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Diffusion of Total Quality Management: An Organizational Self-Production Perspective

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DIFFUSION OF TOTAL QUALITY MANAGEMENT:

AN ORGANIZATIONAL SELF-PRODUCTION PERSPECTIVE

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ABSTRACT

DIFFUSION OF TOTAL QUALITY MANAGEMENT: AN ORGANIZATIONAL SELF-PRODUCTION PERSPECTIVE

Baizhong Zhao
Old Dominion University, 1993
Director: Dr. Frederick Steier

American industries are in the process of a quality revolution. Most companies are busy implementing Total Quality Management (TQM) programs. However, the experience of both Japanese and American companies indicates that successful TQM implementation depends on an understanding of implementation processes, which itself relies on an understanding of organizational self-organizing, for it is through this process that TQM gets diffused and becomes a core component of an organization's culture. Self-organizing is a so-called process-oriented approach, based on theory from cybernetics (Ashby, 1962; Steier & Smith, 1985; von Foerster, 1960), dissipative structure theory (Prigogine & Stengers, 1984), and chaos theory (Gleick, 1987). As developed in this research, the concept "self-organizing" is extended into the study of TQM implementations, focusing on the diffusion mechanisms of TQM into human organizations, called the organizational self-production model.

It is submitted that the organizational self-production process consists of four interrelated mechanisms: participation, involvement and interaction; reflection and interpretation; generation of organization-self knowledge; and action under that knowledge. In this research, this process is measured in five dimensions: participativity,

individuality, interdependability, informationality, and accountability. Empirical results collected in this research indicate that the organizational self-production perspective yields new and interesting insights. Both content analysis of interviews and statistical analysis of surveys demonstrate that the five dimensions provide useful variables for organizational research, yielding positive correlations with both operational and cultural indicators of TQM diffusion. Furthermore, the findings imply that the organizational self-production perspective provides a theoretical foundation for workplace reengineering.

DEDICATION

Dedicated to my first teachers since I was two years old

My great-grandfather

Mr. Changshan Zhao

My grandfather and grandmother

Mr. Wenzhong Zhao and Mrs. Zhang Zhao

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iv

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TABLE OF CONTENTS

vii

LIST OF TABLES

viii

LIST OF FIGURES

INTRODUCTION

Total Quality Management, also called Total Quality Control (TQC) or Company-wide Quality Control (CWQC) by the Japanese, was originated in the United States in the 1930s and successfully practiced and developed by the Japanese thereafter. Rather than being a single philosophy, TQM represents a system of management principles, derived from the teachings of quality "gurus," such as Deming (1986), Juran (1989), Crosby (1979, 1984), Ishikawa (1985), and Feigenbaum (1956, 1981). These principles include: the customer-driven principle, which states that customers make judgments on quality, and all business goals will follow if customers are satisfied; the process-driven principle, which emphasizes continuous process improvement rather than products alone; the employee-driven principle, which emphasizes total involvement of all organizational members in quality improvement processes; the data-driven principle, which states that managerial activities are based on facts obtained through using statistical techniques; and the system-driven principle, which states that the improvement of quality is embedded in the improvement of systems or organizations (Lee & Ebrahimpour, 1985; Olian & Rynes, 1991; Saraph, Benson, & Schroeder, 1989; Schonberger, 1992).

The quality miracle has occurred in Japan. It is certainly hoped that it also occurs in the United States. Since the 1980s, many U.S. companies have implemented various TQM programs. For example, the U.S. Navy applies TQM principles to alter its

1

bureaucratic systems through leadership changes, called Total Quality Leadership (TQL); in the healthcare industry, many hospitals have adopted programs called Continuous Quality Improvement (CQI) programs, which include activities, such as identifying problems, determining causes, identifying solutions, implementing improvement actions, evaluating results, and monitoring progresses; in manufacturing organizations, Statistical Process Control (SPC) tools, such as control charts and cause-and-effect diagrams, are applied, and self-managed work teams are implemented; in R&D and design firms, robust design and Taguchi method are applied to reduce costs and improve quality. Although various organizations use different methods, they all aim at the company's continuous improvement of quality in order to gain a competitive advantage.

Implementation Effectiveness and Implementation Approaches

Effective TQM implementation is an organizational change process, which in implementing TQM, empowers an organization to improve its efficiency and effectiveness. Nadler (1987) proposed that a change effort is effective when (1) the organization is changed from its current state to its future state; (2) the functioning of the organization in the future state meets the expectation; (3) the transition is accomplished without any undue cost to individual organizational members; and (4) the transition is accomplished without any undue cost to the organization. In applying Nadler's criteria, successful TQM implementation implies that (1) the TQM implementation will bring about operational improvements; (2) TQM implementations are humanistic, that is, without imposing undue constraints on individual organizational members; and (3) TQM

programs implemented will bring about organizational cultural change, through which TQM philosophy becomes an organic part of the organizational processes so that the whole organization is empowered.

However, although recent reports have indicated that TQM programs have fostered improvement in some companies, many TQM efforts have failed according to Nadler's criteria. In some companies, TQM programs, with an original objective of reducing costs and improving quality, did not improve product quality in any way. Rather, companies significantly increased quality costs, including organizational costs, such as quality bureaucracy, and human costs, such as decreased organizational morale and employee job satisfaction, due to the imposition of organizational members' values and belief systems (Fuchsberg, 1992; Harari, 1993; Newsweek 1992). These companies also suffered the so-called "Excessive Activity Syndrome" (Chang, 1993; Schaff, 1993), which is the condition that occurs when many different TQM activities have been simultaneously implemented, but only limited measurable results are achieved over a reasonable period of time. These TQM programs, comprised of various training efforts on statistical process control, quality teamwork, customer service, quality audit, and quality planning, are carried out through programmed activities, such as "quality of the month," "quality project," or "TQM movement." More and more evidence has shown that some TQM efforts are just "marginal improvements around the edges" (Clemmer, 1991: 38) and only enjoy a relatively short period of attention and then faded out.

Through examining various change efforts in different contexts, Beer, Eisenstat, and Spector found that some change programs do not produce changes "because they are

guided by a theory of change that is fundamentally flawed" (1990a: 159). In this theory,
the change program is (1) imposed on the organization from the top and is limited to
effort initiated by top management to promulgate a company-wide change program
through renewing a mission statement or corporate culture and changes in organizational
formal arrangements, such as a structure and system for changing employee behaviors,
(2) designed in terms of "off-the-shelf standardized solutions," and (3) focused on one
particular human resource management issue: employee skills, leadership style,
performance evaluation and compensation, organizational structure, or organizational
culture (Beer, Eisenstat, & Spector, 1990b: 24). They argue that enduring organizational
changes are dependent on task alignment, which begins with the organizational periphery
and moves toward the corporate core. In the cases they studied, changes in individual
behaviors--the most important, but also the most difficult part in organizational
development--do not result from corporate culture or organizational structural change,
but from a changed organizational context, in which new roles, responsibilities, and
relationships evolve.

Just as with these failing organizational change programs, some TQM
implementation failures are due to three "flawed" implementation theories or approaches:
prescriptive, tool, and critical factors (Nutt, 1986). The prescriptive approach emphasizes
the implementation mechanisms of making organizational changes, similar to the "process
model" approach in implementation research (Srinivatan & Davis, 1987). Under the
process model, implementation is considered as a process consisting of distinct,
sequential stages of implementation activities. A typical example is Lewin's process

model, in which a planned change goes through three different stages of unfreezing, moving, and refreezing (Lewin, 1947; Schein, 1969). Several TQM implementation models follow a prescriptive process model approach, including Berry (1991), Ciampa (1991), and Mahmoud, Rice, and Anders (1992). For example, Ciampa (1991) proposed a six-step model for implementing TQM: visioning, analyzing, training and problem-solving, educating, institutionalizing, and reinforcing and continuing to clarify the vision.

The tool approach values different techniques and methods of implementation for facilitating implementation effectiveness. In the TQM case, this approach deals with quality management "techniques." The TQM implementation implies the application of these techniques for organizational activities. Some writers prefer to express Total Quality Management as a set of managerial techniques and methods, including seven QC tools, such as the process flow diagram, cause-and-effect (fishbone) diagram, control chart, checksheet, pareto diagram, scatter diagram, graph, and histogram (Ishikawa, 1976), and seven new QC tools, such as the relation diagram, KJ method, systematic diagram, matrix diagram, matrix data-analysis, Process Design Program Chart (PDPC), and arrow diagram (Mizuno, 1988). Other QC techniques include the Taguchi method and Quality Function Deployment. In the Taguchi method, experimental design theory is utilized to improve product quality. Based on the matrix experimental design, which uses orthogonal arrays, control parameters are adjusted to create robustness to environmental and noise factors, so products can be produced close to the targeted value, with minimal variances (Taguchi & Clausing, 1990). Quality Function Deployment (QFD) is another systematic approach for integrating customers' demand, design

requirement, and manufacturability into one large chart, which can be accessed by sales people, design engineers, and manufacturing engineers. Through this approach, products can be designed and produced with higher customer satisfaction, improved quality, and shortened cycle time.

The third approach deals with critical success factors identified in implementation processes based on theoretical analysis and empirical evidence. For example, Schultz, Slevin, and Pinto (1987) identified ten success factors for project implementation processes, including project mission, top-management support, project schedule and plan, client consultation, personnel selection and training, technical tasks, client acceptance, monitoring and feedback, communication, and troubleshooting. Most current TQM implementation literature falls into this category, arguing for the importance of TQM components, factors, and principles for successful TQM implementations. Analysts argue that, if these components, factors, and principles are applied, total quality will follow (Benson, Saraph, & Schroeder, 1991; Saraph, Benson, & Schroeder, 1989; Schonberger, 1992). Clemmer (1991) identified five challenges for implementing TQM in organizations based on his experiences with both American and Canadian companies: getting top management support/buy-in, customer feedback/quality measurement, training, designing a TQM system, and implementation.

The "flawedness" is due to three common problems associated with these implementation approaches. First, feelings, perceptions, and reactions of individual organizational members are basically ignored in these theories. So individual organizational members are treated as machines and can be replaced or "repaired" when

required. Second, the implementation process is treated as a simple "replacement" or "adding-in" of TQM components into organizational activities. Thus, interactions between TQM and the existing organizational processes are ignored. Implementation efforts concentrate on following general, on-the-shelf principles, and staying away from detailed mechanisms through which organizations can "absorb" TQM as a part of organizational culture (Deal, 1991; Heilpern & Nadler, 1992; Olian & Rynes, 1991). Third, change programs designed based on these approaches have nothing to do with strategic organizational renewal. In this way, there is no place for consideration of long-term, enduring organizational change aligned with TQM implementation efforts.

An underlining assumption for these implementation approaches is the rational model of thinking (Richards, 1991), which Schon (1983) referred to as "technical rationality." First of all, this rational approach is linear. As such, it emphasizes tangible things, but not dynamics; causal relationships, but not circularity. If event B takes place, the event A, which "caused" the event B, must be found out. If we assume a linear relationship between these two events, we can then manipulate them: If we do A in practice, we will get B--if B is expected. This linear thinking is clearly reflected in the current TQM research: If we implement the things that the Japanese did, the Japanese-style total quality management will be achieved.

Second, this approach is objectivity-oriented: The world is believed to be objective, existing independent of observers. In this world, anything, if it exists, can be seen, touched, and also duplicated. Under this view of reality, people tend to see things in terms of tangible measures, such as profitability, dividends, or return on investment.

The inter-subjective aspect of human understanding, such as appreciation of long-term benefits, added values, and complex relationships, are not of concern. In TQM research, those "things" that are thought to be easily imitable in practice and to have tangible differences, such as QC circles, SPC techniques, and suggestion systems, are what is focused on. Processes involving more complex issues, such as how TQM methods work, how TQM methods interact with other factors, and how TQM methods become a part of an organization's culture, are normally not considered.

Third, because of the rational bias toward linear and objectivity-oriented thinking, the only difference in the components is emphasized through simple comparison. These differences are treated as necessary and sufficient conditions for differences in the system. If one system is different from the other, first, we analytically look at what the difference in their components is. If the difference in components can be defined, we believe, by simply copying the different parts to the system, we can then get that system. According to this way of thinking, in order to study how Japanese management is different from U.S. management, we focus only on QC circles, QC tools, management philosophies, or suggestion systems. Thus, if the U.S. copies these things, it would then have Japanese-style management. What is ignored is how these components interact with each other to form a unique dynamic, a whole system.

TQM: The Japanese Approach

Japanese quality management has been studied intensively by both Japanese scholars (Ishikawa, 1985; Karatsu, 1988; Kondo, 1988) and Western scholars

(Ebrahimpour, 1985; Garvin, 1984a; Hatvany, 1981; Lee & Ebrahimpour, 1985; Mahmoud et al., 1992; Saraph et al., 1989). The literature indicates the importance of some Quality Control tools and methods, which are summarized as humanistic enterprise systems, Quality Control tools, organization-wide quality management efforts, organizational techniques, and management abilities.

Humanistic Enterprise System

Japanese Quality Management is based on the so-called "humanistic enterprise systems" (Ozaki, 1988). Under the humanistic systems, human resources are believed the most vital factor of production and the ultimate origin of the market value. Employees are assumed to be intellectual beings with intelligence and psychological beings having different emotional demands (Ozaki, 1988). In supporting these assumptions on human nature, Japanese firms practice a so-called life-long employment system, consensus decision making, and total employee involvement.

Quality Control Tools

Since Deming introduced SPC methods to Japan in the 1950s, the Japanese have been able to generate various quality management methods and techniques, including seven and new seven QC tools, QC Circles, Quality Function Deployment (QFD), Taguchi Method (TM), and Poka-yoke or Zero-defects techniques (Shingo, 1986). These tools play an important role in total quality achievement.

Organization-Wide Quality Management Efforts

Japanese firms spend large amounts of money on employee training. It has been a tradition to train all levels of employees and managers to use QC tools and techniques. Contrary to the American approach to quality control, Japanese organizations make managerial tools available to all employees. First-line workers can use simple statistical methods to collect data, calculate means and standard deviation, and construct control charts. For some companies, employees even understand more complex quality control tools.

Organizational Techniques

Japanese quality management is also based on some organizational techniques. The QC circle is the most common form of team organization. In this technique, three to five workers voluntarily get together to solve production problems--using their own private time (Cole, 1979). Through these intensive, interpersonal interactions, employees become "coupled" at the group level. They adopt their group's and workshop's quality goals as part of their individual goals, and thus workers become motivated to achieve their individual goals first in order to achieve their group's goal. Japanese companies also emphasize transferring information about the production process, organizational image, and company's philosophy and values--what Nonaka (1991) called organizational self-knowledge--to all employees. Through this information, employees become capable of figuring out what is going on within their company, what is the company's objective, and how the individual effort relates to the organizational achievement.

Management Ability

Why are the Japanese so successful in quality achievement? Karatsu (1988), an authority of Japanese quality management, once argued that "the real answer lies in the abilities of Japanese management" (1988: 12). In Japan, each company has its own way of doing business, and the uniqueness originates with the company "heroes," who are normally founders or chief executives, such as Toyoda of Toyota. The founder or chief executive of a company helps to create a constant focus on quality improvement.

Beyond these technical tools and methods described above, the Japanese apply a so-called process-oriented approach to managing total quality in an organizational context. Zhao (1993) recognized four mechanisms of this process-oriented approach, including quality achievement mechanism at individual level, creating organizational conditions for maintaining the individual mechanism, connected quality vision through coupling, and continuous process improvement. Through these four mechanisms, TQM philosophy and methods are not only "applied" in organizations, but are also diffused into the core of organizational activities, becoming a part of the organizational culture.

Individual Quality Achievement Mechanism

The fundamental quality achievement mechanism is called PDCA cycle which consists of four major components: plan, do, check, and act. It is also called the Deming cycle, because it was brought to the Japanese by Dr. Deming, who based it on the Shewhart cycle. This actually is an error-reduction control mechanism, similar to the cybernetics of Wiener (1948). Using an established quality goal that serves as a

reference, production outcomes are continuously checked; the result is fed back to the comparator where the result is compared with the quality goal. If a difference between the result and the goal occurs, actions will be taken to reduce the difference. Through this difference-reduction cycle, quality performance based on accepted quality goals is maintained. The Japanese approach is characterized as the quality achievement mechanism at individual level (Kondo, 1990). In Japan, first-line workers and foremen are considered to be major players in quality control because they have direct experience on issues of quality, produce final products, and possess knowledge about production. As Ishikawa indicated, "Workers are the ones [who] actually produce, and unless workers and their foremen are good at what they do, QC also cannot progress" (1985: 21).

Conditions for Maintaining the Individual Mechanism

This individual mechanism is not at all taken for granted. Japanese organizations try very hard to generate an organizational climate in which this mechanism can take place. Under the humanistic system mentioned above, Japanese workers are granted a great deal of autonomy to take actions to correct quality errors. It is very common in Japanese firms that employees have the right to shut down production lines when quality problems occur. Managers are always available to employees when they have problems. Once a quality problem is found, solutions are defined through group efforts called QC circles. Actions can be taken immediately when approval from management is obtained.

Connected Quality Vision through "Coupling"

In the Japanese system, the quality goal is not just "localized" at the individual level; the goal is connected through the integration of individual activities. An "individualized" goal is based on and defined by a "shared" vision of the overall quality for customers, who may be both internal and external. Through cross-functional management, cross-functional training, and company-wide teamwork, workers and management are able to realize that their common customers are the final users of their products. They are collectively responsible for satisfying those common customers. Under this shared vision, it is guaranteed that everyone is "marching in the same direction" (Pascale & Athos, 1981).

Continuous Process Improvement

Another mechanism the Japanese use to manage total quality is known as continuous process improvement or KAIZEN. By continuously challenging existing ways of conducting business, new ideas are continuously generated and implemented (Imai, 1986). The Japanese make this happen through their suggestion systems. In Toyota, suggestion boxes are set up at each workshop and division. Whenever employees and foremen have ideas about quality improvement, they drop their ideas into a box, where these suggestions are then picked up by special people. Workable ideas will be put into practice very quickly. In less than forty years, Toyota has received more than twenty million ideas of improvement through the suggestion system. In Japan, the participation rate of employees into the suggestion system is averaged to be 67 percent, in contrast to

8 percent in the United States (Yasusa, 1989). Thus, it is not just having a suggestion system that is effective, but making it a system where participants' contributions are valued, and the participants know this.

Toward A Process-Oriented Approach

The examination of the current experience, review of the literature, and comparison with the Japanese approach to TQM implementations reveal that successful TQM implementation depends on a process-oriented understanding of TQM implementations, which emphasizes mechanisms of how TQM interacts with organizational factors and how TQM becomes a part of an organization's culture. Specifically, a process-oriented approach addresses the following issues of TQM implementations: First, it sees individual organizational members as the analysis unit. So how individual organizational members, not organizations exclusively change, matters. Second, human organizations, as collections of individuals, are treated as processes or dynamics, not tangible things alone. Third, the process-oriented approach focuses on mechanisms of organizational change that assist in bringing about effective organizational changes so that the change will endure.

