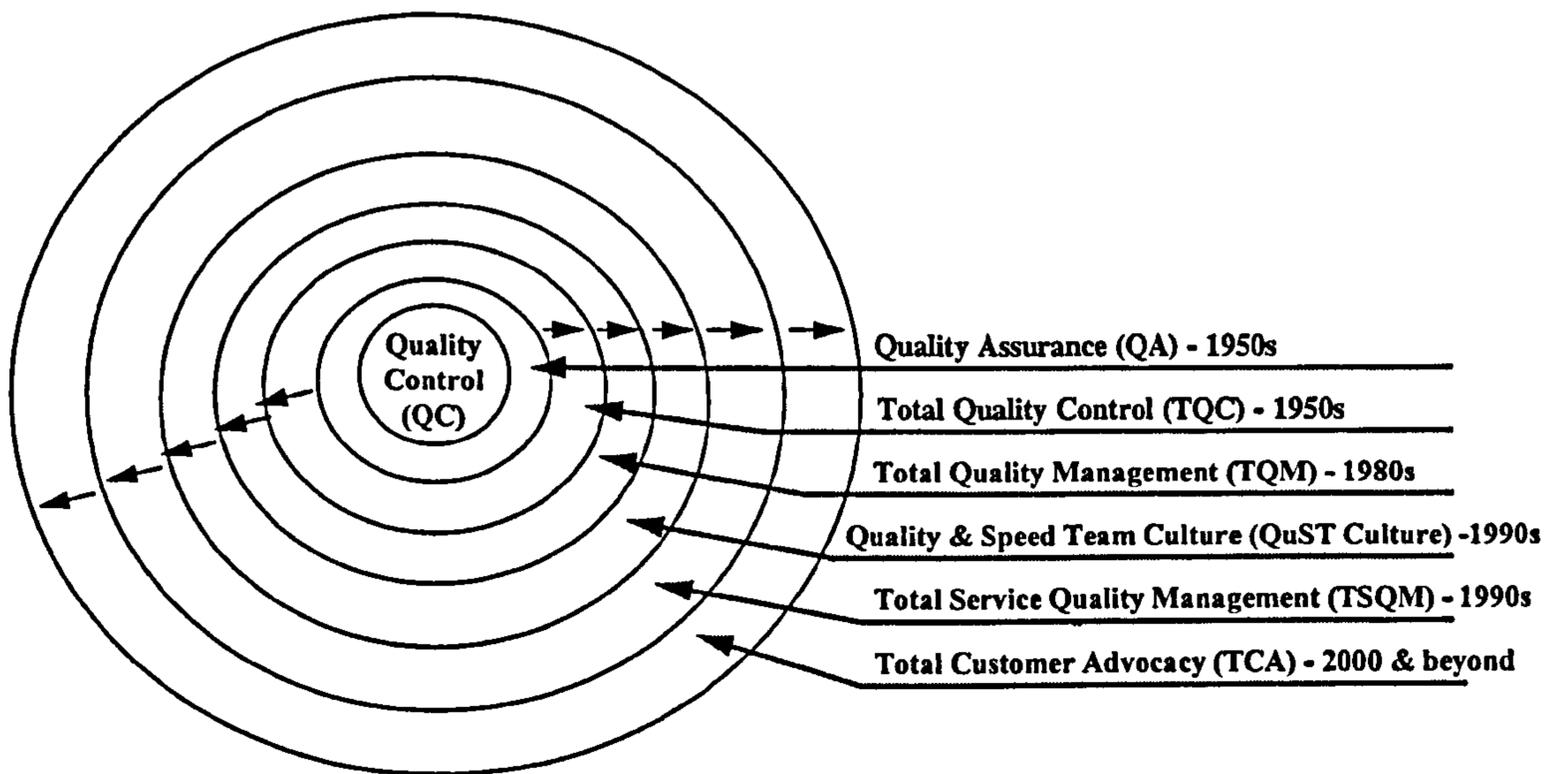


Figure 2.17. Total Customer Advocacy Evolution Chart

2.5 New Logistics Model in Asia Pacific

This is a time-compressed world. Time compression in product development is to introduce a new product earlier than your competitors. In a logistics service operation, it means to deliver a product to the customer in the shortest cycle time. If a product has the shortest development time, it is seldom the first to become obsolete. If a product is delivered in a just-in-time (JIT) mode, the total material costs will be significantly lower to both customers and suppliers.

The just-in-time (JIT) movement in manufacturing is a time-based strategy. Reinertsen et al. (1991)'s^[46] goal of JIT manufacturing is not inventory reduction but being responsive to what the customer wants when such inventory is wanted. It is effective because it allows the organization to be more responsive to the market place.

To improve responsiveness and shorten the total service cycle time, the reshaping of the logistics support in Motorola Asia Pacific was necessary.

Three out of five service quality dimensions adopted by the CRC are logistics related issues. For example, customers require fast response time in product availability, quick turn around time for product support and real time delivery of finished goods services. To meet all these requirements, Motorola Asia

Pacific decided to make drastic changes in logistics support and distribution channels. The challenge to the author was to turn all these into reality.

Figure 2.18 illustrates the logistics and distribution model before 1988. In this model, Hong Kong is the centre of Asia Pacific semiconductor products distribution network.