Cybernetics (Ashby, 1956; Maturana & Varela, 1987; Steier, 1992; von Foerster, 1974; Wiener, 1948), along with the emerging self-organizing paradigm of dissipative structure theory (Prigogine & Stengers, 1984), synergetics (Haken, 1984), and chaos theory (Gleick, 1987), provides invaluable insights for constructing a process-oriented approach to TQM implementation. Cybernetics is a term coined by Norbert Wiener

(1948), who studied the mechanism of communication and control in man and machine. In its early formation, cybernetics focused on describing the phenomenon of how a system maintains its stability, self-regulation, and self-organization through negative feedback. Von Foerster (1974) applied this early concept to interactions between observers and the observed; thereafter second-order cybernetics emerged. Second-order cybernetics deals with the art of human understanding by including human observers within the observing process.

Process and change are central to cybernetic thinking (Steier, 1992). The cybernetic approach to process and change addresses the linkage between phenomena at the micro-level and functions at the macro-level through feedback loops. Interaction between macro- and micro-activities becomes a fundamental mechanism of generating change. So attention turns to how micro-level phenomena take place, how they are amplified through mutual interactions and information exchange, and how they are modified and changed, also called "order out of chaos through fluctuations (Nonaka, 1988; Prigogine & Stengers, 1984).

Applying cybernetics, a process-oriented approach, to studying TQM implementations, three specific questions will be emphasized. First, the assumed linear relationship between what implemented and organizational effectiveness becomes problematic. Organizational empowerment results only when the implementation process is effectively managed, and the process management, not just "what" is implemented, is an important factor. Thus reasonable change programs do not necessarily produce expected changes if the process is not emphasized (Beer et al., 1990a, 1990b).

Second, the process view of TQM implementation implies that the very purpose of TQM implementation is not the application of TQM methods or philosophies in organizations, but a revitalization and an empowerment of the whole organization through TQM efforts. In this sense, TQM implementation only serves as a triggering event, which is aimed to facilitate system-wide organizational transformation through which organizational culture is changed and the whole organization is empowered (Zhao, 1991).

Third, understanding how implementation takes place and how TQM becomes an organic part of organizational activities depends on the understanding of organizational processes. The emphasis is not only on how an organization is organized in terms of its missions, objectives, and structures, but also how these missions, objectives, and structures are generated and maintained by organizational members, also known as the organizational self-organizing mechanism. Through the self-organizing mechanism, TQM is diffused into a core component of an organization's culture (Deal, 1991; Olian & Rynes, 1991).

Research Objectives and Dissertation Organization

TQM implementation needs a process-oriented approach. The establishment of the approach requires interdisciplinary synthesis and development, which is the core objective of this research. Specifically, this research will accomplish three objectives:

First, this research will develop a process-oriented framework, called the organizational self-production model, for effective TQM implementation. The model allows in-depth exploration of personal views, feelings, and perceptions of organizational members during TQM implementation processes.

Second, it is to verify and test hypotheses constructed in this research, which describe the relationship between the TQM diffusion and organizational self-production model.

Third, this research is also concerned with the effectiveness of TQM implementation in action. The action emphasis is realized through survey feedback of research findings to the participating organizations, so that continuous improvements of the TQM diffusion can be achieved there.

This dissertation is organized into three major parts. The first part deals with theoretical development and literature review, including Chapter 1 and Chapter 2. Chapter 1 is devoted to the theoretical development of the organizational self-production model, based on literature review and synthesis of organizational studies. Major mechanisms of organizational self-production process are identified in Chapter 1. Chapter 2 furthers the development of the model, and emphasize organization-individual interactions. Five constructs are defined. The second part of this dissertation consists of

Chapter 3 and Chapter 4, which are devoted to research method and design issues. Chapter 3 describes measurement of TQM diffusion and restates research objectives. Six hypotheses concerning the relationship between TQM diffusion and organizational self-production are developed in this chapter. Chapter 4 discusses research method and methodological issues in detail. The third part of this dissertation delineates the empirical experience of this research, based on the research design described in the second part. Four research sites and specific data analysis techniques are introduced in Chapter 5, and research findings and interpretations are discussed in Chapter 6. In addition, conclusions and future research agenda are discussed in the section entitled Discussion and Future Research Agenda.

PART I THEORY DEVELOPMENT AND LITERATURE REVIEW

CHAPTER 1

Toward Organizational Self-Production

The "flawed" organizational change theory (Beer et al., 1990a, 1990b) is

dependent upon a flawed understanding of human organizations--namely, structural-

functionalism (Astley & Van de Ven, 1983; Burrell & Morgan, 1979; Putnam, 1982;

Silverman, 1971), which was commonly espoused by organizational change practitioners

(Beer et al., 1990b). Structural-functionalism is derived from functional explanations of

observers, who assume that what is studied is a system, and the system can be studied

through its functions (Abrahmson, 1978). One example is systems theory, which

emphasizes certain aspects of understanding, including (a) components of the system are

functionally interlaced; (b) the system is different from the sum of its components; (c)

the system interacts with environment so that orders of the system can be gained from

the interactions with the environment; and (d) input from the environment is transformed

into output to the environment through the system's internal structures (throughput).

Under the systems approach, organizations are considered to be open systems, and

attention is mainly given to interactions of systems within their environments. Therefore,

the contingency theory of organizational analysis (Lawrence & Lorsch, 1967; Thompson,

19

1967; Woodwards, 1958), subsystem properties (Katz & Kahn, 1978), and the organic organizational design (Burns & Stalker, 1961) become the foci of organizational studies.

Structural-functionalism has experienced a significant amount of criticism recently (Ashmos & Huber, 1987; Bethling, 1980; Frost, 1980; Pondy & Mitroff, 1979; Steffy & Grimes, 1986). First, it is based on a neo-mechanistic view of human nature (Pondy & Mitroff, 1979). This neo-mechanistic view is different from that in scientific management and bureaucratic theories, in which human beings are assumed to be machines. Under the neo-mechanistic view, organizational members are conceptualized as passive participants of organizational activities, that is, "as an instrument of production, as some sort of "needs-driven mechanism," as a rational and avid maximizer of profits, as a resource to be exploited and monitored, as a cost to be controlled and minimized" (Aktouf, 1992: 411). According to this conceptualization, research attention is directed to the overall organizational economic performance, but away from issues, such as how workers grow and develop in the workplace, and how individuals, as both psychological and intellectual beings (Ozaki, 1988), perceive, construct, and deconstruct organizational realities. On the relationship between individuals and their organizations, the "partial inclusion" belief remains dominant (Barnard, 1938). As Barnard (1938) pointed out, individuals' personal goals and objectives are not always consistent with organizational objectives, so individuals are "partially included" within organizations. This "partial inclusion" view is used to recognize the difference between individuals and organizations, but to ignore the dialectical relationship between individuals and

organizations for realizing both individual and organization objectives (Benson, 1977; Maturana, 1980).

Second, under the functional approach, as Hartman (1988) indicated, organizations are assumed to be systems. Each part of the system has a special function leading to the fulfillment of organizational goals. Organizations are designed through aligning these functional parts. This functional explanation emphasizes causal relationships, and the behaviors of the parts are treated as causes of the behavior of the system. According to this logic, one can control a system by manipulating its parts. Hidden assumptions include. On the one hand, that organizations are treated as linear relationships between parts and the system; on the other hand, organizations are universal, real, and objective things. Research attention is directed to the "objective" side of organizational processes, such as transactions between organizations and their environment, arrangements of people, and technological modes within organizations, but away from the subtle and complex processes, such as the construction of meanings through interpretation, the use of language, the restructuring of communication channels, and the decision making processes (Pondy & Mitroff, 1979; Putnam, 1983).

Third, this objectivity-oriented view on human organizations assumes that organizational effectiveness is achieved through a "structural fit," or "goodness-of-fit," with much emphasis on the structural side of organizations. Under this view, organizations are represented by certain forms of structural arrangements, which are constrained by technological interdependence and interactions between the organizations and their environments (Perrow, 1967; Thompson, 1967; Woodwards, 1958). So

searching for the "best" form or structure has been a common theme of organizational studies. Various organizational structures, such as functional, divisional, multi-divisional, matrix, and parallel structures have been proposed and studied. However, the "structural fit" view misses a key aspect of effectiveness--organizational capability for internal self-organizing (Zhao & Steier, 1993a). When organizational environments change, the organization has to be redesigned according to the new "structural fit" identified. Because the environments are under continuous change, the organization will never match the environment.

Fourth, the consequence of the structural-functional view is that organizations can be designed by outsiders based on universal laws discovered by organizational scientists. It is believed that, if the organization is designed this way, it will be effective. However, as many scholars have argued, inquiry from outside of the organization is different from that from the inside (Evered & Louis, 1981). The latter emphasizes organizational action effectiveness, such as coping with environmental changes, taking actions for adjustment, managing for change, and surviving in turbulent conditions, while the former emphasizes the universality of organizational theories in design, experimentalization, and technology.

Deconstruction of Structural-Functionalism

Various theories and perspectives have been proposed to deconstruct the structural-functionalism, such as interpretive (Putnam, 1983), critical theory (Steffy & Grimes, 1986), critical radical humanism (Aktouf, 1992), organizational cognition (Gioia & Manz, 1985; Weick, 1979b), and organizational culture (Schein, 1985; Deal &

Kennedy, 1982; Peters & Waterman, 1981). These perspectives have laid a foundation for a synthesis of organizational theories. In this section, we briefly review three schools of thoughts: interpretation and social cognition in organizations, organizational culture, and structuration theory of organization.

Interpretation and Social Cognition in Organizations

Interpretive and social cognitive approaches share a certain amount of similarities, but have different emphases. The interpretive approach focuses on the "way individuals make sense of their world through their communicative behavior" (Putnam, 1983), while the social cognition approach emphasizes the "cognitive means" for individual interpretation and meaning generation. This chapter does not aim to distinguish the two approaches, but rather to explore the common assumptions and conclusions from these two approaches. Previous studies in interpretive and cognitive approaches have concluded that (1) individual organizational members are able to reflect and to interpret their experience of participation and interaction within organizational contexts; (2) reflections and interpretations generate meanings through the use of language and other symbols in social contexts; (3) meanings may exist in the form of mental representations, such as schema, scripts, or categories; and (4) these mental representations will affect actions (Daft & Weick, 1984; Gioia & Manz, 1985; Pondy, Frost, Morgan, & Dandridge, 1983; Putnam, 1983; Weick, 1979b).

If we say that functionalism emphasizes the hard and tangible side of human organizations, such as structures and technology, the interpretive and social cognitive

approaches emphasize the soft and intangible side, including such aspects as interpretation, meanings, and organizing rules. In his seminal work on loosely coupling systems, Weick (1968, 1979a) argued that any human organizations contain two parts: subassemblies, which are comprised of tightly coupled, and relatively stable double interacts, dyiads, and triads, and assembly rules, which are defined as procedures, instructions, and guides that members use to mobilize several double interacts into large processes. Based on this earlier analysis on assembly rules in organizations, Weick (1979b) further proposed that human organizations are a body of thoughts, which are generated through organizational members' thinking. These thoughts can be in the form of schemata, causal textures, or reference levels. Later on, Weick and his colleagues emphasized the dynamic nature of organizational knowledge process, arguing that organizations should be viewed as an interpretation system, in which people interpret what they have done, define what they have learned, and solve problems on what they should do next. In their account, interpretation is a very important process, through which production events and interactions with environment can be translated into meanings, knowledge, and rules for organizations (Daft & Weick, 1984; Weick & Daft, 1983). Along these lines, Gray, Bouton, and Donnellon (1985) argued that organizations are entities of constructing and destructing meanings, which connect concepts, relationships, values, and deep structures. These meanings are held among organizational members, made in the processes by which members interact with each other, and shared through their collective actions.

The meanings generated by organizational members become shared and connected through their interactions and communications in production activities. Upon examining this "shared" or "collective" property of organizational activities, we see that some new concepts are constructed by organizational scholars, including organizational memory (Walsh & Ungson, 1991), mind (Sandelands & Stablein, 1987), identity (Albert & Whetten, 1985), and knowledge (Duncan & Weiss, 1979). For example, Duncan & Weiss (1979) defined organizational knowledge as guiding rules for organizational members to apply for producing expected outcomes. In this sense, organizational knowledge is about action-outcome relationships, including the conditions under which the relationships hold, organizational and individual images perceived by organizational members and applied by them to assess the organization-person fit, and organizing rules through which individual actions are coordinated. Organizational knowledge determines the definition of the organizational future, means of adaptation and change, and the consistency of actions.

Organizational Culture

Culture is a concept borrowed from anthropology. In their research on the pattern of successful U.S. companies, Peters and Waterman (1981) found that one of the common characteristics these companies possessed is their shared understanding of organizational processes, called corporate culture or organizational culture. Schein (1985) defined organizational culture as "a pattern of basic assumptions--invented, discovered, or developed by a given group as it learns to cope with its problems of external

adaptation and internal integration--that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (1985: 9). According to this definition, Schein differentiated three levels of organizational culture: (1) artifacts, the most visible level, which is concerned with organizational physical and social environments including technology, art, and other visible behavioral patterns; (2) values, a testable level by social consensus, which is concerned with shared preference, or the sense of what ought to be; and (3) basic assumptions, an invisible level, which is concerned with preconscious beliefs embodied by organizational members, such as relationship to environment, nature of reality, time, space, nature of human being, etc. Therefore, organizational culture is another approach that goes beyond the tangible concern of organizational processes.

One aspect in the study of organizational culture is that culture is considered as a root metaphor for analyzing organizational processes. According to Morgan (1986), organizations as the whole can be understood as cultures, or shared meanings by organizational members. The research attention is directed to these issues, such as how culture is generated, how it becomes shared, at what forms it exists, and how it changes. One particular interest in organizational cultural studies is organizational symbolism, which emphasizes the influences of organizational rituals, myths, stories, and ceremonies on organizational processes (e.g. Pondy et al., 1983). The other aspect in the study of organizational culture is the influence of culture on individual behaviors. In other words, this aspect of research is concerned with the roles of organizational culture in organizational organizing processes. As Wilkins and Ouchi indicated, organizational

culture is the "dominant form of control" (1983: 469). One particular form of organizational culture or local culture is called clan. By socializing them to the organizational cultures, organizational members become of capable of seeing "their objectives in the exchange as being congruent (not mutually exclusive)." Through this congruence, organizational culture helps organizational members to "determine what is best for the relationship" (1983: 471).

Structuration Theory in Organizations

As Giddens indicated, the structuration theory in social practice is a natural departure from structural-functionalism. Thus, structuraction theory is sometimes called "a non-functionalist manifesto." Structuration theory has been understood as a theory concerning the relationship between the activities of knowledgeable human actors and the structuring of social systems. The major premise is that "human beings are knowledgeable agents," who "know a great deal about the conditions and consequences of what they do in their day-to-day lives" through reflexively monitoring social settings and responding to changes in terms of implicit stocks of mutual knowledge (Giddens, 1984: 281). In this sense, social activities are skilled, knowledgeable actions of individuals. The natural consequence of recognizing human beings as agents and social activities as agency is the duality of social structure. Here structure is distinguished from systems. According to Giddens, social structures are the rules and resources people use in interactions, while social systems are the observable results of social interactions, existing as "regulated relations of interdependence between individuals and groups."

Social systems do not have structures, but exhibit "structural properties." The duality of structure implies that "social structures are both the medium and the outcome of social interactions", they are the medium because members draw on rules and resources to interact within and produce practices, and they are the outcome because rules and resources exist only by virtue of being used in a practice; whenever the structure is employed, the activity reproduces it by invoking and confirming it as a meaningful basis for action" (Poole, Seibold, & McPhee, 1986: 247). Structuration, as the process of production and reproduction of social systems through applications of rules and resources across time and space, takes place through this duality of structure.

Structuration theory has attracted a great deal of interest from scholars in management and organizational studies (Whittington, 1992), including organizational culture (Riley, 1983), organizational climate (Poole & McPhee, 1983), organizational structuring (Ranson, Hinings, & Greenwood, 1980), management and management accounting (Macintosh & Scapens, 1990; Whittington, 1992), and organizational communication (Poole & DeSanctis, 1992; Yates & Orlikowsky, 1992). For example, Ranson et al. (1980) applied structuration theory as a framework to analyze organizational structure and structuring processes. Contrary to the bureaucratic approach to organizational structure, which emphasizes function differentiation, integration, authority, and control, Ranson et al. (1980) argued that organizational structure reflects a connection between framework and interaction. Furthermore, "organizational structure, therefore, describes both the prescribed frameworks and realized configurations of interaction, and the degree to which they are mutually constituted and constituting"

(Ranson et al., 1980: 3). Based on this theoretical orientation, Ranson et al. suggested a theory of organizational structure, focusing on the roles of organizational actors who "reflectively monitor their experience and thus remake and recreate that experience" (1980: 4), and proposed three interdependent processes for organizational structuring: (1) organizational members create province of meaning which incorporate interpretive schemes which form the basis of their values, preference, and strategic orientations; (2) an organization consists of alternative interpretive schemes, value preferences, and sectional interests; and (3) the constitutive structuring of organizational members always accommodates contextual constraints inherent in organizational and environmental characteristics.

Organizational Autopoiesis (Self-Production): A Synthesis

The review of three schools above reveal a possibility for constructing a process-oriented model of organizational change. First, in this model, organizational members (including both management and employees) must be assumed as "active and intelligent participants" (Aktouf, 1992; Ozaki, 1988), who actively generate and process social information about self, the organization, and the organization-self relationship. In this sense, the individual self is a self-concept (Brief & Aldag, 1981; Markus & Wurf, 1987; Sullivan, 1989). Individual organizational members join organizations to realize the meaning of self; individuals are organization-bounded, and the self is the organizational self. The organizational self is constructed through organizational members' continuous

processing of information about the individual self, and others, including peers and managers, organizations, and situations.

Second, how organizational members--as intelligent participants--interpret their participation, and the meanings they generate must become a focus of the study of organizational change. Organizations should be studied in terms of, not only technological interdependence and interactions with environments, but also meaning generating, sharing, and communicating processes. In this sense, a human organization is a process or dynamic that maintains the "organization" in terms of its own purposes as perceived by insiders, not "functions" or "structures" identified by outsiders.

Third, organizations have a dual meaning: on the one hand, organizations are a collection of physical components, such as people (physiological beings), machinery, and raw materials, that is, they are producers of physical goods and services; on the other hand, organizations are also a body of knowledge, meaning, and organizing rules shared by organizational members. This knowledge, meaning, and organizing rules are generated through organizational members' interpreting organizational production activities, and they also affect the execution of production activities.