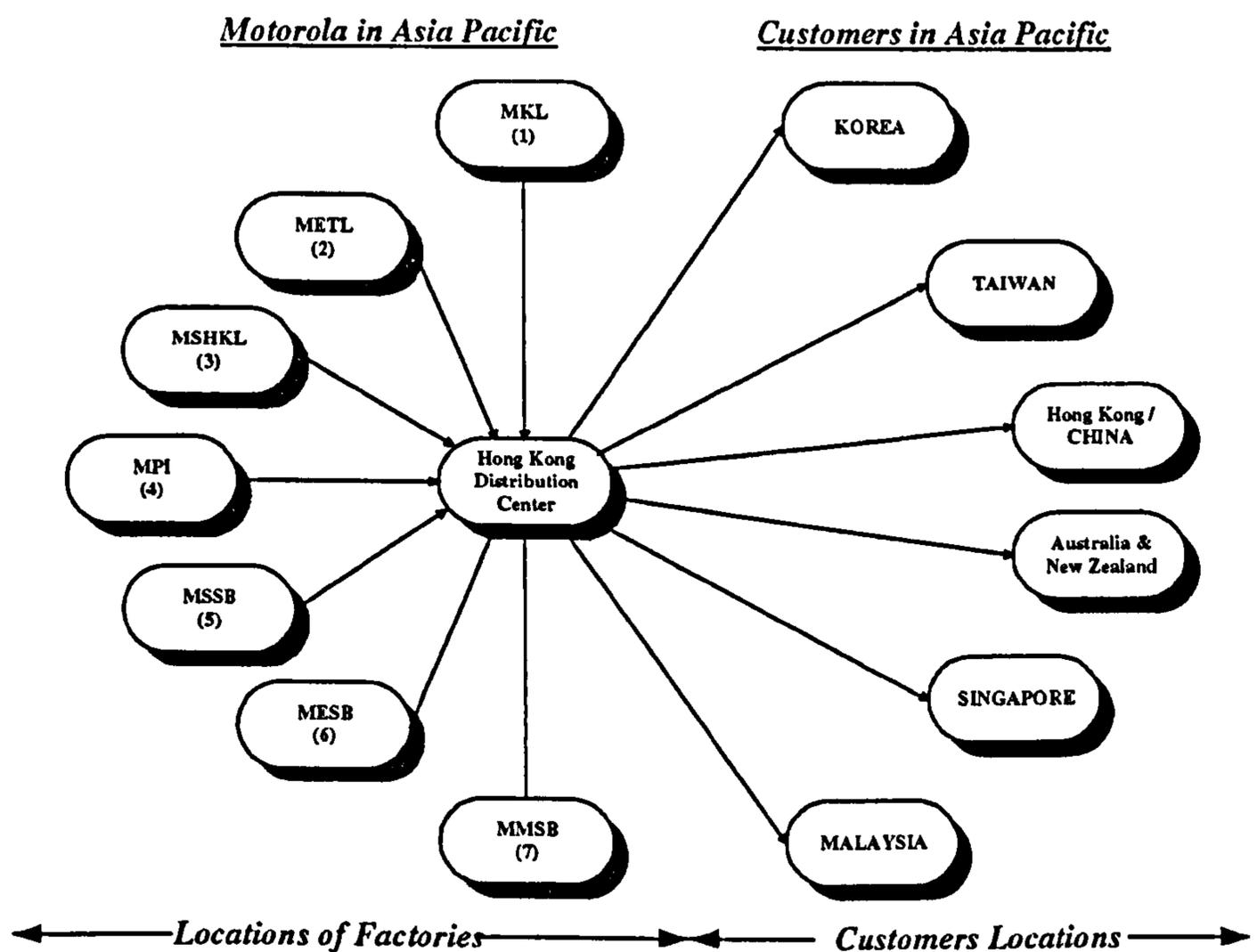


Figure 2.18. Dropship Logistics Re-engineering - Before 1988

- | | |
|---|-------------------------------------|
| (1) MKL - Motorola Korea Limited | (5) Motorola Semiconductors Sdn Bhd |
| (2) METL - Motorola Electronics Taiwan Ltd. | (6) Motorola Electronics Sdn Bhd |
| (3) Motorola Semiconductors Hong Kong Ltd. | (7) Motorola Malaysia Sdn Bhd |
| (4) Motorola Philippines | |

The new Asia Pacific logistics model (Figure 2.19) created by the author in the subsection 3.2.1 of Portfolio 3 provides better and faster services to customers.

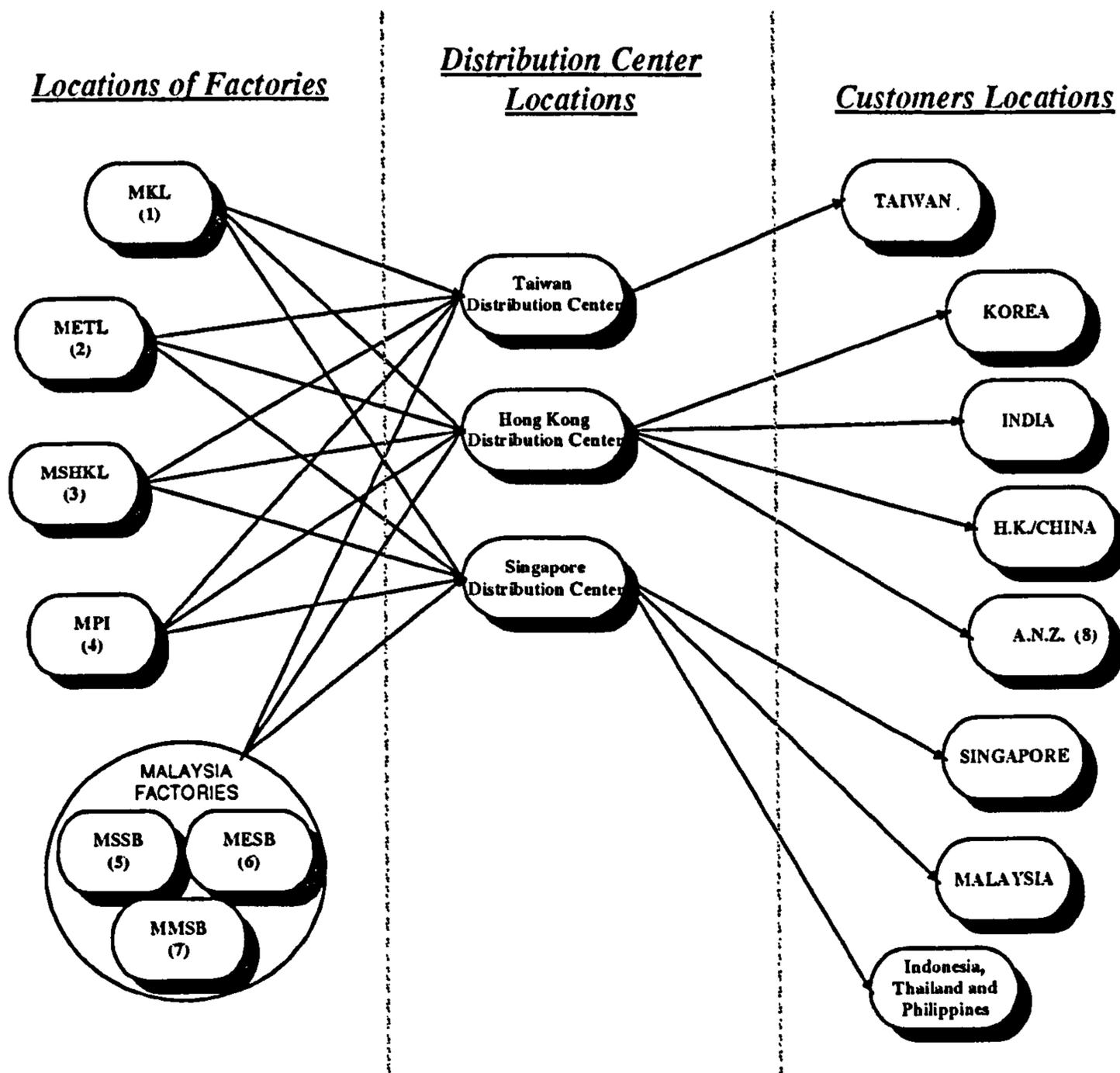


Figure 2.19. Asia Pacific Logistics Model - 1995

- | | |
|---|-------------------------------------|
| (1) MKL - Motorola Korea Limited | (5) Motorola Semiconductors Sdn Bhd |
| (2) METL - Motorola Electronics Taiwan Ltd. | (6) Motorola Electronics Sdn Bhd |
| (3) Motorola Semiconductors Hong Kong Ltd. | (7) Motorola Malaysia Sdn Bhd |
| (4) Motorola Philippines Incorporation | (8) Australia & New Zealand |

The benefits of this new logistics model are significant and far-reaching.

Section 3.2 of Portfolio 3 explains the detail.

2.6 China Semiconductor Products Shipping to Taiwan

The country importation policy published by the Taiwan government before 1994 was to restrict import of China manufactured semiconductor products to Taiwan customers. It may sound strange to many people who do not know politics. In politics, anything can happen. The author found himself in the front line having to negotiate with the Taiwan government.

With the aim to serve our customers better by lowering the total logistics cost, the author initiated negotiations with the Taiwan government on behalf of Motorola. The project was perceived as impossible, but the effort that we put in was important for long-term success.

The importation of China manufactured semiconductor products to Taiwan customers was successfully achieved in late 1997. It was a major breakthrough in logistics. Figure 2.20 indicates the achievements made over the years.

Detailed activities and roadmap are described in subsection 3.2.4 in Portfolio 3.

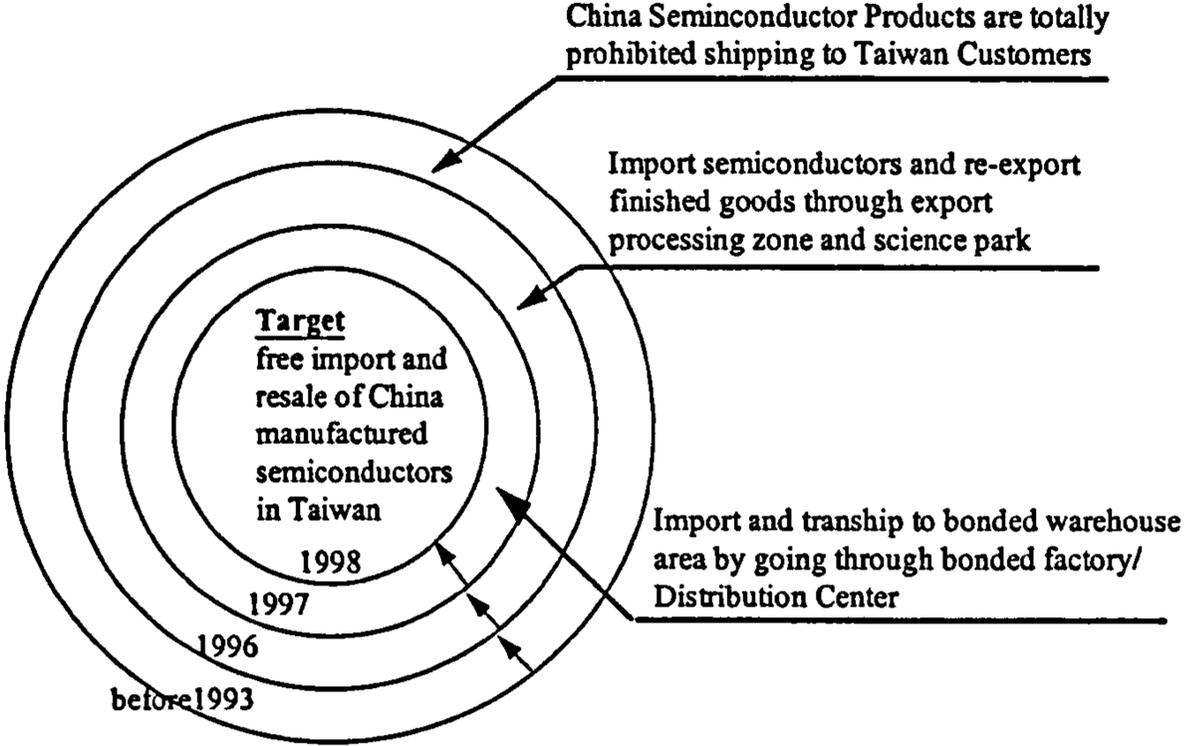


Figure 2.20. Process of China Semiconductor Products Importing to Taiwan Customers

2.7 Quality & Speed Team (QuST) Creation & Implementation

Total Quality Management (TQM) is a management process based on some fundamental principles that focus on meeting customers' expectations. TQM is the "way of life" for an organization committed to a never-ending improvement cycle. It is a quality culture.

The QuST process, initiated by the author and supported by his company, is TQM with a strong focus on the speed of execution and teamwork. The Motorola's QuST organization was chaired by the author in the early 1990's to lead the entire organization into a new era - this has been a valuable experience. The author shares the QuST concept in many external TQM conferences and seminars and was well recognised by many companies.

The eight domains and its focused activities (Table 2.6) are the key components of the QuST culture development. The QuST model (Figure 2.21) developed by the author in section 4.1 of Portfolio 4 is used to communicate the process and the linkage among four core business activities in the organization.

<p>1. MANAGEMENT COMMITMENT & STYLE: TO PERIODICALLY EVALUATE THE MANAGEMENT COMMITMENT AND TO MAKE PROPOSALS ON:</p> <ul style="list-style-type: none"> • NEW METHODOLOGIES; • LEADERSHIP STYLE; • PARTICIPATIVE STYLE; AND • EMPOWERMENT 	<p>2. MEASUREMENT AND BENCHMARKING: TO DEFINE THE INTERNAL & EXTERNAL REQUIREMENTS ON QUALITY AND SPEED.</p> <ul style="list-style-type: none"> • DISPERSE MEASUREMENT GOALS AND METHODS THROUGHOUT THE ORGANIZATION. • RAISE THE AWARENESS ON THE COST OF NON-CONFORMANCE AND SPEED. • BENCHMARKING THE BEST IN CLASS OPERATIONS.
<p>3. COMMUNICATION, PROMOTION & QUALITY WEEK: TO COMMUNICATE AND PROMOTE 6-SIGMA & BEYOND QUALITY CULTURE.</p> <ul style="list-style-type: none"> • DETERMINE THE CHANNEL, MAGNITUDE, FREQUENCY AND EFFECTIVENESS OF COMMUNICATION & PARTICIPATION. • ORGANIZE THE "QUALITY WEEK" PROMOTION EVERY YEAR. 	<p>4. CONTINUOUS IMPROVEMENT THROUGH PEOPLE PARTICIPATION: TO ENCOURAGE AND SUPPORT EMPLOYEES TO SET UP THE VOLUNTARY QUALITY TEAMS, WHICH INCLUDE</p> <ul style="list-style-type: none"> • ON ERROR TRAINING (OET), • WORK IMPROVEMENT TEAM (WIT), • SERVICE IMPROVEMENT TEAM (SIT), • SPEAK OUT STAFF RECOMMENDATION PROGRAM, • TOTAL PRODUCTIVE MAINTENANCE (TPM), AND • COORDINATE WORLDWIDE TCS⁽¹⁾ COMPETITION.
<p>5. EDUCATION & TRAINING: TO ASSURE A WORLD-CLASS WORK FORCE THROUGH CONTINUOUS IMPROVEMENT IN QUALITY, PRODUCTIVITY AND FLEXIBILITY OF EACH EMPLOYEE BY PROVIDING TRAINING ON THE MOST UP-TO-DATE METHODS AND IDEAS. (E.G., ISO9000, WORK IMPROVEMENT TEAM, SIX SIGMA, FORD 8D, ETC.)</p>	<p>6. RECOGNITION, CELEBRATION & EMPLOYEE SATISFACTION: TO SET UP MOTIVATIONAL PROGRAMS AND AWARD SYSTEMS TO ENSURE WE HAVE A HAPPY AND SATISFACTORY WORKFORCE, SUCH AS: OUTSTANDING TEAM OF THE YEAR; DEPARTMENT AWARD TO EXCELLENCE; SHARK'S FIN SOUP BONUS PROGRAM; PLUS ON-GOING STAFF ACTIVITIES ORGANIZED BY THE SOCIAL CLUB WHICH IS ONE OF THE VOLUNTARY EMPLOYEE SETUPS.</p>
<p>7. RESPONSIVENESS & SPEED OF EXECUTION:</p> <ul style="list-style-type: none"> • ONE OF THE IMPERATIVES ON COMPANY CULTURE IS TO TARGET ON SERVICES, SPEED AND FLEXIBILITY WITH QUALITY. • TO EVALUATE, EXAMINE AND REDUCE THE NON-VALUE ADDED PROCESSES THROUGH MAPPING EXERCISE. 	<p>8. RENEWAL (REVIEW, RENEW, DO IT AGAIN AND TO BE BETTER):</p> <ul style="list-style-type: none"> • TO CONTINUOUSLY REVIEW, EXAMINE THE CHANGES NEEDED. • TO RENEW AND TO KEEP THE PROGRAM ALIVE. • TO WORK CLOSELY WITH QuST COMMITTEE AND DOMAINS LEADERS FOR ABOVE.