It becomes critical to find a systematic framework to synthesize and to operationalize various aspects of organizational studies beyond structural-functionalism. Fortunately, autopoiesis, a critical part of cybernetics and theory developed by Maturana and colleagues, has such a capability to make the synthesis possible. Autopoiesis literally refers to self-production (*auto-* self and *-poiesis* production). Maturana and colleagues, who based their research on biological systems, indicate that a system become autopoietic

when it has produced itself by its own processes (Maturana, 1981; Maturana & Varela, 1980, 1987). In this sense, autopoiesis is a theory of self-production or self-organization. The whole theory is supported by Maturana and Varela's observations on living organisms such as cells, metacellulars, and animals. The typical example of autopoietic process occurs in cells, as Maturana and Varela indicated: metabolism produces chemical components; then some components form a boundary, which limits the components within the cell. The whole production dynamic constitutes a closed network through which the cell produces itself.

Autopoiesis is represented by four pillars: (1) the concept of unity and organizational closure, (2) the distinction between *organization* and *structure*, (3) structural coupling, and (4) the language and languaging (Zhao & Steier, 1993a). According to Maturana (1981), a unity is defined as "an entity distinct from a background, characterize both unity and background by the properties with which this operation endows them, and defines their separability." Organizational closure refers to the self-determinined nature of autopoietic systems. According to Maturana and Varela (1987), any autopoietic system is organizationally closed because it defines itself. Organization here is used as opposed to Structure, a key distinction made by Maturana and Varela. According to Maturana (1981), the relations between the components that define a composite unity as the composite unity of a particular class constitute its Organization. The actual components, together with the actual relations that concretely realize a system as a particular member of the class of composite unities to which it belongs by its organization, constitute its Structure. In autopoietic systems, Organization

is determined by its <u>Structure</u>. In other words, composite systems are <u>Structured-</u>determined systems. Structural coupling is concerned with interactions between two or more organizationally closed systems. As Maturana and Varela (1987) argued, in organizationally closed systems, environmental influences cannot come into the system directly. Instead, these influences perturb the system for structural change. This relationship is called structural coupling. At last, Maturana and Varela (1987) argued that language is a biological phenomena. When organisms are coupled, a linguistic domain, which includes all linguistic coordinations of actions, is generated. Human language is generated in the next recursion of coordination: the linguistic coordination of the linguistic coordination of actions. As Maturana and Varela indicated, "we are in language only when through a reflective action we make a linguistic distinction of a linguistic distinction."

Luhmann (1988, 1990) extended Maturana and Varela's autopoiesis and applied it to social systems. According to Luhmann, autopoiesis serves as a general framework for societal and social studies. This conclusion is based on his critique and synthesis of four schools of tradition: general systems, cybernetics, phenomenology, and autopoiesis. Luhmann distinguishes three types of systems: biological, psychic, and social. They are all autopoietic systems, but each has different mechanisms for realizing its autopoiesis. For a biological system, the autopoietic process is realized through its own biological interaction; for a psychic system, its autopoiesis is realized through consciousness; for a social system, the autopoietic process is realized through manipulation of "meanings," that is, communication, because social systems are "meaning-based" systems. Therefore,

autopoiesis in social systems deals not only with self-organizing, production, and the eventual change of their own structures, but also with their self-reference, which applies to the production of other components (Luhmann, 1990: 3).

Luhmann considered communication in social systems not only as the mode of autopoiesis, but also as a self-referential process. Because of this latter property, Luhmann adjectivized communication as ecological (1988). As Luhmann advocated, "communications are not "living" units; they are not "conscious" units; they are not "actions" (1990: 3). In other words, a psychic system thinks, but a social system communicates, and "communication is an evolutionary potential for building up systems that are about to maintain closure under the condition of openness. These systems face the continuing necessity to select meanings that satisfy these constraints" (1990: 13).

A group of organizational scholars became interested in applying autopoietic principles into organizational studies (Chubb, 1990; Morgan, 1982; Steier & Smith, 1985, 1992). They argue that human organizations are autopoietic or self-referential systems. Seminal works in this school are Steier and Smith's articles on organizational cybernetics. Steier and Smith (1985, 1992), by following the concept of autopoiesis, argued that human organizations can be understood entirely in terms of their internal processes. This phenomenon is called descriptive closure (Richards & Gupta, 1985), also known as organizational closure or organizationally closed systems (Keeney, 1983; Maturana & Varela, 1980, 1987; Mingers, 1989; Steier & Smith, 1985, 1992). They extended the concept of organizational closure into human organizations, arguing that, in organizationally closed systems, "the internal relations with which that system

constitutes itself have a coherence that does not involve any reference to the system's environment" (1992: 11). They also argued that research attention should be shifted to how organizations become organizationally closed.

Organizational Self-Production Mechanisms

Another critical task of this research is to operationalize autopoiesis, or self-production, which presently exists only as a philosophical and abstract theory, in order to provide insights for effectively managing TQM implementations in practice by organizational practitioners. Based on the considerations above, the operationalization begins with the duality of organization, as Steier and Smith (1985) indicated. According to Steier and Smith, two aspects of organizational processes should be distinguished: relations of production, or how organizations are organized based on technological interdependence, and production of relations, or how organizations maintain themselves as organizations in production activities. We define the first aspect of organization studies--relations of production--as organizational production, while the second aspect--the production of relations--as organizational self-production.

Organizational self-production takes place through four interdependent processes: (1) participation, involvement and interaction; (2) reflection on participation, involvement and interaction; (3) generation of organization-self knowledge; and (4) actions under organization-self knowledge, as shown in Figure 1. Going through this four-step cycle, an organization, on one hand, can accomplish its production objectives; that is, inputs are transformed into outputs. On the other hand, through reflection on participation and

interactions in production activities, organizational members come to share their common

beliefs about organizational reality, constructing their roles in organizations, modifying

their relationship with others and their organizations, and taking actions based on the

meanings they have jointly constructed. In other words, the organization, as a body of

meanings and interpretation, maintains itself as the organization. That is, the organization

self-produces itself.

Figure 1
Organizational Self-Production
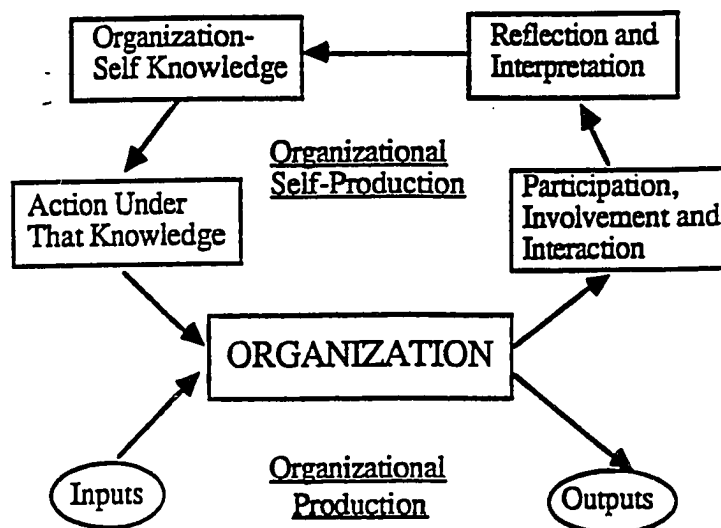
Participation, Involvement, and Interaction

Organizations consist of people who are participants in organizational activities. In the joining of organizational processes, organizational goals, that might be impossible through individual efforts can be accomplished. In order to achieve organizational efficiency, on one hand, organizational members specialize in functions based on the principle of division of labor. For example, in the managerial and non-managerial jobs, the former is responsible for thinking and planning; the latter, for acting and executing. On the other hand, all organizational members must be simultaneously integrated through organizational roles, norms, rules, and cultures. The degree of interaction, participation and involvement is dependent upon the organizational differentiation and integration, which is both constrained and enhanced by the mode of organizational technology (Thompson, 1967; Woodward, 1958).

Reflection on Participation, Involvement, and Interactions

Involvement in organizational production activities is only one side of the coin. Reflection and interpretation are on the other. As symbolic interactionists have argued, organizational realities are constructed through both individual members' internalization, which refers to self-reflection or looking inward, of the social interactions and their use of language in organizations (Ashworth, 1979; Blumer, 1969; Mead, 1934). In other words, organizational members have the capability to reflect on what they do in organizations, and interpret what those doings or actions mean to them. The reflection and interpretation are a highly individual activity, and the result may not necessarily be

shared by all organizational members. Previous research on semantic information distance, defined as "the gap in information and understanding that exists between superiors and subordinates (or other groups within an organization) on specified issues" (Jablin, 1979: 1207), has indicated that reflection and interpretation can be very different and significantly affect organizational performance, such as labor-management relations and job satisfaction (Jablin, 1979).

Organization-Self Knowledge

Individuals' self-reflection on organizational activities will generate meanings to organizational members. The meanings reflect to some extent the individual assessment on the relationship between the individual and his/her organization, called organization-self knowledge (Zhao & Richards, 1993). When the meanings generated are similar to the majority of the organizational members, these meanings become organization-self knowledge. This knowledge is comprised of three major components: perceptions on organization, self-definition of individuals (as "individuals"), and the relationship between perception and self-definition. Organization-self knowledge has characteristics of sharedness and connectedness, which refer to the similarity and relatedness of interpretations across actors. The sharedness and connectedness are highly related to the organizational members' interdependence in their production activities and lateral communications.

Actions Under Organization-Self Knowledge

Organizational members will do what they intend to do based on their organization-self knowledge. In effective organizations, individual members take actions volitionally, which in turn results in higher satisfaction, responsibility and contribution, and commitment to and identification with their organization. Individual volitional actions jointly constitute organizational collective efforts, or "marching in the same direction" according to the Japanese term (Pascale & Athos, 1981). Therefore, action under organization-self knowledge is a source of organizational effectiveness. In ineffective organizations, however, individual members are coerced to do what they are wanted to do in terms of organizational policy and regulations. The consequence is that individuals have no sense of responsibility for the overall performance and lack commitment to and identification with the organization.

Implications for Implementation Research

Organizational self-production as a paradigm has tremendous implications for implementation research and organizational change management. Its theoretical orientation and implications, which stress the deconstruction of the structural-functionalism, the synthesis of previous studies as alternatives to the structural-functionalism, and the introduction of a process-oriented framework, have been discussed in this chapter. In summary, the organizational self-production model is characterized as (1) it begins with the fundamental assumption that organizational members are capable of reflecting and interpreting what they do in the organizational contexts, and the

reflection and interpretation account for an important aspect of organizational processes; (2) it focuses on the duality of organizations, that is, organizations have both physically organized patterns, such as structures, and non-physical organizing mechanism, such as interpretation and meanings, and the two interact with each other; and (3) it is practical and operational, described through a four-stage cycle: participation, involvement and interaction, reflection and interpretation, generation of organization-self knowledge, and action under that knowledge.

The organizational self-production model has significant implications for practice. The focus of this section is on its applications in organizational design, organizational change and transformation, and implementation of technological innovations in organizations. The traditional approach to organizational design takes the structural-functionalism as its basis. This approach includes information flow approach (Galbraith, 1977) and contingency approach (Lawrence & Lorsch, 1967). Under the structural-functionalism paradigm, organizations are "designed" for purposes and functions which are defined by "designers," normally the "outsiders." For example, contingency theorists advocate the "goodness-of-fit" between the organizational structure and the environmental characteristics. An effective organization must be designed to "match" its environments, in terms of differentiation and integration (Lawrence & Lorsch, 1967). Scholars who believe in technological interdependence argue for the determinance of technology on organizational arrangement (Perrow, 1967; Thompson, 1967; Woodwards, 1958). In practice, organizations designed in this way are normally malfunctional or ineffective, because the condition when the design was made is always changing. Organizational self-

production implies a new paradigm for organizational design. Because organizations involve both production and self-production processes, organizations must be designed in terms of the relationship between its production and self-production. In other words, organizations must be designed as self-maintaining processes, called self-production, not for identified functions or structural configurations.

Implementation is an organizational change process, and the organizational change can take different modes. Organizational transition refers to superficial modifications in organizational activities, called the first-order change; organizational transformation refers to strategic reorientation, paradigmatic shift, and cultural change, called the second-order change (Levy & Merry, 1986; Tushman & Romanelli, 1985). The current organizational change theories, shaded by the structural-functionalism, are characterized as two types of change efforts: the change in organizational mission statements by the top and the change in organizational structural arrangements. As discussed in the Introduction, this is a "flawed" change theory, and change programs designed based on this theory do not produce changes (Beer et al., 1990a). Organizational self-production implies a process-oriented change theory. That is, a sustainable and effective change is achieved through the diffusion process, called "order out of chaos through fluctuations" (Prigogine & Stengers, 1984). The diffusion process takes place through three interdependent mechanisms: triggering criticality, self-organization, and restabilization (Zhao & Steier, 1993a), and the diffusion is realized through four mechanisms of organizational self-production: participation, involvement and interaction, reflection and interpretation, organization-self knowledge, and actions under that knowledge.

CHAPTER 2

Organization-Individual Dialectic and

Organization-Self Knowledge

Organizational self-production takes place through organization-individual interactions, specifically, organizational members' participating in organizational activities, interpreting their participation, assigning meanings to their interpretations, and taking actions based on the meaning organizational members generate. From a collective point of view, an organization is a whole, and an individual member is a part. So, organization-individual interaction is a part-whole dynamics. Between the part and the whole, a rich dynamics maintained. This part-whole dynamic is defined as the organization-individual (O-I) dialectic.

Organization-Individual (O-I) Dialectic

A human organization exists as a whole, consisting of various people who come together to accomplish common goals, and individual organizational members are parts of the whole. Organizational processes take place through interactions between the parts and this whole. This part-whole relationship has attracted the interest of organizational scholars. Barnard (1938) might have been the first to recognize the difference between individual goals and organizational objectives. Argyris (1960) introduced the term

41

"psychological contract" into organizational studies, referring to the mutual relatedness between individuals and organizations. Katz and Kahn (1978) approached this issue through so-called "role-making" processes: an organization is a system of roles that connects individuals to the organization. By introducing the concept of the "person-organization fit," Chatman (1989, 1991) argued for the importance of the congruence between the norms and values of organizations and the values of individual members. Because a rich dynamic relation exists between individual organizational members and their organizations, it is critical for organizations to maintain a goodness-of-fit between individual members and their organizations in terms of the values individual organizational members developed in the selection and socialization activities.

Benson (1977) crystallized the interaction between organizations and their members through introducing a dialectical view of human organizations. By recognizing the social construction aspect of human interactions, Benson argues that the organization is a dynamic of the parts with the whole: the whole consists of parts; parts contribute to the whole, and the whole influences the parts. Benson argues that the social world is constructed by its participants. Thus, according to the dialectic principle of totality, social arrangements are "complex, interrelated wholes with partially autonomous parts" (1977: 4). Concerning the interrelatedness of the whole and its parts, Benson further argues that the constructed "social world always constitutes a context, which influences the ongoing process of production." In this way components that are parts of "the social structure then become intertwined in complex ways" (1977: 4), and furthermore, "i(I)n a dialectical analysis the organization must be studied as a whole with multiple,

interpenetrating levels and sectors" (p.9). According to Benson, this implies "conceptualizing the organization as a concrete, total phenomenon and attending to the intricate ways in which its components are tied together" (p.9). This argument is also aligned with the reproduction theory of organizations (Stryjan, 1989) and the structuration of social processes (Giddens, 1984).

The organization, according to Morgan (1986), exists as a holographic system. This holographic system metaphor provides another intriguing approach to conceptualizing the part-whole relationship. Comparing the way a holographic plate encompasses all the information necessary to produce a complete image of each of its parts, Morgan develops a concept, called holographic organization, "where capacities required in the whole are enfolded in the parts, allowing the system to learn and self-organize, and to maintain a complete system of functioning even when specific parts malfunction or are removed" (1986: 95). According to Morgan, a holographic organization is designed through four mechanisms: the redundancy of functions, learning to learn, requisite variety, and minimum critical specification.

Organization-individual dialectic represents two aspects of organizational processes: individual selfing and organization organizing, as shown in Figure 2. In the selfing cycle, individual organizational members "figure out" the concept of "self" in order to develop a sense of "fit" to the organizational context. In this sense, the individual organizational member is a self-concept, continuously constructed by organizational members (Brief & Aldag, 1981; Markus & Wurf, 1987; Sullivan, 1989). Through participating in organizational processes and interpreting its participation,

individual organizational members actively search and process social information in the organizational environment and adjust their behaviors according to this information. The information processing activity is based on previously acquired knowledge (Klatsky, 1984; Markus & Sentis, 1982; Minsky, 1975; Schank, 1981; Winograd & Flores, 1987), called schema (Gioia & Poole, 1984; Gioia & Manz, 1985; Lord & Foti, 1986; Taylor & Crocker, 1981). In order to accomplish this selfing process, various types of social information are needed: information about other persons, which is related to the person- or other-schema (Cantor & Mischel, 1979), information about oneself, which is related to self-schema (Markus, 1977), information about situations, which is related to the person-in-situation schema (Lord & Foti, 1986), and information about events, which is related to the event schema or scripts (Abelson, 1976; Gioia & Poole, 1984).

Figure 2
Organization-Individual Dialectic
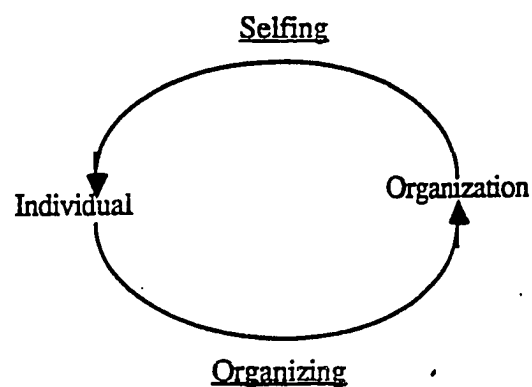
If organizational members have opportunities to participate in the organizational process and have access to a variety of social information within the organizational context, the self, which is constructed during the selfing process is an organizational self. Moreover, the meaning organizational members generate becomes organization-self knowledge, and the action taken under that knowledge is collective action. Collective actions constitute the organizing aspect of human organizations. This is demonstrated in two aspects: On one hand, organizational members participate in organizational production processes, transforming various inputs into outputs in order to maintain their organizational survival. From this point of view, organizational members contribute their time, effort, and physical energy to organizational production functions--the major concern of traditional organizational analysis. On the other hand, organizational members also reflect on their production activities, constructing organizational rules, regulations, and norms. Under the guidance of constructed organizing rules, organizational members continue their participation within the organizational process as active members, contributing their commitment and accountability (Steers, 1977; Walton, 1985) to the organization. Through this self-production process, as defined in Chapter 2, an organization maintains as the organization.

Organization-Self (O-S) Knowledge

The very product of the organization-individual dialectic is the organization-self knowledge, which serves as the sole medium for organizational self-production. Organization-self knowledge is defined as the individual's assessment or perception of

the relationship between the organization as the whole and the self as the part. According to this definition, first of all, organization-self knowledge is a self-assessment of the relationship between the individual and the organization. Thus, organization-self knowledge is an individual mental activity. Second, it is generated through interactions with other organizational members; so in this way this knowledge is the image of collective activities. Third, organization-self knowledge is not a thing, but a concept. It is exhibited in the interactive process and is attached to the dynamic. If the dynamics is gone, O-S knowledge will be also.