Table 2.6. Eight Domains of Motorola's QuST Process

Quality & Speed Team (QuST) Creation & Implementation

⁽¹⁾ TCS = Total Customer Satisfaction

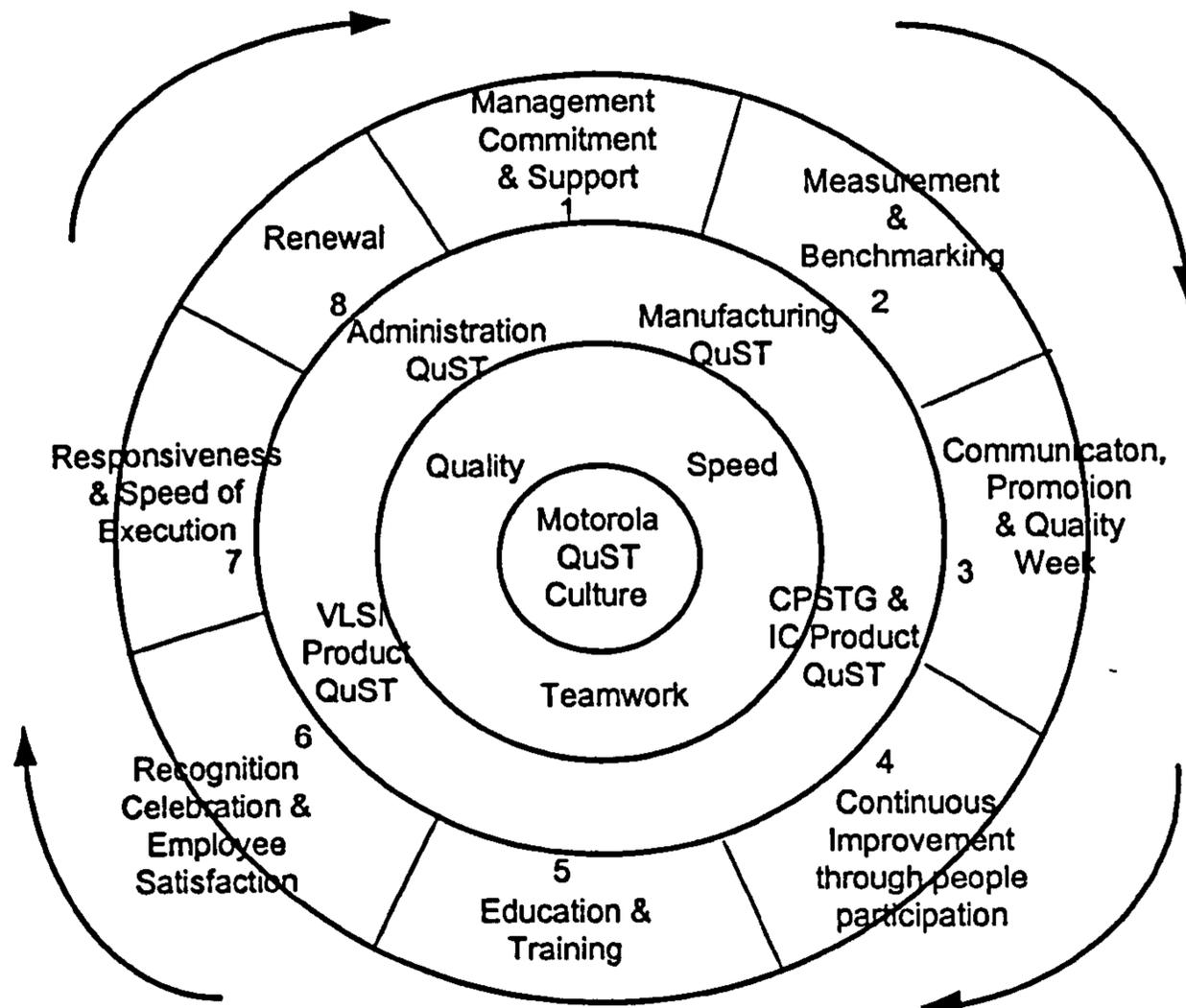


Figure 2.21. Motorola APSPG QuST Model

The QuST process in Asia Pacific pioneered the following important activities:

- started advanced leadership training for all managers and supervisors,
- made the quality & speed week as an annual activity,
- developed the small-win⁽³⁾ recognition program for employees,
- built ten-key-practice criteria as the critical performance measurement and assessment for every individual,
- made the shark fin soup program⁽⁴⁾ visible to all employees, and

(1) CPSTG & I.C. = Communication, power, sensor technology group and integrated circuit products

(2) VLSI = Very large size integrated circuit

(3) Small-Win is a small recognition program to appreciate employees' contribution in a daily effort.

(4) Shark Fin Soup Program is a motivation program by communicating and rewarding employees through team achievements.

- started the service improvement team (SIT) in regional sales offices.

The QuST process was covered in detail in Section 4.1 of Portfolio 4.

2.8 New Education and Training Programs

The CRC Loyalty Growth Cycle (Figure 1.1 in P. 5) identifies the need to achieve customer loyalty by developing employee loyalty first. Training and education can develop loyal employees.

The service quality team building training and the 7 Habits education are new programs for employee development. For example, the understanding and adoption of the six principles of service excellence skills will create a positive attitude towards achieving service quality excellence. The six skills covered by the service quality teambuilding training are:

- UNDERSTAND your customers' expectations
- INFORM your customers
- CREATE positive impressions with your customers
- FIND a "YES" for your customers
- BUILD loyalty relationships with your customers
- COMMIT to the continuous improvement practice

The 7 Habits Workshop, on the other hand, focuses on the two levels of leadership development (Figure 2.22). This is an inside-out approach to increase people's power. It requires building personal trustworthiness first and then creates trust at the interpersonal level to improve relationships. Covey^[47] says that *"As trust is built, we all can confidently empower individuals and groups within the organization to produce desired results"*.

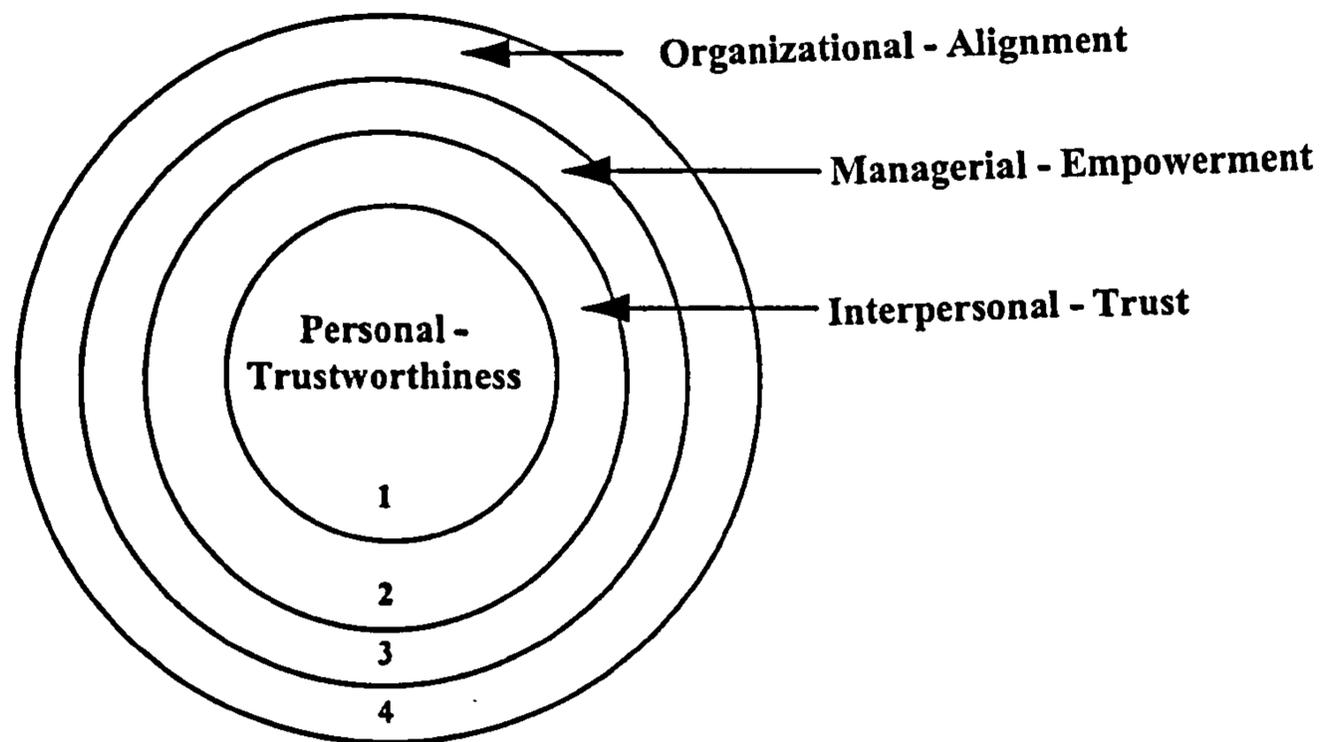


Figure 2.22. Covey's Four Levels of Leadership^[47]

If "trust" in an organization is not strong, the common practice is to focus more on control and less on employees' empowerment. The future of the organization will be in trouble.

The 7 Habits are actually habits of personal change for effectiveness. The habits are based on principles and targeted to achieve maximum long-term personal and interpersonal satisfaction in relationships. Covey (1989)^[48] defines the habits as *"a person's character, creating an empowering center of correct maps from which an individual can effectively solve problems, maximize opportunities, and continually learn and integrate other principles in an upward spiral of growth."*

The Maturity continuum (Figure 2.7 in P. 33) indicates 3 levels of personal change: from dependence to independence, finally reaching interdependence.

Employees must learn self-mastery and self-discipline in order to achieve the Private Victory before moving on to Public Victory.

The service quality team building workshop and the 7 Habits Training are the two most welcomed training classes in the company.

Figure 2.23 indicates the Motorola's Asia Pacific capability upgrade learning roadmap through people development and individual value investment. This is a summary of key service quality related programs put together by the author.

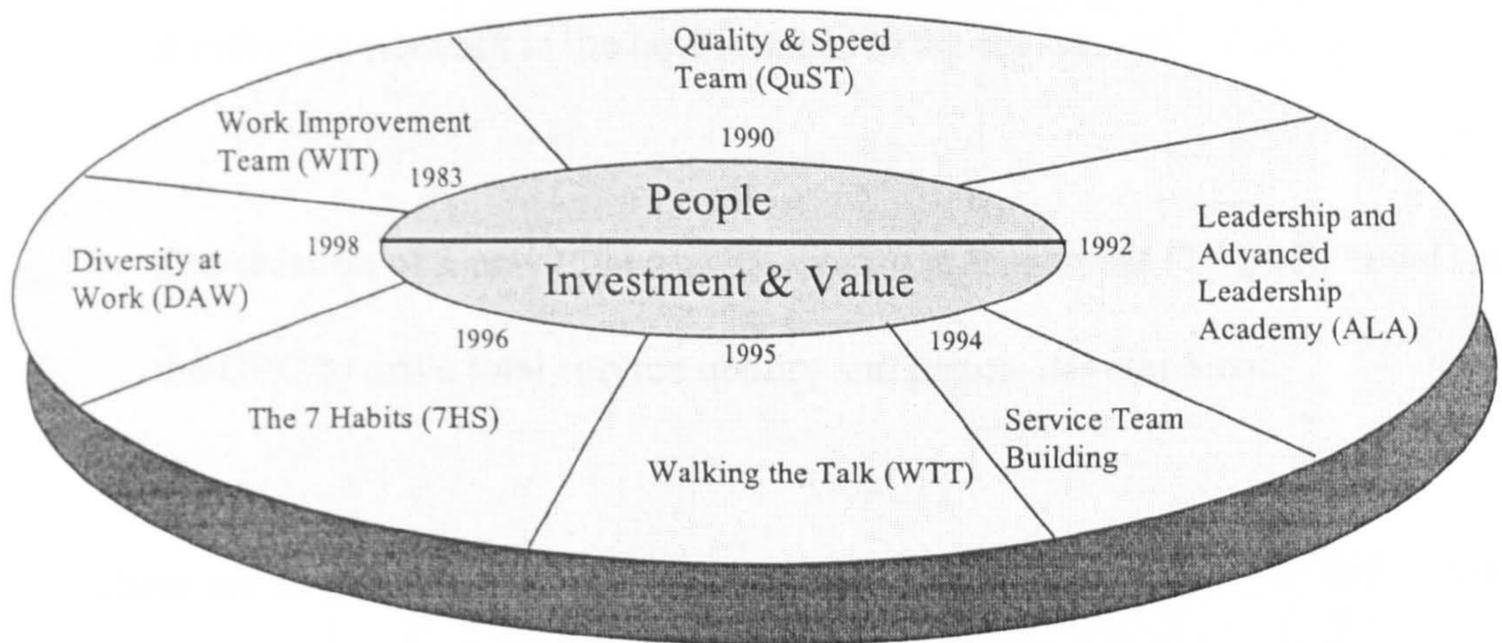


Figure 2.23. Motorola's Capability Upgrade Learning Roadmap

2.9 Areas of Innovation

The areas of innovation are:

1. The creation of a new cross-functional team called “The Customer Responsiveness Center” (or The CRC). This is a unique way of setup in the worldwide semiconductor industry.
2. The development and innovation relating to merging of quality and speed together to become the Quality and Speed Team (QuST) Culture.
3. Breaking the political barriers to enable the delivery of semiconductor products from China to Taiwan. The Motorola Asia Pacific logistics and distribution network is the best-in-class in the region.
4. The creation of a new total service quality management (TSQM) model in the CRC to drive total service quality and people development.