Organization-self knowledge is comprised of three major components: the perception of the whole, the conceptualization of the self, and the relationship between the whole and the self. First, the perception of the whole is comprised of the personal understanding of the organizational process. Nonaka (1991) indicated that Japanese organizations are able to facilitate the establishment of individual self-knowledge about their companies. According to Nonaka (1991), this self-knowledge is "a shared understanding of what the company stands for, where it is going, what kind of world it wants to live in, and, most importantly, how to make that world a reality." The second component of O-S knowledge is the self-concept of individual participants. The self-concept is the self-definition of the self or "me." It is concerned with the self, answering the question: Who am I? In social contexts, a key issue of the self-concept is the reference used for defining the self. The third component is the relationship between the self and the whole. For the self, this relationship concerns these issues: How and what

can I contribute to the whole? How does the whole serve me? The dynamic of the "whole-parts" is realized through this connection.

As an individual assessment on the relationship between the individual and the organization in organizational contexts, the organization-self knowledge is a product of the organization-individual dialectic, and this knowledge is a catalyst which facilitates this dialectic process. First, the organization-self knowledge serves as the "glue" which links individual members to the whole organization. When O-S knowledge exists, the individual "self" is defined, not in terms of individual "selfishness" or as "myself," but in terms of the individual's interrelationship with others and with the whole. This interrelationship is based on the perception of the organizational image in the minds of individual organizational members. By processing information about the whole organization, individual members are able to establish their roles within organizational contexts based on the conceptualization of self-concept.

Second, O-S knowledge serves as the fundamental mechanism of organizational collective activities. Some cognitive properties, such as the organizational mind (Sandelands & Stablein, 1987), the organizational identity (Albert & Whetten, 1985), and the organizational memory (Walsh & Ungson, 1991) are embedded in the collective process. The organization has human-like cognitive functions only when the complex interactions between individual and individual and between individual and organization exist. These organizational cognitive properties determine the collective responsiveness of human organizations, which is defined as the capability the organization--taken as a whole--possesses to adapt to any environmental changes. Collective responsiveness

requires that the organization continuously generates new ideas and transform rapidly these new ideas into organizational collective efforts.

An important property of collective responsiveness is the sharedness of organizational activities. One lesson we have learned from the Japanese is the collective responsiveness of the whole organization to environmental changes (Bower & Hout, 1988; Stalk, 1988). To Japanese managers, the human organization is a collection of many people with different ideas, opinions, and objectives. Individual understanding of organizational vision, moving directions, and the consensus involved in decision making are the major determinants of Japanese quality organizations. O-S knowledge embodies a rich mix of information about organizational vision, direction, strategy, and the fit between individuals and organizations. By making accessible the organization-self knowledge to all employees, Japanese organizations guarantee that all people march in the same direction very quickly (Nonaka, 1991; Pascale & Athos, 1981; Zhao, 1992). The other property of collective responsiveness involves self-organizing rules and regulations. According to this trait, O-S knowledge includes the implicit theories of organizing (Brief & Downey, 1983), "which can efficiently govern uncertain and complex transactions" (Wilkins & Ouchi, 1983: 475), because individual organizational members take actions under the guidance of O-S knowledge both consciously and unconsciously.

The last function of O-S knowledge lies in the emotional relationship between the individual and organization. O-S knowledge can be a predictor of individual emotion, specifically the attachment of individual members to the organization. This attachment

is measured by job satisfaction, organizational commitment and identification, and loyalty. With the organization-self knowledge, individuals become capable of envisioning the whole picture of organizational processes, the means for individual self-achievement, and the relationship between organizational and individual achievement. This will create the feeling of satisfaction, commitment, and loyalty. Previous studies on semantic-information distance (Hatfield & Huseman, 1982; Eisenberg, Monge, & Miller, 1983), information adequacy (Daniels & Spiker, 1983; Spiker & Daniels, 1981), and organizational commitment (Mortaz, 1988; Steers, 1977) have indicated that providing thorough information about what is going on within the organization to organizational members is positively correlated with the individual's job satisfaction and organizational commitment.

It should be noted that organization-self knowledge is different from organizational culture. Historically, organizational culture has been a key concept and area within the realm of organizational research. According to Schein (1985), organizational culture is defined as "a pattern of basic assumptions," which can be invented, discovered, or developed by a group of people who cope with such problems as external adaptation and internal integration. One implication of organizational culture research lies in the view of looking at organizations in terms of shared meanings (Smircich, 1983). In this view, the pattern of any group of people depends upon the existence of common modes of interpretation and shared understanding of experience. Organizational culture is also considered as the mind-set of individual members. Based on the collective reality of an organization, individual members see and understand

particular organizational events, actions, objects, or any situations in terms of their individual mind-set (Morgan, 1986).

Organization-self knowledge is significantly different from organizational culture for at least three reasons. First, research on organizational culture, although it has three levels of meaning--artifacts and creations, values, and basic assumptions (Schein, 1985)-- is often limited to the artifact level. The focus has been on the explicit part of organizational culture, such as rituals, stories, and artifacts. However, organization-self knowledge is always a process, in which the individual, as a part of the whole, interacts with the whole. The knowledge exists when the process exists. Artifacts are the traces left by the process. Second, research on organizational culture emphasizes the collective property of the organizational process: the sharedness. However, organization-self knowledge emphasizes the relationship between the organization and the self. The focus is on interactions between the organization and self. The central theme for organization-self knowledge inquiry is on how to generate this shared knowledge and how this shared knowledge plays a role in the self-organizing process. Third, organizational culture is a long-term and stable concept; organization-self knowledge is a short-term, situation-bounded, and real-time concept. Furthermore, organization-self knowledge is attached to a particular organizational dynamic.

A Case Study

A case study is included in this section in order to delineate the meaning and functions of organization-self knowledge.

During the 1992 Spring Semester, a knowledge architecture experiment was conducted in the Department of Engineering Management at Old Dominion University. Based on the assumption that knowledge is a social process, the experiment was designed to explore the human-to-system interactions that characterize the transformation of information into a system designed with a high level of accessibility for its human participants and with an ability to change itself. The experiment was not to be constrained by the current state of the art in computing or expert systems, but only by the imaginations and physical limitations of the participants. The system had a Dynamic Knowledge Unit (DKU), consisting of three active processors and two observers who are responsible for "designing" the processing architecture, which represents a mechanism of imputing and outputing information. All faculty members, graduate assistants, and doctoral students were participants in the experiment (approximately 40 people). The responsibilities of the DKU were to "process" inputs from participants and to continuously adjust the architecture to facilitate participation and further interactions within the system.

The initial design of the system was characterized by two basic principles: (1) Anything within the experiment could change and (2) processing would occur in such a way as to not discourage participation. Keeping these two principles in mind, participants used "input cards" to provide their comments on either the initial topic, a new topic, or the processing methods of the DKU. Inputs were processed by the DKU so that they might become more accessible to the participants and alter the entire architecture in the process (the simplest form of processing was a categorization). Processed cards and

processing notes were recorded in the logbook, and categories identified by the DKU were displayed on a bulletin board, located in an "operations room." The initial topic for eliciting inputs was: Should requirements for admission to the doctoral program be changed so that there is an increased preference for students with engineering degrees over those with other backgrounds?

The interactions between the participants and the DKU went through three stages. In the initial stage, participants exhibited enthusiasm and interest in both the topic and the experiment. Around thirty input cards were turned into the processing unit during the first week of the experiment. Many people came to the operations room to see the results. In the second stage, the number of input cards was fewer, and more of the questions concerned the actual processing mechanism. One participant took several input cards from the logbook and put them on the bulletin board in groups to replace the categories identified by the DKU, and called this "self-organization." In the third stage, almost no input cards were turned in, and fewer and fewer people came to the operations room. Some participants again reorganized the whole system, taking all cards out of the logbook and arranging them on the wall in new clusters.

The participants had a reflection session at the end of the experiment. Many expressed strong feelings of frustration and dissatisfaction on the following issues: slow processing or no response from the system, no interactions with others, and no ideas about the system. One participant said that he did not consider himself a participant, but rather a user because he could not conceptualize what his responsibility was within the system.

This case study demonstrates how organizational failures can occur without adequate individual-organization dialectic and organization-self knowledge during human organizing processes. On the one hand, the "what-is-the-whole" question has became critical since the very beginning of the experiment. After providing inputs to the processing unit, individual participants expected to know more about how their inputs were processed, and how other participants responded to their comments, and what conclusions were drawn from the discussion. However, because the whole experiment was represented only by those categories identified by the DKU and displayed on the board, individual participants could not perceive the whole picture of the experiment through other channels. As one respondent indicated, the experimental categories were "just statements." The system has no "two-way communication," and communications are "outside the system." Without a clear picture about the whole, individual responsibility could not be conceptualized, so the relationship between the whole and self is disconnected. When another participant was asked about his participation pattern, he expressed that he participated rather late in the experiment, waiting to see what he could contribute to the experiment because he had no understanding of the details of the experiment. Unfortunately, as the participant indicated, he never got the chance. Many other respondents expressed similar feelings about their "carefulness" in deciding whether to participate. When participants were asked about their perceptions about the experiment many responded with vastly differing ideas. They all had their own guesses about the nature of the experiment.

On the other hand, because participants did not perceive the whole of the experiment, they could not relate the whole to their personal roles. As one respondent indicated in the post-experiment interview: "I was being curious about the experiment [and] tried to help it work. I could not find [any] two-way communication. [There was] no response to my question. I was very disappointed." Another respondent commented, "the experiment did not bring discussion, only input, without communication. Communication occurred outside the system", and "The output cards [categories] are just statements." When third participant was asked "what was your personal role in the experiment?" He responded, "I was an ordinary user. [I tried] to do something to make it [the experiment] work. I was interested in doing it, but I didn't see it."

From these responses, it is clear that these participants' responsibilities were ambiguous. Their self-concepts had nothing to do with others and the whole system and in fact, limited participants' responsibilities to "reading" and "imputing."

The Relationship between O-I Dialectic and

Organizational Self-Production

The organizational self-production process takes place through the organization-individual dialectic. This relationship is shown in Figure 3. In the organizational self-production cycle, participation/interaction activities perform a sort of organizational collective function, related to the organizing aspect of the organization-individual dialectic. In the second stage, individual self-reflection and interpretation deal with the individualized selfing aspect within the organizational contexts in which the self-concept

is established. Attention turns to the selfing aspect of organizational processes. Through individualized self-reflection and interpretation of organizational activities and events, organization-self knowledge is constructed, so the interest is transitioning to the selfing aspect. When this action stage is reached, the process turns to the collective and organizational interests. Again, due to the fact that at the action stage organizational members take actions collectively and collective actions constitute he organization as a whole, the action stage relates to the organizing aspect of the organizational process.

Figure 3
The Relationship between O-I Dialectic and
Organizational Self-Production
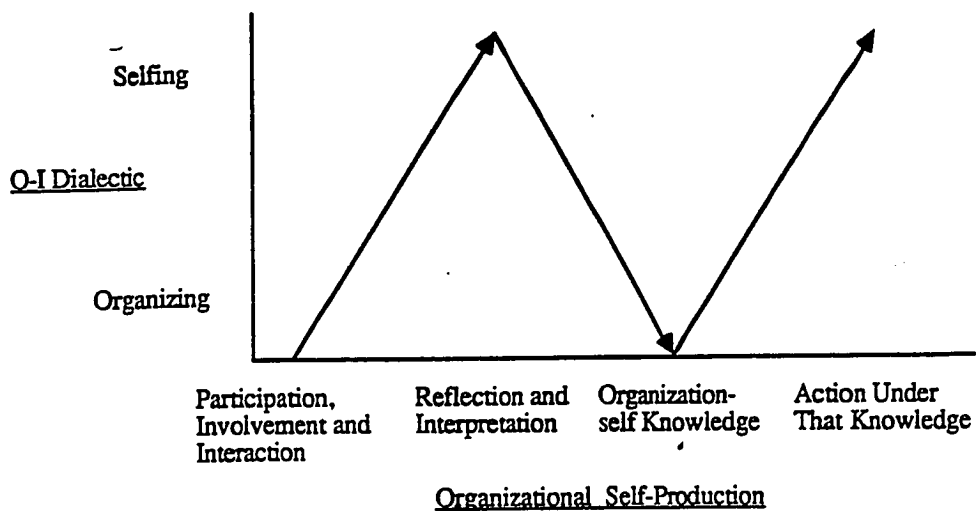
Selfing			
O-I Dialectic			
Organizing			
Participation, Involvement and Interaction	Reflection and Interpretation	Organization-self Knowledge	Action Under That Knowledge

Organizational Self-Production

Major Constructs of Organizational Self-Production

Organizational self-production takes place through organization-self knowledge, which is based upon the interaction between organizational members and the organization itself, also known as the organization-individual dialectic. Organization-individual dialectic describes two aspects of organizational processes: selfing and organizing. Due to this nature, organizational self-production can be described in terms of the five dimensions to the organizational process: participativity, individuality, interdependability, informationality, and accountability. These dimensions are summarized in the following:

Participativity

Participativity is a measure of organizational design, referring to the degree to which organizational members are capable of continuously getting involved in production activities. This design is a technical design, based on the technological nature of the workplace. Participativity measures an organization's capacity for employees' participation, involvement, and interaction, which are associated with the first stage of organizational self-production. Some organizations are designed for high involvement and participation of their employees; some are not. Examples of high participativity designs include team-oriented workplace organizations, which are represented in the Japanese QC circles (Lawler, 1986).

Individuality

Individuality reflects the selfing aspect of organizational processes, specifically the degree to which individuals develop personal ideas and opinions about how work can be done and apply these ideas and opinions into organizational processes. Individuality measures the organizational internal climate or environment for organizational members' reflections and interpretations of their participation, involvement, and interaction. Because of specialization and differentiation, each individual develops his own expertise and opinions on how work can be done, in addition to the shared organizational objectives. In the high individuality organizational environment, organizational members are encouraged to create new ideas of job accomplishment (Hummel, 1987; Kondo, 1990).

Interdependability

Individuality is only one side of a coin; the other side is the sharedness of organizational realities by individual members. Interdependability refers to the degree to which organizational members are mutually aware of and support each other so that they are able to "see" their organization as a whole, themselves as parts, and the relationship between the whole and the part (Nonaka, 1991). Interdependability measures the possibility of forming "shared" organizational interpretation, which is a major source of organization-self knowledge.

Informationality

Informationality refers to the availability of social information within organizational contexts to organizational members, constituting another source of organization-self knowledge. Individual organizational members need a great deal of social information in order to construct both concepts of the self and the organization. Part of the social information can be obtained through direct participation and involvement in the production process. However, direct experience can be limited, especially in large organizations. Thus, information processing depends upon communication. In order to continually involve all employees in the organization, the organization must be designed to inform all employees of the underlying organizational events and processes (Nonaka, 1991; Zuboff, 1985).

Accountability

Accountability refers to the degree to which organizational members develop a sense of responsibility of and contribution to the overall organizational performance. Organizational effectiveness depends upon the effectiveness of the collective action of individual organizational members; accountability measures the possibility of organizational members' taking collective actions in order to achieve organizational production objectives. Organizations must be able to make all employees have a sense of responsibility, commitment, and contribution to organizational activities (Lawler, 1986, 1992).

PART II RESEARCH ISSUES AND DESIGN

CHAPTER 3

Organizational Self-Production Model of TQM Diffusion:

A Restatement of Research Objectives and

Hypotheses Development

In contrary to the structural-functional approach to organizational change, the

organizational self-production approach has a strong process orientation, focusing on the

process of how an organization maintains as the organization through the self-production

cycle while accomplishing its production functions. Because of its process orientation,

the organizational self-production approach provides an interesting insight for

understanding the diffusion process of TQM into organizations. First, the organizational

self-production approach has the ability to address organizational processes and

dynamics. Under the organizational self-production approach, both individual

organizational members and the organization itself are viewed as processes, and they are

realized through interactions called the "organization-individual dialectic," respectively.

Second, the organization-self knowledge, through the organization-individual

dialectic, serves as a fundamental mechanism for promoting continuous quality

achievement at the individual level. This perspective directs attention to the very issue

59

of how individual organizational members feel, perceive, and react to TQM implementation activities, without compelling them to change their attitudes or behaviors.

Third, unlike a mechanical system, the self-regularity of the quality achievement mechanism at the individual level cannot be taken for granted. Therefore, certain organizational conditions are required to maintain such a mechanism. This implies that organizational environments must be "reengineered" in terms of both technological and humanistic conditions (Hammer, 1991; Hammer & Champy, 1993), in order to fulfill the requirement of participation, involvement, and empowerment of employees.

Fourth, the quality achievement mechanism at the individual level needs to be "amplified," so that it can generate quality improvements at the group or workshop level, and "coupled" to create improvements at the organizational level. Through this "coupling" process, the TQM effort becomes rooted at the individual level and is diffused into the whole organization. Then, endurable, cultural change follows. The Japanese experience in TQM implementations has demonstrated that this self-production approach is very successful in generating sustaining and enduring organizational changes (Zhao, 1993).

The objective of this research is to test the validity of these assumptions. Specifically, this research aims at accomplishing the following three objectives:

First, this research intends to develop and verify the organizational self-production model, which allows the in-depth exploration of personal views, feelings, and perceptions of individual organizational members

during TQM implementation processes. Attention is given to five organizational dimensions, which are based on the established organizational self-production perspective, including participativity, individuality, interdependability, informationality, and accountability.

Second, this research tests these hypotheses which describe the relationship between the TQM diffusion and organizational self-production through organization-individual dialectic. However, the purpose of this research is not to prove or reject the model in terms of causal relationships determined by statistical analysis, but rather to demonstrate an alternative approach to practitioners.

Third, this research is also concerned with the impact of the research on participating organizations through survey feedback, so that continuous improvements of the TQM diffusion can be achieved.

Measurement of the TQM Diffusion

In order to study the relationship between organizational self-production and TQM diffusion, a way to measure TQM diffusion must be developed. Various approaches to TQM measurement can be found in the evaluation methods of diverse quality prizes and

awards. The following is a brief overview, which is followed by the measurement development.

A Brief Overview

Originally, the Deming Prize, established in 1951 by the Japanese Union of Scientists and Engineers and in commemoration of Dr. Deming's contribution to the Japanese quality movement, was given to firms who had demonstrated an excellence in quality control and management. The Deming Prize is evaluated based on ten categories of factors: quality management policy and objectives, the organization and its operation, education and its dissemination, the assembly and dissemination of information and its utilization, analysis, standardization, control, quality assurance, effects through quality control, and future plans for quality improvement.

In a similar manner, the Malcolm Baldrige National Quality Award was founded in the United States, originated from the Malcolm Baldrige National Quality Improvement Act signed by President Ronald Reagan on August 20, 1987 (Garvin, 1991). Awards were established for companies with excellent records of performance in customer satisfaction, employee empowerment, and productivity improvement. The awards evaluate companies in seven specific areas: leadership, information and analysis, strategic quality planning, human resource utilization, quality assurance of products and services, quality results, and customer satisfaction. Since its establishment, the Baldrige Award has become a comprehensive framework for assessing progress toward new

paradigm of management and such commonly acknowledged goals as customer satisfaction and increased employee involvement.