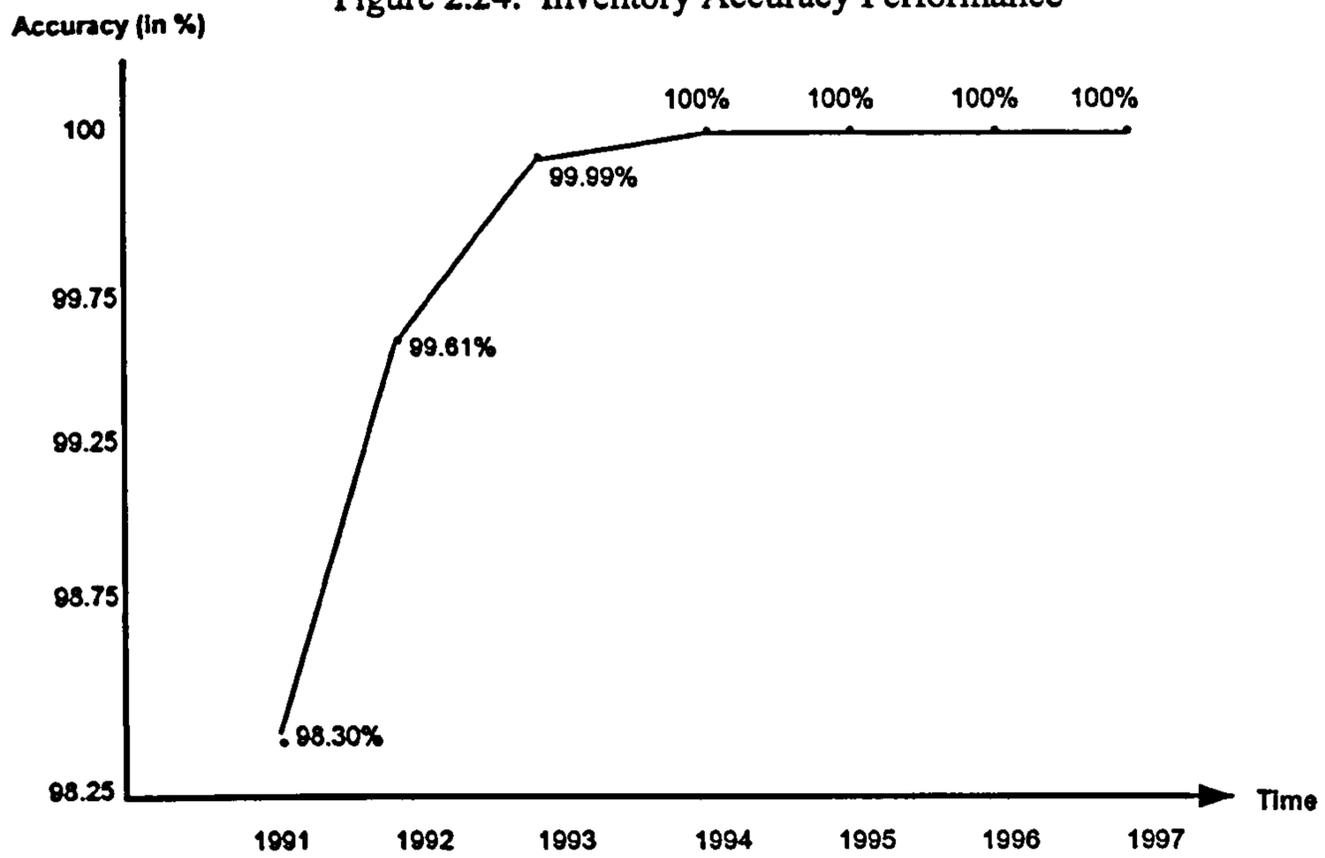
These are covered in Portfolios 1, 4, 3 and 2 respectively.

2.10 Results of the Implementation

Key achievements can be summarized as follows:

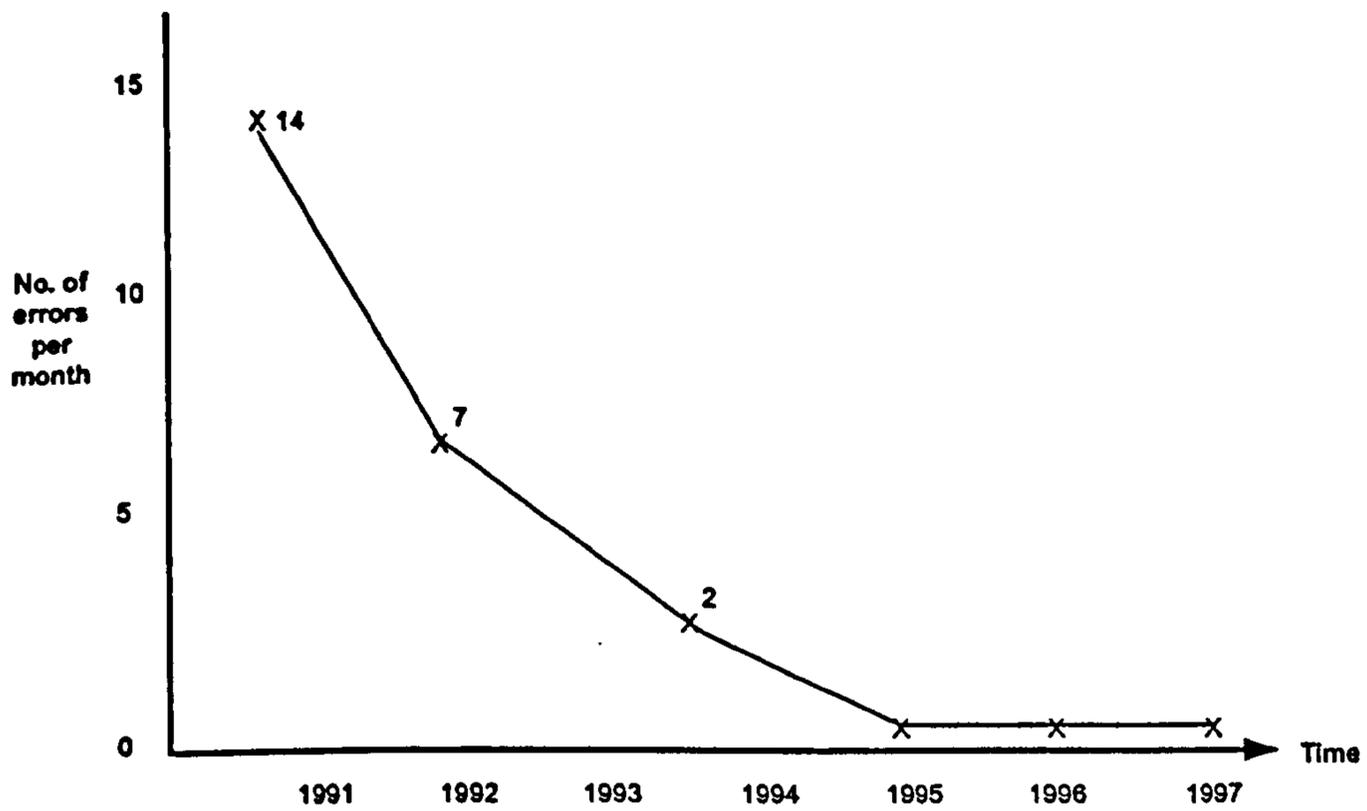
1. Created of the new Customer Responsiveness Center. This is re-engineering towards a truly cross-functional organization to achieve total customer satisfaction and employee satisfaction, and it is the first experiment in Motorola semiconductor products sector. The Asia Pacific team takes the lead.
2. Developed and implemented the Quality & Speed Team (QuST) process. This is an innovative way to address total quality management focusing on teamwork and speed of execution. The QuST culture is the “way of life” for an organization committed to a never-ending improvement cycle. QuST sets the new standard for TQM practitioners. Figures 2.24 and 2.25 highlight the achievement of operational efficiency in material handling operations.
3. Brought in new education and training programs for employees. The service team building workshop and the 7 Habits of highly effective people workshop were well received by employees. More than 1,000 employees (or over 30% of total employees) have completed these two programs.

Figure 2.24. Inventory Accuracy Performance



Source of Information: Inventory Audit

Figure 2.25. Warehouse Customer Picking Performance



4. Enabled Motorola to ship China manufactured semiconductor products to Taiwan. This was a highly political matter that no other company

Results of the Implementation

has attempted. A breakthrough was achieved by the CRC. Future business can be secured from the Taiwan market.

5. Achieved better employee satisfaction in the CRC. This can be reflected in the employee turnover rate (Table 2.7) and the IDE response (Table 2.8).

Employee Turnover Rate (%)	1996 End	1995 End
Market Average	18.2	20.1
Total Employee	8.7	11.9
CRC Employee	<u>3.5</u>	<u>6.1</u>

Source of Information: HR Department

Table 2.7. Employee Turnover Rate Comparison

IDE Metrics (%)	Q2, 97	Q1, 97	Q4, 96	Q3, 96	Q2, 96	Q1, 96	Q4, 95
Target 100%							
Participation Rate with answer 'Yes'							
- Total Organization	98.00	96.00	95.00	95.93	95.65	95.21	95.35
- CRC Employees	<u>100.00</u>	100.00	100.00	98.80	99.40	94.00	97.00
Target 0%							
No Dialogue Rate							
- Total Organization	5.00	6.00	7.29	10.50	10.40	10.03	10.33
- CRC Employees	<u>0.00</u>	1.50	1.20	3.00	1.80	6.40	9.80

Source of Information: H.R. Department

Table 2.8. IDE Performance Comparison

6. Eliminated the customer service department in the Asia Pacific Headquarters. This is a good example of re-engineering effort by reducing non-value-added activities. Total savings amounted to US\$1.2 millions per annum.

7. Achieved significant improvements (Quality and Speed) in Asia Pacific logistics and distribution functions. Table 2.9 illustrates the improvements achieved on a yearly basis.

	1994 Actual	1995 Actual	1996 Actual	1997 Actual
QUALITY				
* Warehouse product picking performance	5.98 sigma	6 sigma & beyond	6 sigma & beyond	6 sigma & beyond
* Warehouse finished goods inventory accuracy	6 sigma	6 sigma & beyond	6 sigma & beyond	6 sigma & beyond
* Administrative & shipping discrepancy (cases per month)	7	5	4	3
* Customer shortage claim (cases per month)	7	6	4	2
* Customer line down (cases per month)	15	8	2	0
SPEED				
* Warehouse receiving cycle time (in hours)	10	8	6	5.5
* D.C.(1) handling cycle time (in hours)				
- Taiwan Distribution Center	17.5	10.5	9	8
- Singapore Distribution Center	11	10.5	10	9.5
* Shipping in-transit cycle time (in days) e.g. Hong Kong to Tianjin, China	3	1	1	<1 day
* Shipping documentation for banking process (in days)	4	3	2	2

Table 2.9. Logistics & Distribution Services - Results

(1) D.C. = Distribution Center

Results of the Implementation

8. Service awards received from customers. Table 2.10 highlights the customer appreciation awards received by Motorola Asia Pacific. This is an indication of customer satisfaction achieved in 1995 and 1996.

Years	1994	1995	1996	1997
No. of Award Received	14	18	19	11 ⁽¹⁾

Source of Information: Sales

Table 2.10. Customer Appreciation Awards Received by Motorola

9. Motorola Asia Pacific was encouraged by the market position improvement as indicated in Table 2.11. Table 2.12 contains the detailed comparison.

Years	1995	1996	1997
Ranking in Asia Pacific	7	6	5

Source of Information: Dataquest

Table 2.11. Motorola Market Share Ranking

Top 10 companies' factory revenue (from shipments of total semiconductors) in Asia Pacific is illustrated in Table 2.12.

Results of the Implementation

⁽¹⁾ Reorganization took place in 1997 lost tracking of total awards received from customers.

1996 Rank	1997 Rank		1996 Revenue	1997 Revenue	% Change	1997 Market Share (%)
1	1	Intel	3,251	4,077	25.4	12.5
2	2	Samsung	1,828	1,922	5.1	5.9
4	3	Texas Instruments	1,736	1,853	6.7	5.7
3	4	Toshiba	1,804	1,807	0.2	5.6
6	5	Motorola	1,424	1,682	18.1	5.2
5	6	Philips	1,471	1,580	7.4	4.9
7	7	NEC	1,283	1,326	3.4	4.1
10	8	SGS-Thomson	1,136	1,075	-5.4	3.3
9	9	Hitachi	1,169	1,003	-14.2	3.1
8	10	LG Semicon	1,177	992	-15.7	3.0

Source of Information: Dataquest 4/1998

Table 2.12. Comparison of Revenue from Top Ten Semiconductor Companies (in millions of U.S. dollars)^[49]

Since Intel dominates the market of personal computer microprocessor chips, it has enabled Intel to enjoy a high growth in the past years. Motorola is learning from Intel and thus is working hard to develop new products for selected high growth markets.

10. Achieved better on-time-delivery service to customers (Table 2.13).

Improvement made from 84% in 1994 to over 93% level in 1996. Early shipments were controlled at 2% level.