In order to determine the impact of Total Quality Management practices on the performance of U.S. companies in 1990, the General Accounting Office conducted a detailed survey and extensive follow-up interviews at 20 U.S. companies. The GAO concluded that there was a positive relationship between TQM implementations and companies performance improvements. The companies' performances were evaluated according to four factors: employee relations, operating procedures, customer satisfaction, and financial performance. Employee relations were measured by employee job satisfaction, attendance, turnover rate, safety and health, and number of suggestions made to improve quality and/or lower costs. Operating procedures measure the quality and cost of products and services, including such factors as reliability, timeliness of delivery, order-processing time, production errors, product lead time, inventory turnover, quality costs, and cost savings. Customer satisfaction reflects how well individual companies focus on meeting customer needs and expectations and is measured in terms of overall satisfaction, number of complaints, and customer retention. Financial performance is the bottom line of a company's operations, which was measured in terms of market share, sales per employee, return on assets, and return on sales (Garvin, 1991).

Measurement: TQM Diffusion Indicators

As mentioned in Introduction, Nadler (1987) proposed that a change effort is effectively managed when (1) the organization is changed from its current state to its

future state; (2) the functioning of the organization in the future state meets the organization's expectations; (3) the transition is accomplished without any undue cost to individual organizational members; and (4) the transition is accomplished without any undue cost for the organization. Applying Nadler's criteria for effective organizational change management, the diffusion of TQM into an organization implies that (1) the TQM implementation will bring about productivity and quality improvement in production and service processes; (2) TQM implementations are humanistic, that is, they do not impose undue constraints on individual organizational members; and (3) TQM programs implemented will bring about organizational cultural change, through which TQM philosophy will become an organic part of the organizational processes so that the whole organization is empowered.

According to the definition above, the TQM diffusion reflects both the outcomes, or results, and the process of TQM implementations in organizational contexts. In this account, the approach to measuring the TQM diffusion should has focus on two aspects of the organizational change, together called TQM diffusion indicators. The first factor is the operational indicator, which reflects improvements in organizational operating procedures, productivity, customer satisfaction, and organizational adjustment. The second factor is the cultural indicator, which concerns improvements in employee relations, value change, and expectation for durable organizational changes.

The Operational Indicator

The operational indicator measures the visible and tangible aspects of organizational improvements in its operations, including productivity increase, cost reduction, customer satisfaction, and organizational adjustment. The indicator can be further broken down into three sub-indicators: Productivity, customer satisfaction, and organizational adjustments. **Productivity** measures the quality and cost of the organization's products and services, including reliability, timeliness of delivery, and production costs. **Customer Satisfaction** measures customers' perception of the product and the service quality provided by the organization, which is gauged by the number of complaints, retention rate, and overall satisfaction. **Organizational Adjustments** refers to the adjustments occurring in organizational structure, reward systems, and quality management systems that are made in order to "fit" the TQM philosophy. The organizational adjustment sub-indicator is measured through the adjustment of organizational structure and the establishment of quality management systems.

The Cultural Indicator

The cultural indicator measures the potential organizational change that can be achieved through TQM implementations, including (1) value changes in the minds of organizational members to favor customer-oriented, process-driven, and highly responsible organizational environment, and (2) expected durations of organizational changes through implementing TQM. The cultural indicator consists of three sub-indicators: leadership change, attitude change, and expectation of durable change.

Leadership change, which measures the interrelationship between employees and leaders and employee job satisfaction with the employee-leader relationship. **Attitude change** indicates company's intention to recognize that the organization is moving in the right direction and developing a new way of doing business through implementing TQM. **Expectation of durable change** measures individual attitudes toward the organizational change effort.

The Organizational Self-Production Model:

Some Hypotheses

As noted above, an organizational self-production process goes through four stages: Participation, involvement and interaction, reflection and interpretation, organization-self knowledge, and actions under that knowledge. In order to facilitate this four-stage cycle, interactions between individual organizational members and the organization to which they belong become a control point. As we indicated in Chapter 3, the dynamic can be characterized in terms of five organizational constructs: participativity, which implies that organizational activities are technologically designed for organizational members to continuously participate in organizational processes; individuality, which refers to how the organizational design allows individual opinions and ideas to be taken into consideration for organizational activities; interdependability, which implies that all organizational members to a certain degree become aware of each other and share a common perception of their organization; informationality, which requires that organizational members have access to all social information about

organizational processes, interdepartmental activities, peers, and individual performance; and accountability, which implies that organizational members develop a sense of responsibility and contribution to the organizational achievement.

This research asserts that TQM implementation, measured by both operational and cultural indicators, will be successful if it is implemented through the organizational self-production process and measured by five organizational constructs: participativity, individuality, interdependability, informationality, and accountability. A complex relationship between the TQM diffusion indicators and the organizational self-production constructs--together with these constructs and indicators--are called the organizational self-production model of the TQM diffusion, as shown in Figure 4.

Figure 4
Organizational Self-Production Model of TQM Diffusion

Organizational Self-Production   Diffusion of TQM

Participativity

Individuality   Operational Indicator
                                        Productivity
                                        Customer Satisf.
Interdependability   Org. Improvement

Informationality   Cultural Indicator
                                        Leadership Change
                                        Attitude Change
Accountability   Expectation of Change
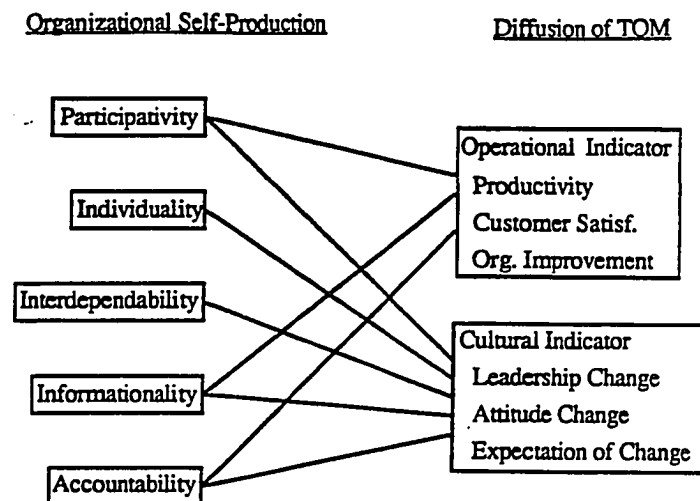
The relationships in Figure 4 are described in terms of following hypotheses:

Hypothesis 1 The participativity of organizational self-production process is positively associated with both operational and cultural indicators of the TQM diffusion.

The participativity of the organizational self-production process reflects the extent to which organizational members are involved in the TQM implementation process, measured by such indicators as cross-functional teams, quality control circles, or decision making groups. One particular example of participativity is the effort of so-called process innovation and work reengineering (Davenport, 1993; Hammer, 1991; Hammer & Champy, 1993; Zuboff, 1985). Traditionally, operating methods and working procedures, through which work is done, are designed based on obsolete principles of efficiency and control (Hammer, 1991). Without changing the old work design, the TQM lacks technological support. As a consequence, sooner or later, the TQM will be squeezed out from the organization. Therefore, job design, work flows, and control mechanisms must be reengineered in order to achieve operational improvements. In the reengineering process, several people work as a team to examine the operating processes and procedures, define existing problems, find solutions, make recommendations, and implement the solution. Involvement in the reengineering effort will generate two aspects of organizational change: On one hand, the problem-solving effort results in eliminating production and operation problems. Thus, operational improvements are achieved. On

the other hand, participation in the process will empower employees, causing attitude change and job satisfaction (Lawler, 1986).

Hypothesis 2 The individuality of organizational self-production process is positively associated with the cultural indicator of the TQM diffusion.

Individual organizational members' understanding of how the organization changes and committed efforts will produce actual change. Because organizational members are specialized and differentiated for certain responsibilities, each individual develops his or her own expertise and opinions as to what quality means and how it is achieved (Zhao, Steier, Gallup, & Woodhams, 1993). High individuality organizations encourage employees to develop their own ways of working. This implies that employees are not only "doers," but also "thinkers" in organizational events. Encouraging and facilitating organizational members to think in the workplace creates higher employee motivation and job satisfaction, positive attitudes toward organizational change, and higher expectation of the change duration (Hummel, 1987; Kondo, 1990; Zhao, 1993).

Hypothesis 3 The interdependability of organizational self-production is positively associated with the cultural indicator of the TQM diffusion.

Organizational quality vision must be shared by all organizational members as a whole, of which individualized ideas are part. Interdependability is related to three aspects of organizational efforts: individual organizational members establish a concept of the organization as a whole, of which they are part; they interpret organizational

events and processes similarly, and the interpretation is based on their own logic; and they establish a "connectedness" amongst their activities with other members across organizational boundaries. High interdependability will result in organizational members' identification with and belongingness to the organization.

Hypothesis 4 The informationality of organizational self-production process is positively associated with both operational and cultural indicators of the TQM diffusion.

Organizational processes must be designed to meet the information needs of all employees through TQM implementations. Organizational processes, to a certain degree, are based on the "selfing" process of individual organizational members which is achieved through social information processing (Salancik & Pfeffer, 1978; Thomas & Griffin, 1989). Previous studies have indicated that social information is closely tied to the relational satisfaction of employees (Spiker & Daniels, 1981), and the effective use of new technology that requires informing all employees about the underlying processes through which an organization accomplishes its work (Zuboff, 1985). In order to support organizational self-production process in TQM implementations, organizational members must be able to access the information about the organization, including information about mangers and peer workers, theirself, and situations, from all sources such as co-workers, supervisors, friends and families, customers, and organizations. High information availability will foster the understanding of organizational processes, resulting in both operational and cultural improvements.

Hypothesis 5 The accountability of organizational self-production process is positively

associated with both operational and cultural indicators of the TQM

diffusion.

Through TQM implementations, all employees should be empowered to develop a sense of responsibility of and contribution to the overall organizational achievement. To do this, more accountable organizational behaviors are required from all organizational members. These behaviors are known as organizational citizenship behaviors, which are "not formally prescribed, but yet desired by an organization" (Schnake, 1991: 736). Examples of behaviors include personal punctuality, helping peers and other members, being responsible for things that are not required by formal organizational policy, and making innovative suggestions for departmental or organizational improvement. Research has indicated that organizational citizenship is a complex phenomenon affected by many organizational factors, including job satisfaction, autonomy, individual needs, and received social information. Higher accountability will result in both operational and cultural improvements of TQM implementation.

Hypothesis 6 The process reengineering through applying Quality Control Tools has

wider influence on organizational self-production process, which results

in the TQM diffusion, than the general Quality Awareness Training does.

The general training for the overall quality awareness has been widely used by various organizations. Most organizations start TQM implementation with the half- or one-day quality awareness training programs. However, applications of basic QC tools,

including flow charts, pareto diagrams, control charts, and fishbone diagrams in work redesign and process change (Lawler, 1992; Kondo, 1990; Hammer, 1991), have more influence on the organizational self-production process than the general awareness training does. By applying QC tools, each individual organizational member has an opportunity to learn quality control techniques, develop their personal view on quality and customer satisfaction, seek and process information for quality status, generate ideas for continuous improvement, and implement solutions for quality improvement. So applications of QC tools in the workplace is closely related to organizational self-production and eventually will cause the TQM diffusion.

CHAPTER 4

Research Method and Methodology

According to the research objectives defined in the previous chapters, the research has three characteristics. First, it is exploratory, aiming at the development of a new theoretical model. Traditionally, organizational processes are mainly studied based on technological interdependence and causal relationships. The new model developed in this research goes beyond this traditional approach, emphasizing the issue of how organizations self-produce themselves in the process of TQM implementations through the individual-organization dynamic. Second, this research is interested in subtle and deep individual feelings and perceptions about selves, organizations, and the relationship between selves and organizations during the process of TQM implementations. Third, this research is designed to test five dimensions of the new model and their relationships with the TQM diffusion. In this sense, it has a property of both traditional and exploratory research (Patton, 1990). In order to conduct this research, the quantitative method, qualitative method, and survey feedback are required.

Open-Ended Interviews

In contrast to the quantitative method, which give a succinct and parsimonious summary of major patterns, the qualitative approach allows the depth, openness, and

73

detail of an inquiry (Patton, 1990: 13). This is critical to accomplish the first research objective: understanding the subtle, in-depth feelings and perceptions of organizational members in the TQM implementation process and developing organizational constructs for the organizational self-production theory.

The qualitative method chosen for this research is the standardized open-ended interview, which consists of a set of questions that take each respondent through the same sequence and ask each respondent the same questions with essentially the same words (Patton, 1990: 280). As Patton indicated, the standardized open-ended interview can minimize any variation in the questions posed to interviewees. In this way, it reduces the possibility of bias that comes from having different interviews for different people, including the problem of obtaining more comprehensive data from certain person while getting less systematic information from others (1990: 281).

In order to solicit inputs from various organizational participants, three groups of people were interviewed, and a different interview protocol was used for each group. The first group consisted of quality managers/coordinators and top level managers in the organization, who are considered to be the "designers" of TQM programs in their organizations. The second group included middle management and first-line supervisors, who are responsible for carrying out the TQM implementation on a daily basis. The third group comprised of employees. The research focused on determining their feelings and perceptions about TQM implementations and the nature of their involvement in the organization. Respondents of the interviews were quasi-randomly chosen from participating organizations, which means (1) technically, all quality

managers/coordinators and top-level managers were included in the sample, and (2) middle managers, first-line supervisors, and employees were supposed to be randomly chosen, but because of scheduling limits, respondents were chosen based on availability. This may have introduced some bias into this research, but it was minimized in the relatively large sample size.

The interview questions consisted of four main parts. The first part of the interview is concerned with obtaining background information about the meaning of quality, the purpose of TQM/L programs, and the characteristics of the TQM/L programs. The second part of the interview concerned the organizational members' feelings, perceptions, and reactions about the TQM implementation. The third part concerned assessment and evaluation of TQM programs, including major achievements and further efforts in some key areas for continuous improvements. The fourth part is concerned with respondents' comments on the interview, which were used for the purpose of closure. The interview protocols for three groups of respondents are included in Appendix A.

All interviews were conducted by the researcher himself.

Organizational Survey

The organization-wide survey is one of the quantitative methods widely used in organizational studies. In using designed and tested survey instruments, the survey technique can provide researchers with systematic and quantifiable data. Survey also has higher confidentiality; it can reach almost every member of an organization, providing

systematic information for researchers. A survey process normally goes through five phases (Edwards & Thomas, 1993): pre-survey planning, which defines the purpose of a survey and the method of conducting the survey; survey construction, in which the actual survey instrument, such as a questionnaire is designed and tested; survey administration, in which the actual survey is conducted in selected organizational sites; data entry and analysis, which deal with preparation and analysis of survey data based on designed data analysis techniques; and presentation of findings, which includes findings of the survey, implications, and recommendations for changes.

The survey used in this research is the questionnaire survey, which aims at gathering personal opinions of organizational members on four levels, including Chief Executives, middle managers, first-line supervisors, and employees. The survey was given to all members of participating organizations, except one organization in which the survey was allowed to be given to two departments. Data collected from the survey were analyzed statistically in order to test these hypotheses defined in Chapter 4.

The questionnaire was designed based on two factors. The first factor concerns the organizational self-production theory developed in this research, the other is the emerging patterns from interviews. The questionnaire is composed of six sections, as shown in Appendix B. The first section has one item (item 1), concerning the length of TQM implementation in an organization. The second section has twelve items (item 2 through 12), concerning TQM tools and techniques applied in the organizations. These tools and techniques include statistical process control, the Taguchi method, quality function deployment, team work, and quality awareness training.

The third section has 36 items (item 14 through 46), which measure the TQM diffusion process. The measurement was made based on two indicators: the operational indicator, productivity, which consists of item 14 through 17, and named Prodc_1, Prodc_2, Prodc_3 and Prodc_4, customer satisfaction consisting of item 18 and 19 and named as Cust_1 and Cust_2, employee relations consisting of item 20 through 22 and named Eerel_1, Eerel_2 and Eerel_3, organizational adjustment consisting of item 23 through 26 and named Org_1, Org_2, Org_3, and Org_4, quality systems consisting of item 27 and 28 and was named Qmgt_1 and Qmgt_2, reward systems consisting of item 29 through 33 and named Reward_1 through Reward_5; and the cultural indicator, including leadership change consisting of item 34 through 40 and named Ldship_1 through Ldship_7, attitude change consisting of item 41 through 43 and named Attitd_1, Attitd_2 and Attitd_3, and expected change duration consisting of item 44 through 46 and named Duratn_1, Duratn_2 and Duratn_3.

The fourth section has 32 items including item 47 through 78, measuring organizational self-production process characteristics. The measurement is designed in terms of five dimensions: participativity consisting item 47 through 51 and named Partip_1 through Partip_5, individuality consisting of item 52 through 56 and named Indivi_1 through Indivi_5, interdependability consisting of item 57 through 65 and named Interd_1 through Interd_9, informationality consisting of item 66 through 72 and named Inform_1 through Inform_7, and accountability consisting of item 73-78 and named Accoun_1 through Account_6.

The fifth section is related to the meaning of quality, having 16 items including item 79 through 94. This section is designed based on five categories: quality in terms of characteristics of outcomes including item 77 through 81, quality in terms of system's state or functions including item 82 through 85, quality in terms of customer needs including item 86 through 88, quality in terms of situations including item 89 through 91, and quality in terms of individual opinions including item 92 through 94 (Zhao, et al., 1993). The last section is concerned with demographics information, including the level of responsibility, the length of working experience, sex, and department.

Items concerning the job satisfaction and interpersonal relationships were taken from the MLQ scale, developed and validated by a group of researchers from University of Minnesota. Items concerning organizational communication and information availability were taken from the OCI scale that was developed and validated by Van De Ven and Ferry (1980). Some items about organizational conditions for TQM implementation were taken from the U.S. Navy's Total Quality Leadership Climate Survey (Department of the Navy, 1992). The rest of the items were designed by the researcher himself in part based on the interview responses.

Survey Feedback

The ultimate objective of any human inquiry lies in a better organizational change strategy, that is, through valid and reliable research findings, an effective change program can be designed, and better organizational performance can be achieved. As

mentioned in the previous chapters, the survey information feedback is also a task of this research.

The whole procedure of survey feedback consists of collecting data from an organization or department by using questionnaires, analyzing the collected data, feeding back the information based on the data analysis to organizational members, and using this information to diagnose the organization and to develop action plans to improve the organization (Cummings & Huse, 1989). Survey feedback is a system-wide method for organizational development (OD); it intends to provide managers and employees with systematic data for diagnosing flaws in the organization and for developing action plans in order to change the organization. Research findings have indicated that the survey feedback approach is very effective in bridging the diagnosis of organizational problems with the implementation of problem solving methods.