	1994	1995	1996
On time delivery to Motorola commitment	73%	78%	93%
Early shipments to customers	18%	17%	2%
Delinquency to customer's request (in million US\$)	40	93	17

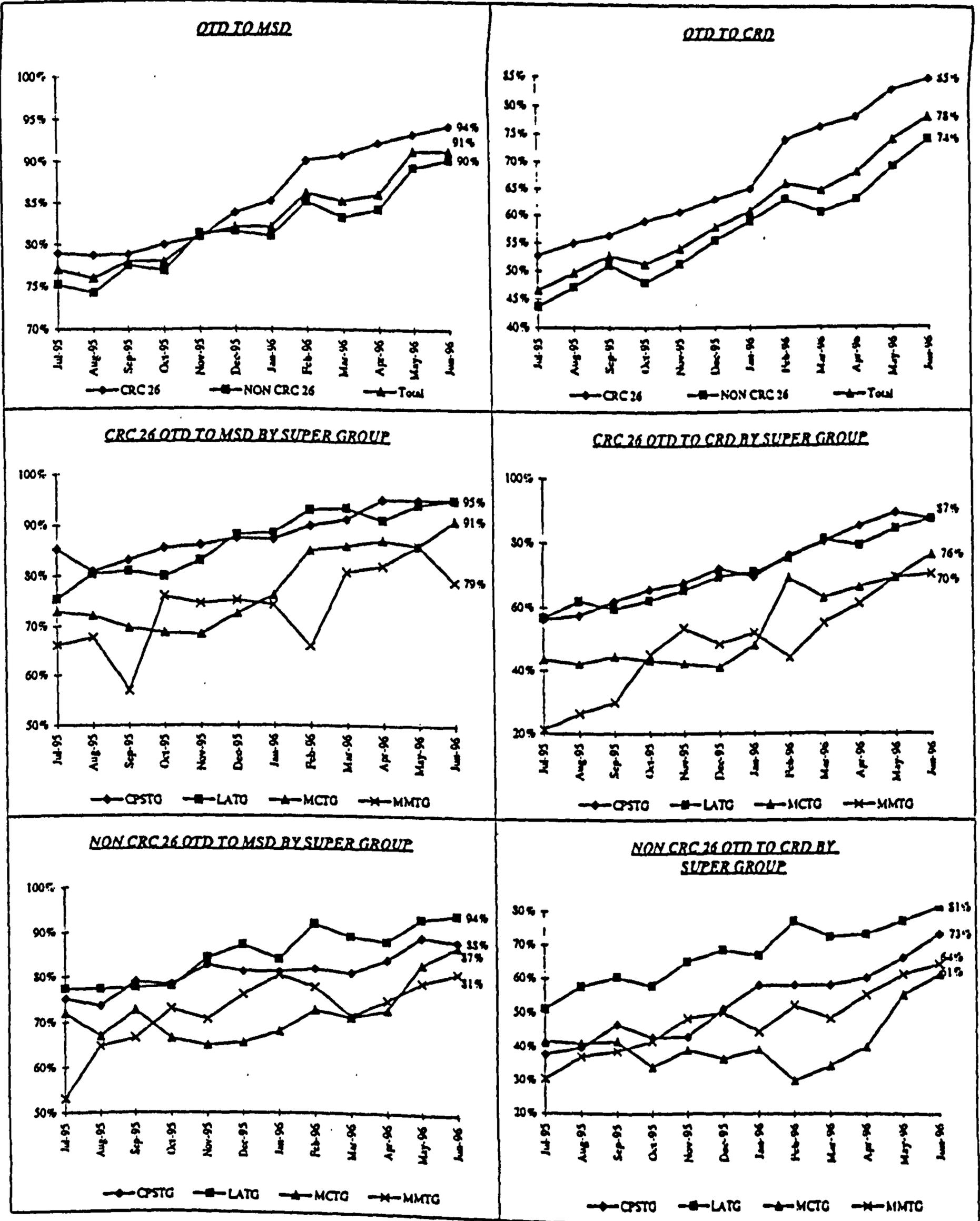
Source of Information: Strategic Planning Department

Table 2.13. Service Improvement to Customers

Attachment 2.10 illustrates detailed on-time-delivery performance analysis from July, 1995 to June, 1996. "MSD" represents Motorola scheduled date whereas "CRD" means customer requested date.



Quality & Speed
thru Teamwork & Technology



APSPQ Operation Review : CRC

Motorola Internal Use only

Attachment 2.10. On-time-delivery Analysis

3. CONCLUSION

As we look ahead, we believe that achieving customer loyalty will become a must in any successful business organization in the 21st century. Planning for future success is a challenge today and must start immediately. Many leaders in the semiconductor industry may still consider technology far more important than total service quality. Whilst technology can be viewed as a means to deliver what customers want, it is an enabling factor only.

People are the key to “customer advocacy”. To get the right people in the job to be loyal employees is a challenge. Employee satisfaction is pivotal to customer satisfaction.

“Relationship building” with customers and employees is thus closely related. Future research can focus on creating the highest value for stakeholders. However employee satisfaction must precede customer satisfaction.

Planning for future success with customers and employees is not a short-term endeavour. It must be developed by the leaders of organizations. Successful leaders of the 21st century must be the persons who accept the importance of total service quality management.

The portfolios submitted in this study provide readers a new perspective into:

- Creating the new CRC structure to drive the total service quality

development. People are put first and customer second (Portfolio 1).

- Initiating the concept of total service quality management (TSQM) from total quality management (TQM). The measurement of total service quality from the customers' viewpoint is put in place (Portfolio 2).
- Building the best-in-class logistics and distribution channel to serve customers better and faster, shipping China-made semiconductor products to Taiwan customers as a result of extended negotiation (Portfolio 3).
- Leading the culture changes by the QuST model is a breakthrough from the TQM concept. Quality, speed of execution and teamwork play the key role to achieve higher results in operational efficiency. The author calls it "QuST" or "TQM Plus" (Portfolio 4).
- Investing in people's future. To build a successful training culture in Motorola. To develop people power requires changes in their ways that they think and behave. Service quality training and the 7 Habits workshop have made a difference (Portfolio 5).

Looking into the future, leaders must master the knowledge and skills of service quality management to grow their business. They have to develop the relationships needed with their people and customers, not only technology. This project study is a "wake up call" to leaders in the industry.

FUTURE RESEARCH

This project provides a foundation for the study of the impact of total service quality in manufacturing industries. In the semiconductor industry, further study can be undertaken to compare how customers rate the relative importance of service quality and technology.

In Motorola, future challenges and research can be expanded into the following areas:

- Fan out the CRC concept from Asia Pacific to other business regions.
- Evaluate the customer service process in both Europe and U.S.A. to make possible changes and eliminate non-value-added functions/activities.
- Develop the QuST process into a Motorola worldwide service quality culture.
- Explore the possibility of shipping China manufactured electronic consumer products to Taiwan (i.e. cellular phones).
- Explore the power of people who make service quality excellence possible. This requires investment to develop people for long term success.
- Develop better customer and employee relationships to create the highest value for stakeholders.
- Evolve the global Customer Focus Center (CFC) from the successful CRC. The CRC only covers the Asia Pacific region. However it would be more powerful to expand the CRC concept to other regions such as U.S.A. and Europe to become a global CRC or global CFC.

The 21st century requires firms to develop service quality excellence. Only people will make this happen. The efforts and achievements thus far convince us we have a pioneering role to play.

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