Research has indicated that information feedback provided by outsiders acts as a powerful force for making organizational changes, and this finding justifies the nature of action research, which focuses on an organization's continuous improvement capability of TQM implementation. According to Susman and Evered (1978), action research combines "generation of theory with changing the social systems through the researcher acting on or in the social system." Susman and Evered continued, "the act itself is presented as the means of both changing the system and generating critical knowledge about it." Action research has been a distinctive form of inquiry since the 1940s (Elden & Chisholm, 1993). The classical model of action research emphasizes the actual social problem solving through scientific inquiry, the participants' definition of context, the

consequence and sense making of intended change, the researcher's monopoly of knowledge generation, and the diffusion of knowledge. Recent advances indicate some emerging features of action research, such as the system level of change target, loosely organized research field, openness of research processes, self-organization as the major intended outcome, and inclusion of the researcher role (Chisholm & Elden, 1993).

This research has a feature of action research because of the emphasis on the continuous improvement of TQM implementation through information feedback. The focus is on the formation of change strategy and implementation of the change plan. Before the strategy formation and implementation is addressed, the research is more classical, with an emphasis on data collection and analysis through standardized, research-dominated procedures, although some assistance for research design are obtained from participants of the research organization.

Information was fed back to all participating organizations. Research findings were orally presented to the top management of the organization B. Other organizations were briefed through written reports. Follow-up assistance was also provided to organization B for modifying their strategic plan, upon their request. The information feedback and follow-up assistance is still an on-going process and subject to future study.

General Research Procedures

The whole research project included four stages: entry to organizations, data collection, data analysis, and final report and information feedback.

Entry to Organizations

In this stage, a research proposal with a cover letter, including an executive summary of the research and all research instruments, was submitted to seven potential sponsoring organizations, based on the researcher's personal relationship with their top management. An oral presentation was given to an organization in the service industry. One organization rejected the proposal because of its irrelevancy to its own program; another organization approved the proposal but due to planned moving required a delay of three months before it could participate. When the proposal was sent to a local manufacturing plant, the plant manager and quality manager expressed their interest in the research and, in fact, did immediately approved the proposal. However, when all instruments were sent to its headquarters, the company disapproved because it was in the process of negotiating with the union. So finally four organizations offered the entry for the research.

Data Collection

Research data were collected based on planned procedures and designed instruments, specially interviews and a questionnaire survey. The data collection arrangements were made between the researcher himself and the liaison persons assigned by the top manager at each participating organization. Interviewees were randomly selected, and questionnaires were given to all organizational members.

Data Analysis

Collected data were organized as a database and then analyzed in terms of planned analytical methods. The detailed techniques used for analyzing data will be discussed in the next chapter.

Final Report and Information Feedback

A final report on the research outcome, which is a part of this dissertation, was produced after the data analysis. A series of meetings with the top management, middle management, and first-line employees were arranged in order to feed back information to participating organizations in the form of both oral presentations/discussions and written reports in terms of different requirements.

Validity and Reliability Issues

Any research is subject to the issue of research credibility (Patton, 1990), which refers to "the simultaneous realization of as much reliability and validity as possible" (Kirk & Miller, 1986: 20). Reliability concerns "the degree to which the finding is independent of accidental circumstances of the research" (Kirk & Miller, 1986: 20). According to Kerlinger (1986), reliability can be translated to mean dependability, stability, consistency, predictability, and accuracy of data and research process; while "validity is the degree to which the finding is interpreted in a correct way" (Kirk & Miller, 1986: 20). In other words, the validity issue is concerned with the fact that we measure what we ought to measure.

Validity and reliability checks in this research begin with pretest checks of research instruments. The criterion-related validity, or the predictive validity, of the questionnaire was checked in multiple ways. First, the questionnaire was given to a small group of organizational members in the organization A. Data were analyzed and fed back to the organization. A thorough discussion with the TQM Coordinator about the findings was held. The findings from the test was shown to have strong consistency with the theoretical prediction. Second, the questionnaire was compared to interviews, which were conducted prior to the questionnaire survey. The comparison showed that the response from the questionnaire matched with the response from interviews. The content validity of the questionnaire, which is concerned with "the degree to which an empirical measurement reflects a specific domain of content" (Carmines & Zeller, 1979: 20), was checked by conducting an item-by-item interview with one participant. Some modifications were made in order to improve the validity after the item-by-item analysis. The construct validity of the questionnaire, which is concerned with the degree to which gives the theoretical aspect it was designed to evaluate, was checked through factor analyzing the loadings of the measurement items on five theoretical dimensions. Factor analysis will be discussed in the next chapter in detail.

The reliability of the questionnaire can be tested through multiple methods: the retest method, the alternative form method, the split-halves method, and the internal consistency method (Carmines & Zeller, 1979). The method used for checking the reliability of this research was the internal consistency method. Previous research has indicated that the internal consistency method works quite well in field studies (Saraph

et al., 1989). The internal consistency of a set of questionnaire items refers to the degree to which these items are homogeneous, which are estimated by using a reliability coefficient, specifically Cronbach's alpha. The detail for conducting the internal consistency analysis will be discussed in the next chapter. The reliability of the questionnaire was also insured by using items from standard questionnaires, such as MLQ and OCI.

The interview questions were tested for validity and reliability before they were actually used. The method used is called a pilot analysis. Based on seven interviews conducted, responses were analyzed in terms of (1) accuracy of reflecting theoretical concerns, (2) understandability of wording, and (3) consistency of understanding. Modifications are made based on the pilot analysis.

According to Patton (1990), validity and reliability of a qualitative research is dependent on (1) techniques and methods for gathering and analyzing data; (2) the researchers' training, experience, track record, status, and presentation of self; and (3) the understanding of naturalistic inquiry, qualitative methods, inductive analysis, and holistic thinking. In order to achieve high credibility in this research, three built-in validity and reliability checks were used throughout the research. First, this research was not be conducted as a single researcher project, despite the fact that this is a dissertation research. The student and his advisors maintained intensive interactions. These interactions intended to enhance the information exchange and supplement the student's inexperience in field. Through this information exchange, methodological and procedural mistakes were identified as early as possible. Second, research reflexivity is considered

as a methodological validity check, so "the observer(s) and responsibilities emanating from any act of observation are reflexively made part of any system of description" (Steier, 1991: 3). Taking this view for granted, the researcher, especially a researcher with international background studying the American organizational culture, becomes used to "looking in," or self-questioning the research process. Third, analyst and method triangulations were used thoroughly in this research (Patton, 1990: 464).

A Methodological Consideration

As mentioned above, both quantitative and qualitative research methods as data collection tools were utilized in order to accomplish the defined research objectives. However, which data were considered to be evidence depends on a researcher's value; and how the evidence is collected and organized depends on a researcher's methodology. A sound research design requires considering the researcher as a part of the research process. The inclusion of researchers in a research process constitutes research reflexivity (Steier, 1989, 1991), a rapidly emerging topic in the areas of research method and methodology.

Reflexivity, as a turning-back of one's experience upon oneself (Mead, 1962; Steier, 1991), reflects a crucial concern with the role of the researcher, or the inclusion of researchers in the research process. As Steier indicated, the "research process itself must be seen as socially constructing a world or worlds, with the researchers included in, rather than outside, the body of their own research" (1991: 2). Steier further clarified that research is a mutual mirroring process, from reciporator to researcher, and from

researcher to reciporator; the research is the mirrored activities. One example of this reflexive nature of research exists in family therapists' construction of families. In studying how families define themselves as family, Jorgenson (1989, 1991) demonstrated that the research outcomes are actually co-constructed by researchers with the collaboration of those being researched.

The reflexive nature of research is taken for granted in this research. The researcher is consciously considered as a part of the research--from research objective definition, research method design, data collection and analysis to the information feedback. In this sense, the research process is treated as a "mutual mirroring" activity between the researcher and the researched. This does not dispute the objectivity of this research, particularly in the areas of validity and reliability of the research, in the traditional research design. To the contrary, this awareness increases research objectivity by pre-checking various possible factors for invalidity and unreliability which are caused by the existence of the researcher.

In order to facilitate reflexivity, a open-ended question was asked to all respondents at the end of each interview concerning their comments and suggestions regarding the interview. Most respondents used this opportunity to add more comments, summarize key points, and raise their questions about the interview and research. In addition, some respondents also expressed how the interview effected them, and specific changes in their mind-sets as a result of the interview. A particularly typical respondent might say, "this interview makes me to think." This response clearly indicates changes

in people's mind and insights gained about their actions. Therefore, the interview, as a

commonly used data collection tool, is itself an action research method.

PART III EMPIRICAL EXPERIENCE

CHAPTER 5

Data Organization and Analysis

Due to the research objectives and methods defined in the previous sections, this chapter introduces the research sites and describes the detail of data collection, organization, and analysis procedures.

Introduction to Research Sites

The research was conducted in four organizations in order to accomplish the defined research objectives. Entry to each organization was based on accessibility. Among seven original requests for participation, four organizations offered the entry. For the sake of anonymity and confidentiality, the organizational names are substituted by letter A, B, C, and D. The type of data collection activities from each organization is shown in Table 1. In the organization A, over 100 questionnaires were given to three large departments. After collecting the first 16 back, the organization had a large re-organization. Because the re-organization had a strong impact on employees, no additional questionnaires were collected from the organization A. Approximately 160 questionnaires were given to all organizational members of the organization B, 147 were

88

returned. Around 30 questionnaires were given to one department in the organization D,

21 were returned. In the organization C, 17 of 28 were returned.

Table 1
Data Collection Summary

Organization Name	Number of Interviews	Number of Questionnaire	Information Feedback
A	10	16	Yes
B	18	147	Yes & Follow-up
C	4	17	Yes
B	1	21	Yes
Total	33	201	

Organization A

The organization A was formed in January 1992 from several components of three

companies that merged. This organization has six departments and around 180

employees. As a relatively independent entity, organization A provides information

services to its sister organizations and functions as a huge data storage facility, consisting

of hundred of thousands of microfiches. When information requests come from its sister

organizations, employees will locate the required microfiche, retrieve the information,

and send out the information in a timely manner. The quality of job means accuracy,

timeliness, and responsiveness. This organization has a formal Quality improvement

program, started in 1992, which focuses on organization-wide quality awareness training,

suggestion systems, reward and recognition systems, and team management. The

objective of the program is to improve productivity, interpersonal relations, and customer satisfaction.

Research activities involved in organization A included research instrument testings, such as interview protocols and questionnaires, interviews with organizational members at different levels, questionnaire survey, and a written survey feedback.

Organization B

Organization B has a similar organizational structure and function as organization A. Organization B provides various services, including security, maintenance, and supplies, to its sister organizations within a large organizational context. The organization B has seven departments, and around 160 organizational members. Organization B began its Total Quality effort in 1991. The focus was originally placed on organization-wide quality awareness training, process improvement teams, and leadership improvement. The major objectives within this organization include improvement in organizational morale, efficiency, and customer satisfaction. Since 1992, the emphasis has shifted to process reengineering, which is achieved through applying flow charting techniques. The top management hopes that, through this process, the Total Quality effort can be combined with their daily work.

The research activities involved in this organization included interviews. questionnaire survey, information feedback, and some follow-up assistance for the implementation of recommendations.

Organization C

The organization C is a small manufacturing company with about 28 employees, producing various composite construction materials based on its three production lines. The company is Japanese-owned, but managed by Americans, with assistance of three Japanese managers in the areas of Quality Control and Marketing. With technology imported from Japan directly, the quality of products in thickness, finishness, and uniformity is technically superior to all products in the existing market. The company has not adopted a formal quality management program. However, they emphasize the improvement in relationships between products and associated processes, attacking their quality problems by "reengineering" their processes. Another effort is the preventive maintenance of their production equipment. The whole quality effort is combined with its day-to-day activities.

Research activities in this organization consisted of four interviews with their production and quality control managers, including two Americans and two Japanese, and a company-wide questionnaire survey. Findings and some recommendations were also fed back to the company.

Organization D

The organization D is a manufacturing company with about 180 employees, having 50 years of history in distribution and manufacturing. Their manufactured products include a variety of insulated wires and cables that meet their customers' needs. The company has not adopted any formal quality management program. However, some

parts of Statistical Process Control (SPC) techniques, such as control charts and pareto diagrams, have been modified and implemented in their plant since 1991. This implementation has resulted in significant improvement in both product quality and organizational morale.

The research activities in this organization included one interview with its quality manager, and a department-wide questionnaire survey. Some findings and recommendations were also fed back to the company.

Data Organization

Data collected from different sources, namely interviews and surveys, were organized and analyzed in different ways. Interviews were transcribed from tapes recorded during each interview, and these transcribed interviews were organized into a database, which is a computerized text file. Survey data from questionnaires were transformed into a DOS file, which was then ready for statistical analysis using the SAS computer software package.

Interview Analysis Procedures

The primary method for analyzing interviews is content analysis (Patton, 1990; Weber, 1990). According to Patton (1990), content analysis is "the process of identifying, coding, and categorizing the primary patterns in the data" in order to make valid inferences. The content analysis in this research went through four stages. At the first step, the established database, which is a text file consisting of all interview

transcriptions, was divided into two major parts. This division was based on the theoretical framework developed in this research and research design. The first category contained background information about the quality management initiatives, including the meanings of quality, objectives of the quality program, major improvements, and future efforts. The second part is concerned with the five dimensions of organizational self-production process, that is, participativity, individuality, interdependability, informationality, and accountability. Two categories were created in response to the division, and used as index labels embedded in the computerized text file. The whole text was sorted by using the SORT function of WordPerfect 5.1.

At the second step, key words were identified for each part, so each paragraph or subparagraph were coded. A key word is a word that represents a theme of a sentence, a group of sentences, or a whole paragraph. For example, one respondent expressed his opinion on information availability as: "Morning meetings get the word out. We also have face-to-face communication and a newsletter." These together can be assigned the key word as "communication channel." The coded text in terms of key words was also re-sorted.

At the third step, identified key words were organized as a new data file, and a clustering analysis was conducted. Through the clustering analysis, some similar or inter-related concepts were grouped together and formed new concepts (Krippendorff, 1980). The new concepts emerged as the major constructs of organizational self-production theory. After clustering, frequency analysis was also conducted (Krippendorff, 1980).

At the fourth step, inductive analysis was conducted based on the key words assigned to each sentence or paragraph, so the major patterns about how people feel and perceive during the TQM implementations emerge. These patterns eventually become the basic reference point for the constructs of organizational self-production, which answers the first research question, that is, how people feel about the TQM and describe the relationship between TQM diffusion and organizational self-production.

Statistical Analysis Procedures

In order to accomplish the research objectives of reliability, validity, and hypotheses testing defined in this research, certain statistical analysis procedures were also utilized in addition to the interview analysis.

Factor Analysis

One concern in human inquiry is the covariation between different variables or constructs. Covariation is concerned with how one variable responds when the other changes. These observed covariations may be due to some underlying common factors. Factor analysis is a widely-used tool for detecting these underlying common factors. In this particular research, the factor analysis was used to confirm the five dimensions of organizational self-production theory through checking the loadings of questionnaire items on each dimension. If the loadings are distributed into five dimensions, or if there exist five separate factors among the questionnaire items, this indicates that the five dimensions of organizational self-production are valid in the sense of statistical

covariation (Kim & Mueller, 1978a, 1978b). The factor analysis was also used to test the convergent and discriminant validity of the questionnaire (Spector, 1992: 54). The varimax method of rotation was used in order to improve loadings and dimensionality (Kim Mueller, 1978a, 1978b). Factor analysis was conducted through using the procedure FACTOR in the SAS software package.

Item Analysis

Item analysis is another tool used for testing reliability and validity of a survey questionnaire. The purpose is to find those items that form an internally consistent scale and to eliminate those items that do not (Spector, 1992: 29). The measure used in this analysis is Cronbach alpha, which reflects the extent to which items intercorrelate with one another. If the existence of a certain item reduces the Cronbach alpha, this means that the item doesn't belong to this group. Therefore, it should be eliminated from the questionnaire. The outcome of an item analysis will be a valid and reliable instrument. The item analysis was conducted through using the SAS package.

Multiple Regression Analysis

Factor analysis and item analysis resulted in a reliable and valid questionnaire, which can be used for measuring the relationship between variables and constructs. The next step is to test the hypotheses established to describe the relationship between organizational self-production theory and TQM diffusion. The method used for this test is the multiple regression analysis, which gives the partial coefficient matrix between the

organizational self-production constructs and TQM diffusion indicators. The high partial regression coefficient indicates the strong positive relationship between the organizational self-production dimension and TQM diffusion indicators. First five hypotheses were tested in terms of these partial regression coefficients. The analysis was conducted using the procedure GLM of the SAS package.

Comparison of Means

The data source for this research were categorized into two major groups. One group is characterized by the implementation of TQM programs, with an emphasis on organization-wide quality awareness and team work training. The other is characterized by having no established quality programs, but by emphasizing process improvements. The two groups are compared in terms of TQM diffusion indicators and organizational self-production constructs, in order to test the hypothesis 6. The T-test method was used to test the significance of the difference. The SAS procedure TTEST was used to accomplish this particular task.

CHAPTER 6

Findings and Interpretations

After finishing both the context analysis of the interviews and the statistical analysis of the survey questionnaires, some patterns emerged. This chapter is devoted to the findings from various analyses in this research and the interpretations of these findings.

Findings and Interpretations of Interviews

As stated in the research design, 32 interviews were conducted in four organizations. The findings are organized into two parts: achievements of TQM implementation and people's feelings and perceptions about the implementation.

Achievements of TQM Implementation

Table 2 shows the key words assigned to the TQM achievement part in content analysis and in the emerging indicators of TQM achievement. Among the 47 key words used, three categories emerged, representing 12 responses in operational and organizational changes, 10 responses in interpersonal and attitude changes, and 20 responses in future efforts for continuous improvement. The fourth group is associated with the response of either "no major change" or "I don't know," accounted for 5 responses out of a total 47.

97

Table 2
Achievements of TQM Implementation

Indicators	Key Words Used	Frequency
Operational and Organizational	Efficiency	5
	Process Change	3
	Customer Satisfaction	1
	Crossfunctional Cooperation	1
	Quality as Standard	2
	12	
Interpersonal and Attitude Change	Interpersonal Relations	1
	Leadership Change	2
	People	5
	Awareness of Quality	2
	10	
Future Efforts on Quality	Training on the Job	4
	Cross-Training	3
	Interdepartmental Cooperation	2
	Communication	3
	Team work	2
	Leadership in Middle	3
	Fine-tune of Q Program	3
	20	
No Change/Don't Know	No Major Change	3
	I Don't Know	2
	5	
Total Responses		47

98

Operational and Organizational Changes

The major element in this category is efficiency improvement, 5 responses out of 12. For example, in the last year, organization B actually cut off 20 vehicles of the total it was paying for and cut down on a lot of unauthorized phone calls that cost them money in order to deal with the budget cut situations. Another element refers to the so-called "process change," with 3 responses. Process change means "that each department, from the top and down to the bottom and bottom to the top, to be the best they can, and to look the operation that they are doing and see it can be done better," as a worker described. Through process change, a worker commented, "we are trying to make our jobs little easier, finding a little shortcut on how to do it. Nothing major, but little things started to add up to something big." A typical example of the process change is the reengineering of information- retrieval procedures in organization A. Retrieving a single piece of information from the information base took seven days before the reengineering. Their clients became very upset with this. In order to reduce the turnaround time and increase the accuracy of information retrieval, a cross-functional team was formed. The team met regularly, studying the situation, discussing possible alternatives, and making recommendations to higher management. After implementing some of their recommendations, such as coloring the call numbers, pre-sorting requests, and eliminating unnecessary working steps, the turnaround time was reduced to one day, and accuracy also improved. Another change that the process reengineering brought about is the prevention of "burnout." A top manager in organization B explained that before reengineering they had so many cross-functional quality improvement teams--one single

person could be on several teams. Attending one quality team meeting after another, people felt "burned out," and complained that these meetings had nothing to do with their own operations. Through charting and reengineering their own process flows, people were able to concentrate on their own operations and began to look at their own problems. So process reengineering is capable of combining quality improvement efforts with daily operations.

The operational improvement also includes customer satisfaction. As some respondents indicated, in order to understand what customers want and how they are satisfied, some departments "go to talk to clients [customers], either regularly or unregularly." By focusing on what customers want and how to satisfy them, customer satisfaction is improved. In organization B, the number of phone calls from angry customers decreased from at least once a day last year to an average of two or three a month now. Because customers have different desires and needs, the quality standard also varies, with different products for different customers. One Japanese Quality Control manager pointed out, "customers need a whole thing, not just product, [but] also quality, price and cost, delivery systems, and explanations about the quality." In order to get the information from customers, managers must "go to customer sites," to "explain to customers."

The another aspect in operational quality achievement is organizational adjustment, including cross-departmental or cross-functional cooperation and quality management as a standard system. In order to make quality work, people are working through cross-functional teams. Meanwhile, they are also seeking inter-departmental

support and assistance. One quality manager told me that by implementing the quality program, "people are now talking to each other more than they ever did before, much [talk] was not only in their little work space. They are talking to people outside their department. You don't hear "what he said . . ." as much as you used to. If they have problems then they go solve the problem together." Another aspect of the organizational improvement is that organizational members tend to treat the quality initiative as a new standard of organizational operations. With this new standard, people feel "less confusion." "You have open communication. You have everybody tries to do their best," as one supervisor in organization B commented. An employee in organization B also commented, "Without the quality program, you just do your job any way you wanted. With the quality program, you have a standard, and pretty much expect to meet [the standard]".

Interpersonal and Attitude Changes

Another category of organizational changes through TQM implementation is interpersonal, including employees' job satisfaction, leadership style, and people's attitudes. Overall, through the quality effort, people begin to "work as units," and TQ "pulling people together." So people are sharing information and resources, cooperating with each other, and helping each other. As one supervisor indicated, "it is not what I do or you do, but [what] we do. We [are] all in this together." So the "whole morale" is changing. "Junior people" no longer feel "afraid," "scared," and "intimidated."

Important to the change of people's feelings is the change of leadership style. Most middle managers become conscious of playing participative management. In other words, they actively seek information and suggestions from lower level employees, and seriously treat these suggestions. Most managers use an "open door" policy, meaning if anyone has any idea about a "way of doing things better than we are doing, please come in and we will look at it, and see if we can implement it into our schedule." They also become conscious of sending a range of information out to people at lower levels through various communication channels, such as newsletters, daily briefings and meetings, and team meetings. This causes a significant, positive impact on organizational morale. As a quality manager in the organization B commented, "I no longer hear people say why we do that because this is the way we have always done it. They stop saying that, now they are saying: we have always done that way, but why? At least now they are asking why we are doing this, which is important because it means they are thinking." "People are no longer willing to accept things because it is just the way it were."

Future Efforts On Quality Management

In order to improve the implementation of the quality programs implemented in organizations, all respondents expressed their opinions on future efforts of quality management. These opinions are classified into seven broad categories. Among 20 responses, on-job training for competency accounts for 4, cross-functional training accounts for 3, improvement of interdepartmental cooperations for 2, improvement in

organizational communication for 3, team work for 2, leadership change in the middle management for 3, and the fine-tune of the program for 3.

No Major Change/ Don't Know

Five responses were classified into the category of "no major change" and "I don't know."

Organizational Self-Production Process

According to the research design, all interviews were content analyzed through assigning key words to a group of sentences or a paragraph that reflects one single theme. These key words and their meanings are listed in Table 3. Key words were further clustered into groups. The clustering was based on consensus made through discussion among two independent researchers. By giving all these key words to another researcher and letting him group them in terms of six categories--with 1 standing for participativity, 2 for individuality, 3 for interdependability, 4 for informationality, 5 for accountability, and N/A for not applicable--then his grouping result was compared with the one of another researcher. After the discussion, the first researcher grouped them again. After two rounds of grouping, a consensus was reached, as shown in Figure 5. The frequency distribution is shown in Table 4. This indicates that interview responses were mainly distributed in five dimensions of the organizational self-production process: participativity, individuality, interdependability, informationality, and accountability.

Table 3
Key Words and Their Meanings

Key Words	Meanings
Process change	Change processes to make quality
Work reengineering	Redesign work/jobs
Daily work	Relate quality to daily work
Task requirement	Quality as required job behavior
Tool applications	Use QC tools to make quality
Team work	Use work team to achieve quality
Team meetings	Team meetings
Work together	Work together as teams
Discussion/consultation	Managers discuss with employees
Qcustomer	Quality in terms customer needs
Qindividual	Quality based individual opinion
Qproduct	Quality in terms of products
Qgeneral	Quality in the general sense
Qsystem	Quality of system/organization
Qwork	Quality of work
Idea generation	Generate new ideas from employees
Suggestions	Make suggestions for improvement
Suggestion teams	Suggestion through team meetings
Individual knowledge	Individual knowledge for quality
Consciousness	Conscious of quality
Creativity	Employees' creativity for Q
Figure it out	Employee problem solving
Learning	Learning and training for Q
Encouragement	Encourage employee to make Q
Listen to	Listen to employees
Motivate	Motivate employees
Opendoor	Opendoor policy for communicat.
Ownership	Sense of ownership
Private	Sense of privacy
Problem solving	Problem solving

104

Table 3 (cont'd)
Key Words and Their Meanings

Key Words	Meanings
Mutual awareness	Mutual awareness and interaction
Interdepartment	Cross-departmental cooperation
Interpersonal	Mutual interdependency
Goal	Understanding of goals
Wholeness	Understanding of the whole organization
Understanding	Understanding of the whole
Customer	Understanding of customers' need
Channel openness	Openness of communication channel
Information availability	Availability of information
Information needs	Information needs
Information sharing	Sharing of information
Feedback	Feedback about job performance
Not knowing	Have no information
Information importance	Importance of information
Information types	What types of information
Challenge	Challenge to employees
Climate	Organizational climate
Conditions	Organizational conditions
Commitment	Commitment of employees
Spontaneity	Spontaneity of quality work
Willingness	Willingness to do quality work
Responsibility	Take responsibility

105

Figure 5
Clustering of Key Words

Process Reengn.

Process change(2)
Work reengineering(11)
Daily work(2)
Task requirement(3)

Participativity

TQM tool applications (4)

Team Work

Team work(24)
Team meetings(3)
Work together(3)
Discussion/consultation(1)

Mutual awareness(2)

Interactions

Interdepartment(4)
Interpersonal(6)

Interdependability

Understanding of goals

Goal(11)
Wholeness(2)
Understanding(5)
Customer(5)

106

Figure 5 (cont'd)
Clustering of Key Words

Individualized Quality

- Qcustomer(5)
- Qindividual(5)
- Qproduct(2)
- Qgeneral(1)
- Qsystem(4)
- Qwork(6)

Idea/Suggestions

- Idea generation(9)
- Suggestions(16)
- Suggestion teams(1)

Creativity

- Individual knowledge(1)
- Consciousness(1)
- Creativity(2)
- Figure it out(1)
- Learning(3)

Idea System

- Encouragement
- Listen to(2)
- Motivate(1)
- Opendoor(3)
- Ownership(1)
- Privacy(1)
- Problem solving (1)

Individuality

107

Figure 5 (cont'd)
Clustering of Key Words

Channel openness(11)

Information availability(5)
Information needs(1)
Information sharing(4)
Information(1)
Feedback (2)
Not knowing(1)

Information Availab.

Informationality

Importance of information(8)

Information types(12)

Conditions for Commitment

Challenge(1)
Climate(4)
Conditions(1)

Commitment(1)
Spontaneity(1)
Willingness(5)

Commitment

Accountability

Responsibility(3)

108

Table 4
Frequency Distribution of Responses on
Organizational Self-Production

Variables	Elements	Frequency	
Participativity	Process Reengn.		18
	TQM Tools		4
	Team Work		31
		53	
Individuality	Individualized Quality		23
	Idea/Suggestion		26
	Creativity		8
	Idea System		10
		67	
Interdependability	Mutual Awareness		2
	Interactions		10
	Understanding		18
	Customers		5
		35	
Informationality	Channel Openness		11
	Information Availability		14
	Importance		8
	Information Types		12
		45	
Accountability	Conditions for Commitment		6
	Commitment		7
	Responsibility		3
	16		
Total Responses			<u>216</u>

109

Participativity

According to its definition, participativity represents the degree to which people are involved in the organizational process during the TQM implementation process. As a major employee empowerment method, participation and involvement have become a symbol of total quality management. Almost all organizations, whether having TQM programs or not, claim that they empower employees through participation.

Many different approaches exist in order to involve employees. It is seen from Table 4 that teamwork is the most common method of participation, with 31 responses out of 53. Work teams, organized either within one single department or across different departments and comprised of five to seven people, meet regularly to solve their existing problems. Through teamwork, employees "document the process, recreate learning tools for "themselves," a department director pointed out, "through working as teams, employees obtain opportunities to get involved, to voice their concerns, to gather information about what is going on within the organization, department, and division. Therefore, they develop a sense of ownership," feeling that "they own the process." Describing the team process, one employee stated: "First of all we set up an agenda, a portion of information sharing, every member shares what is going on, and problem solving, particular problems just air it up, and review action plan. Assign different tasks to people between two meetings, and check actions taken prior to the meeting."

However, although the work team is a form of participation and involvement, it doesn't necessarily mean the real participation and involvement of employees. One common problem with the teamwork approach is "burnout," or one person on too many

teams. In some situations with the teamwork approach there can be a lack of relevancy to individual team members' daily operations. One department director clearly pointed it out: "[although] these people have similar goal(s), service to clients, but they have little in common with each other. So trying to make it [a team], or trying to bring these people together under the team concept, was not a good fit . . . You can call what you want, but you can't get it." This "imposed" team approach resulted in the perception of TQM as an extra, or additional, task of organizational day-to-day operations. So people feel "there are certain situations you can't use TQL because you have to get certain things done immediately," as a first line supervisor commented.

The pure "team" approach, either within a department or cross-functional, to total quality management without systematic support was doomed to fail. This was what actually happened in organization A. When the senior manager, who was fully committed to the pure "team" approach, switched to another place, his successor immediately terminated the concept and shifted back to the traditional management method. Although the reason for the switch-back was multiple, the major one was that the team management method "did not bring about efficiency."

An alternative to the pure "team" approach, with the emphasis on team meetings, is the process reengineering through applying certain quality control tools, such as control charts or flow charts, as indicated from the interview responses. By recognizing problems embedded in the pure team approach, such as burnout and irrelevancy, the top management in the organization B shifted their efforts from cross-functional teams with the Quality Awareness training to the process reengineering. By charting their own

process flow and working procedures, people at both the supervisor and the lower level became really involved in the process. They "sit down and look at the system, the process, why it is going to work," [and] then relate their basic processes to their problems. In so doing, they eliminate the source of problems. So "we came up with a system where it just smoothly runs. We have no problems," as one supervisor pointed out.

A production manager in the organization C stressed the importance of process reengineering in total quality management. According to him, a way of solving quality problems is to look at the relationship between the product and the associated process. "When you measure and track your quality and customer satisfactions, then you need to go into product-process matrix . . . to determine which process parameters control product parameters that your customers are most interested in." The manager continued, "When you identify the critical process parameters, you have to be able to control [them]. You have to determine your process capability. You have to know the relationship, basically do regression analysis between the process parameters and product parameters." As far as the reason for process reengineering, the manager explained, "you have limited resources. You got to make sure how many manpower you have available. You really want to look at major issues, not spending all your time on the minor issues and missing a major point." A Japanese quality control manager with more than 20 years quality control experience also confirmed the importance of process reengineering. According to him, the most important thing in quality control is the "built-in process and design." In his mind if you do not have good process, your quality will not be consistent.

<u>Individuality</u>

Individuality is another aspect emerging from the content analysis. The concept of individuality, which refers to the degree to which individual organizational members develop individualized quality vision in the organizational context, is theoretically supported by the fact that quality can be defined differently by different people. Previous studies have indicated that five approaches exist to define the concept of quality, including transcendental, product-based, user-based, manufacturing-based, and value-based, (Garvin, 1984b). In addition, five "vehicles" can be used by organizational members to define the meaning of quality: outcome or result, function or state of the system, needs of customers, situations, and personal opinions (Zhao et al., 1993; Steier, Zhao, Woodhams, & Gallup, 1993). This research again confirmed these findings; individual organizational members defined their meanings of quality in terms of the characteristics of final products or services they have done, needs and expectations of their customers, working environmental and organizational quality to support the quality job, and individual opinions.

This finding clearly indicates that the meaning of quality is not single-valued, but networked. As far as what quality really mean, a paradox exist. As Ishikawa has argued, quality control aims at satisfying "the requirements of consumers," called "consumer orientation." Meanwhile, quality also means "quality of work, quality of service, quality of information, quality of process, quality of division, quality of people, including workers, engineers, managers, and executives, quality of system, quality of company, quality of objectives, etc" (1985: 45). This argument indicates two important aspects of

total quality: the organization-wide meaning of quality, focusing on customer satisfaction, and the "individualized" meaning of quality, closely tied with individual jobs. As Ishikawa indicated, "Workers are the ones [that] actually produce, and unless workers and their foremen are good at what they do, QC also cannot progress" (1985: 21). The shared vision of quality serves as the ultimate goal of total quality control, and the individualized vision of quality serves as the critical path to the goal; the two become intertwined. A key issue of total quality management is how to facilitate the individualized vision of quality, which is closely related to employees's day-to-day jobs, in order to achieve the organization-wide customer satisfaction.

From the interview responses, it is seen that almost all managers and supervisors recognized the importance of employees' creative ideas to total quality management. As one manager commented, because "employees are closest to the work, you have to listen to their suggestions. They know it probably better than anybody else. [If] you don't listen to what they are saying, you just lose a good source." In order to obtain ideas from employees, most companies set up so-called suggestion systems, putting suggestion boxes into the workplace. At certain times, suggestions are collected and analyzed by management. If any suggestion is feasible, they will implement them. The suggestion system works very well in Japan through which employees bring in new ideas and methods. Another approach associated with the idea suggestion is called the open-door policy, and consulting with employees before taking any actions. As one manager described, "I told them at any time, if there is a way of doing things better than we are doing, please come in and we will look at it, and see if we can implement it into our

schedule." In departmental meetings, managers routinely ask people anything about any subject. As one manager pointed out, "I ask them anything at any level. Can you go ahead and provide me some recommendations and suggestions [so that] we can better make this more efficient and timely?" When employees establish a closer and trustful interpersonal relationship with their managers, "they want to come to talk to me, and they do," one manager concluded. However, the evidence from practices indicates that the open-door policy relies solely on a leader or manager's individual leadership styles. If managers do not have the self-awareness, the open-door policy and consulting methods may not work.

One practical problem with the suggestion system during the TQM implementation is that, you can have a suggestion system, but you may not be able to have any suggestions. In other words, employees hardly ever make any suggestions through the system, because there is no supporting organizational environment or climate to make it work. Employees want to make suggestions, and managers encourage them to do so, but they simply do not have any suggestions. One worker unreluctantly commented, "When you look at things overall, you have to view things in different light, [so] you can have some suggestions. But when you look at one small area, [if] somebody presents a problem to you, then you come up some suggestions . . . But without that problem, I cannot come up with any answer. I have to have a problem first, then I have the answer. I really cannot, I don't see [problems], because I get so used to doing things in that way. I cannot see beyond the point." A simple logic behind this comment is that idea suggestions and suggestion systems are two different things. It doesn't work in the way

that most people think that you have ideas suggested by employees if you have a suggestion system. The true idea suggestion involves providing supporting organizational environments, including incentives, rewards and recognition, job redesign, information feedback, problem solving techniques, and team work. Without these conditions, people do not frequently make suggestions, because they "are paid not to think," and "afraid of speaking up."

Interdependability

Improvement of quality and customer satisfaction requires cooperation of all functional units and individual members within the organization. This is also confirmed in this research, 12 responses on mutual awareness and interactions out of 35 in subtotal. Mutual awareness and interrelationship depend on employees' personal views: how they perceive their department, the other department, the whole organization, and the interactions with suppliers or customers outside the organization. In seeing this "bigger" picture, they can fit themselves within. Although sometimes goal setting and a mission statement help in providing the bigger picture to organizational members, the organizational goal and perceived wholeness by employees are two separate things in the TQM implementation process. For example, organization B has organized several cross-functional teams who work on different projects. Their goals are very clear to all managers: to solve different problems existing within the organization. However, how employees perceive these teams? As one worker perceived, "basically what I was seeing is a pattern of getting couple of people from this department and couple of people from

that department, putting them together to work on a project together, but I didn't know what TQL projects other departments have been working on."

Some organizations have wonderful goals and mission statements, such as "to be the best [largest] organization in the country" or "to provide the best service for customers." However, the understanding of organizational goals at different organizational levels can be very different, sometimes even the opposite. Without an efficient information delivery mechanism, people just don't have "a good sense of the importance of changing what they do, importance of this particular step, and how it affects the whole." In some cases, even some information delivery mechanisms have been developed, such as quality newsletters, but "a lot of people they just don't care [about them]." The issue here is not the communication model; you give them information, and they receive it. The real issue goes beyond the simple communication model; it concerns the whole job redesign and process reengineering. In order to make quality work, the workplace must be reengineered so that the all jobs become interdependable with each other, and job related information can flow freely, in terms of what they are doing, how they are doing, what others are doing, and what the whole organization is doing. With the interdependable job design, people become capable of being concerned with "what is done correctly so that it doesn't cause others' problems," and being "concerned about the next person I handled what I have done would be able to understand what I have done." Furthermore, they would have the awareness that, if some problems occur, "they will reflect on me, not only reflect on me but the whole department. So I am in the position where I have to excel to a certain level or the department looks bad."

It has been found that TQM programs are supported by interdepartmental interactions. One middle manager pointed out, "In the past, to some extent, there was a little bit of isolation there. I got [one department] and you got [another department], never the twin comes together. But that is not the case anymore. We work across the boundaries from one department to another department. We all support each other . . . I think the crossover is more upfront now than it was probably a year and half or two years ago. I think it happened because we sit down at the table and say, 'how can we better make [the organization] functioning better.'" This attitude is "all related back to this TQ." To the contrary, however, some quality programs failed to develop interdependable mechanism in the organizational context. As one manager commented, "I think we understand, but I don't think we have done a good enough job bringing in our departments together," because "we are relatively independent supporting the same clients," so "we don't have much interactions."

Informationality

Making information available to organizational members plays an important role in diffusing Total Quality into organizations. By getting information about various activities within organizations, people know what they are expected to do how well they are doing, and how much further efforts they need to commit. As a supervisor commented, "It is good to [make] information available to your employees, giving them information, letting them constantly know what is going on. A lot of time people feel better involved where they are working, the working atmosphere. If they are involved,

they know what is going on." Another function of making information available is to "broad their [employees'] scope," a department director from the organization B believed, "we can't limit them to do what they do 8 hours a day. They got to be able to understand how their job fits in the rest of the [company]." If people are left in the dark, "they don't know what is going on," so "they are not aware of what they are looking for this quality performance," then "you create your headache," another supervisor commented.

The most common information people need in an organizational context can be categorized into three groups: general information concerning environmental changes outside the organization, which have ultimate impacts on their organizational lives, such as through policy changes and acquisitions or merges; information concerning what is going on within the organization and their own department, such as organizational performance, restructuring, and policy change; and job-related information, such as daily activities, job performance, skills, and customer satisfactions and expectations. Often used communication channels for making the information available include meetings, either monthly, weekly, or daily briefings, which is the most often used methods; organizational or departmental newsletters or flyers, training classes, or the so-called "trickled down" approach, which means that managers consciously "pass down" information they have to lower levels in the workplace.

One critical issue in the information availability during TQM implementation process is the availability of work-related information to all employees. Although there is a tremendous amount of information concerning the general environment of the

organization and what is going on within the organization, the organic mechanism for delivering work-related information hasn't been reengineered in the workplace in most organizations. Work-related information, including customer (both internal and external) needs, quality standards, job performance, and interrelatedness with co-workers, are fundamental to total quality. In several organizations, the mechanism is just not there, and people are talking about quality in the general sense, but not in a manner related to daily work.

One exception to this was found in a department of organization A. In order to make all information, especially work-related information, available to all people within the department, the department director and her managers created a For Your Information (FYI) system: they use various folders containing an assortment of information inside and put every member's name on the folder within a group. The folder was circulated constantly, and everyone within the group not only had access to it, but also felt free to add any information in the folder. The continuous circulation of the folders makes all relevant information available and gets all the people involved. The interesting thing to this practice is its design is related to workplace. As one employee commented, having the access to the folder itself makes them feel empowered, because folders are usually used for managers and directors.

Accountability

Consistent, total quality depends upon organizational members' spontaneous quality effort from all organizational levels. The spontaneity in turn requires accountable

organizational behaviors from organizational members. Practice has shown that this accountability is determined by organizational members' sense of commitment, responsibility, and contribution to the organization as a whole. In order to facilitate this spontaneous behavior, organizational members shouldn't be forced or imposed to perform particular duties.

Accountable behavior is a complex phenomenon. Patterns of interview responses indicate that empowerment, information feedback, and workplace cooperation are closely related to the behavior. A manager in organization A found that, in order to make employees accountable, the first thing to show employees was how to "make a difference," making people take pride in not making mistakes. Then you give them ability to make decisions and be responsible for something. When people are in a responsible position, they will feel good about it, because they will "shine," if they are able to handle the situation successfully. Information feedback about performance is another approach to accountable behavior, giving people a responsibility first and then telling them how well they are doing. One worker told me that he felt very happy and confident about his job because when others recognized her superior performance compared to other's. Another worker indicates: "Usually a manager is in charge of [this function]. Now, I am in charge of it. I have my own desk. As far as I have my own desk, I have been told how to run computer, and I will be very involved with the organization of [other functions] I never been involved before. It just seems that my responsibility is well defined, and seems that everyday there something new I need to do, and it makes me a lot more confident at jobs, a lot happier to be in [this organization]."

She attributes this to the quality program: "It is the TQL thing here. I can speak up. I can say, 'I don't like what you are doing, and I feel you are wrong.'"

Cooperative environment in organizations also make employees feel accountable. One supervisor pointed to me, "Now people start to think, maybe we better sit down, maybe we better discuss it as a group . . . I feel people are now starting to ask why we can't do this project, why can't we try this. [As] responsibility widens, it is added some responsibility, give you a chance when you are not used to work with other people outside your department.

In summary: although various TQM methods, such as team work, suggestion systems, and quality awareness training, are implemented, some important mechanisms for supporting the TQM are not reengineered in the workplace. In other words, although these methods are there, they are not necessarily working in the way they supposed to. This is the reason why most TQM programs failed. Successful TQM implementations call for workplace reengineering, which can be designed based on five dimensions of organizational self-production theory: participativity, the degree to which organizational members are involved in the implementation process through job redesign and process change; individuality, the degree to which individual employees develop individualized quality vision and meanings; interdependability, the degree to which individual members develop mutual awareness and support each other in order to achieve the overall quality goals: informationality, the degree to which all relevant information becomes available

to people in the workplace; and accountability, the degree to which people develop sense of commitment, responsibility, and contribution.

Findings and Interpretations of Statistical Analysis

Exploratory factor analysis was conducted first in order to verify the organizational self-production theory. This was done by checking loadings on the various factors of the questionnaire. Factor analysis was also conducted to test both the validity and reliability of the measurement of organizational self-production constructs and TQM diffusion indicators.

Organizational Self-Production Dimensions

Table 5 presents the size of sample, mean, standard deviation, and correlations among all variables. Both organizational self-production and TQM diffusion scales are highly correlated. Among the TQM diffusion scale, five variables (variable 1 through 5) share relatively high correlations, with $r > 0.60$. This implies that the five variables overlap to a certain degree, measuring different aspects of the TQM diffusion. For the organizational self-production scale, intercorrelations among certain constructs are very high. Correlation coefficients between accountability and all other four variables, between individuality and participativity (0.69), between individuality and informationality (0.72), between participativity and informationality (0.68) are very high. The explanation for the high intercorrelations among variables is the overlapping of measurement. For example, accountability shares a commonality with individuality in terms of the individualized

aspect of organizational processes, and participativity is connected with informationality because participation will naturally increase the availability of information in practice.

According to the design of this research, organizational self-production is measured by 32 items of the questionnaire on five dimensions: participativity, individuality, interdependability, informationality, and accountability. The first task of statistical analysis was to verify that the measure was actually evaluating these five dimensions. This was done through extracting principal factors using the exploratory factor analysis method.

The extraction of principal factors among the original 32 items in the survey questionnaire was initially checked using the Maximum-Likelihood (ML) method (Kim & Mueller, 1978a, 1978b). Assuming there would exist one, two, three, four, five or even six common factors among the original 32 items, chi-square analysis without Bartlett's correction and Akaike's Information Criterion (AIC) was obtained. Because the ML method tends to give the much larger number of factors than we actually want, the actual analysis was done by analyzing the degree of chi-square and AIC reduction, as shown in Table 6. It indicates that retaining five common factors is probably sufficient to explain the most variance. This conclusion was further confirmed through principal component analysis using the principal component method (Kim & Mueller, 1978a, 1978b). Due to the minimum eigenvalue criterion, only five factors show their eigenvalue greater than 1.0. These five factor, their eigenvalues, and accumulative percentage of variance explained are shown in Table 7.

Table 5
Correlation Matrix

Variables	N	Mean	Std	1	2	3	4	5	6	7	8	9	10
1. Prodc	192	4.68	1.35	1.00									
2. Orgmp	195	4.35	1.38	0.68	1.00								
3. Attitd	200	4.59	1.52	0.64	0.67	1.00							
4. Ldship	200	4.90	1.31	0.65	0.67	0.62	1.00						
5. Duratn	198	4.71	1.53	0.69	0.75	0.79	0.71	1.00					
6. Partip	195	4.61	1.51	0.68	0.75	0.59	0.73	0.77	1.00				
7. Indivi	197	4.71	1.48	0.47	0.60	0.59	0.71	0.62	0.69	1.00			
8. Interd	195	5.77	1.15	0.39	0.39	0.44	0.44	0.58	0.43	0.39	1.00		
9. Inform	195	4.40	1.33	0.48	0.68	0.55	0.67	0.64	0.68	0.72	0.43	1.00	
10. Accoun	194	5.00	1.48	0.71	0.72	0.70	0.71	0.81	0.78	0.68	0.68	0.68	1.00

125

Table 6
Factors, Chi-Square, and AIC

Number of Common Factors	Chi-Square	AIC
1 Factor	1791.18	863.18
2 Factors	1409.07	543.07
3 Factors	1141.75	335.75
4 Factors	949.78	201.78
5 Factors	788.11	96.11

126

Table 7

Factors, Eigenvalues, and Variance Explained
for the Organizational Self-Production Model

Factors	Eigenvalue	Accumulative % Variance Explained[a]
Factor 1	15.22	68.18
Factor 2	2.48	77.92
Factor 3	1.60	83.87
Factor 4	1.23	88.00
Factor 5	1.08	91.54

[a] Data used in this column is from principal factor analysis.

127

Because the original data indicates a substantial loading for factor 1, it was rotated orthorganally in order to simplify them. Varimax and promax methods were used in the process of actual data analysis, as suggested by experts and often used in the literature (Kim & Mueller, 1978a, 1978b). From results of rotation, some unnecessary items were deleted in order to improve the loading and dimensionality. Specifically, Item Indivi_5, Interd_1, Interd_3, Interd_4, Interd_5, Interd_9, Inform_1, Inform_2, Inform_6, and Accoun_1 were deleted from the original questionnaire. Loadings of each item on five factors are shown in Table 8.

It is concluded, from the factor analysis above, that (1) the measure designed for organizational self-production does load to five factors, which is consistent with the five dimensions of organizational self-production theory, and (2) after rotating and deleting unnecessary items from the original measure, 22 items left were clustered on five factors, measuring the five dimensions of organizational self-production. Specifically, factor 1 is related to participativity, which concerns the degree of employee involvement in job redesign and process reengineering during the TQM implementation; factor 2 is related to the individuality, which concerns the individualized vision of quality work; factor 3 is related to interdependability, which concerns the mutual understanding and interaction among different organizational members; factor 4 is related to accountability, which concerns employees' sense of commitment, responsibility, and contribution; and finally factor 5 is related to informationality, which concerns the information availability and channel openness for organizational communication.

Table 8
Factor Structure of Organizational Self-production

Item	Factor1	Factor2	Factor3	Factor4	Factor5
Partip_2	**0.8270**	0.1648	0.1693	0.2224	0.2149
Partip_1	**0.8112**	0.1968	0.1663	0.1606	0.2072
Partip_4	**0.6559**	0.4824	0.0189	0.2731	0.2065
Partip_5	**0.6247**	0.4235	0.1210	0.2558	0.1240
Partip_3	**0.6121**	0.3616	0.1953	0.3330	0.1732
Indivi_1	0.1863	**0.7163**	0.1153	0.1877	0.1571
Indivi_3	0.2615	**0.6929**	0.1771	0.2558	0.2221
Indivi_4	0.3301	**0.6743**	0.1011	0.1015	0.2933
Indivi_2	0.2916	**0.6086**	0.1558	0.2451	0.2732
Interd_7	0.1407	0.0427	**0.7851**	0.2395	0.0723
Interd_8	0.1827	0.0573	**0.6713**	0.2635	0.1491
Interd_6	-0.0474	0.0997	**0.6699**	0.0267	0.1093
Interd_2	0.2532	0.2284	**0.6224**	0.1315	0.0285
Accoun_3	0.2640	0.2129	0.3753	**0.7027**	0.1909
Accoun_2	0.1768	0.2202	0.4455	**0.6270**	0.0992
Accoun_5	0.4420	0.2299	0.1402	**0.6265**	0.3517
Accoun_6	0.4499	0.2991	0.2217	**0.5643**	0.3493
Accoun_4	0.2427	0.3526	0.1841	**0.5515**	0.1920
Inform_3	0.2254	0.3515	0.1272	0.2531	**0.6908**
Inform_5	0.2561	0.2243	0.0809	0.1921	**0.6553**
Inform_4	0.1211	0.4689	0.3277	0.1939	**0.5003**
Inform_7	0.3875	0.2963	0.0920	0.0917	**0.4249**
Variance Explained by Each Factor	3.7923	3.3362	2.7336	2.6926	2.1182

129

TQM Diffusion Measures

A similar procedure was followed to analyze the measure of TQM diffusion indicators. Among the original 33 items on the TQM Diffusion scale, five indicators have eigenvalues over 1.0. This was also confirmed by using Maximum Likelihood method. Table 9 shows eigenvalues, cumulative percentage of variance explanation of each factor. After deleting Item Eerel_1, Eerel_2, Reward_1, Reward_2, Reward_3, Reward_4, Reward_5, Mgtstl_1, Mgtstl_2, Mgtstl_4, and Mgtstl_5, the scale was rotated using varimax method. The factor structure is shown in Table 10.

It is concluded, from the analysis above, that (1) the original two dimensions, customer satisfaction and productivity improvement indicators converged into one dimension, which is explained as the new productivity improvement dimension, including quality improvement, cost reduction, and customer satisfaction, (2) organizational structural improvement and quality management system dimension converged into one dimension, which explain the organizational improvement dimension including structural improvement and quality management system, and (3) other dimensions retained. There are five dimensions retained to measure TQM diffusion, including operational improvement, organizational improvement, leadership change, attitude change, and the expected duration of TQM change.

Table 9

Factors, Their Eigenvalues, and Variance Explained of
TQM Diffusion Indicators

Factors	Eigenvalue	Accumulative % Variance Explained[a]
Factor 1	17.30	71.59
Factor 2	1.99	78.72
Factor 3	1.60	84.18
Factor 4	1.15	87.73
Factor 5	1.02	90.77

[a] Data used in this column from principal factor analysis.

131

Table 10
Factor Structure of TQM Diffusion Indicators

Item	Factor1	Factor2	Factor3	Factor4	Factor5
Cust_1	**0.7684**	0.2690	0.2194	0.1862	0.2497
Prodc_1	**0.7129**	0.2497	0.3569	0.2103	0.1249
Prodc_3	**0.7121**	0.3066	0.2987	0.1608	0.0723
Prodc_2	**0.7085**	0.3081	0.2422	0.1427	0.1336
Cust_2	**0.6957**	0.1275	0.1099	0.1345	0.1271
Prodc_4	**0.5571**	0.3634	0.0690	0.2224	0.1321
Org_2	0.2841	**0.7674**	0.2438	0.2293	0.0692
Org_3	0.3755	**0.7415**	0.3114	0.1825	0.1120
Org_1	0.1675	**0.7083**	0.1511	0.1718	0.1937
Org_4	0.3229	**0.6603**	0.2776	0.1730	0.1288
Qmgt_1	0.3058	**0.6333**	0.2879	0.3033	0.1328
Qmgt_2	0.2813	**0.6012**	0.1646	0.3257	0.2646
Durat_3	0.3007	0.3095	**0.7693**	0.1829	0.1591
Durat_2	0.3245	0.2885	**0.7163**	0.2717	0.2158
Durat_1	0.2903	0.3662	**0.6816**	0.3693	0.1834
Attitd_2	0.2731	0.2868	**0.4500**	0.3115	0.4007
Mgtstl_7	0.1599	0.1414	0.2013	**0.6414**	0.1337
Mgtstl_3	0.1337	0.3237	0.1433	**0.6207**	0.1767
Mgtstl_6	0.3610	0.2823	0.3057	**0.5194**	0.1078
Eerel_3	0.4720	0.3130	0.2086	**0.4897**	0.1517
Attitd_1	0.2281	0.1887	0.2045	0.2350	**0.5659**
Attitd_3	0.3336	0.3801	0.4298	0.2471	**0.5271**
Variance Explained by Each Factor	4.3372	4.1891	2.9031	2.2991	1.2407

132

Internal Consistency of the Scale

The internal consistency of the scale was checked by using the item-analysis method defined in the previous chapter. Table 11 and Table 12 show the correlation and Cronbach's alpha of each item with those of its group for the TQM diffusion and organizational self-production measures. It is concluded that each measure, after deleting the unnecessary items, shows higher internal consistency with Cronbach's Alpha over 0.7.

Hypotheses Testing

Hypothesis 1 through 6 were tested through multiple regression analysis and T-test. Table 13 shows the partial regression coefficients by using each TQM diffusion indicator as a dependent variable and organizational self-production variables as independent variables. Table 14 shows the results of paired means comparison of both TQM diffusion indicators and organizational self-production variables.

Hypothesis 1 states that participativity of organizational self-production process is positively associated with both operational and cultural indicators of TQM diffusion. This hypothesis is strongly supported. It is seen from Table 13 that participativity is significantly associated with productivity improvement ($r = 0.36$, $p < 0.01$), organizational improvement ($r = 0.34$, $p < 0.01$), attitude change ($r = 0.23$, $p < 0.01$), leadership change ($r = 0.33$, $p < 0.01$), and expectation of change duration ($r = 0.41$, $p < 0.01$). This research concludes that participation through job redesign and process reengineering have strong impacts on both operational and cultural changes.

Table 11
Internal Consistency of the TQM Diffusion Scale[a]

Item Group	Correlation with Total	Alpha
TQM-Diffusion		
Cust_1	0.85	0.81
Cust_2	0.69	0.90
Prodc_1	0.81	0.90
Prodc_2	0.78	0.92
Prodc_3	0.82	0.89
Prodc_4	0.65	0.91
Cronbach Alpha		0.92
Org_1	0.72	0.92
Org_2	0.84	0.90
Org_3	0.84	0.90
Org_4	0.76	0.91
Qmgt_1	0.77	0.91
Qmgt_2	0.73	0.91
Cronbach Alpha		0.92
Durat_1	0.85	0.89
Durat_2	0.87	0.88
Durat_3	0.86	0.89
Attitd_2	0.71	0.93
Cronbach Alpha		0.92
Mgtstl_3	0.61	0.78
Mgtstl_6	0.67	0.76
Mgtstl_7	0.64	0.77
Eerel_3	0.63	0.77
Cronbach Alpha		0.82
Attitd_1	0.61	n/a
Attitd_3	0.61	n/a
Cronbach Alpha		0.76

[a] For standardized variables.

134

Table 12

Internal Consistency of the Self-Production Scale[a]

Item Group	Correlation with Total	Alpha
Self-Prod.		
Partip_1	0.82	0.90
Partip_2	0.84	0.90
Partip_3	0.79	0.91
Partip_4	0.83	0.90
Partip_5	0.74	0.92
Cronbach Alpha		0.92
Indivi_1	0.71	0.84
Indivi_2	0.72	0.84
Indivi_3	0.75	0.83
Indivi_4	0.73	0.84
Cronbach Alpha		0.87
Interd_2	0.57	0.79
Interd_6	0.58	0.79
Interd_7	0.73	0.72
Interd_8	0.66	0.75
Cronbach Alpha		0.81
Accoun_2	0.73	0.90
Accoun_3	0.83	0.88
Accoun_4	0.69	0.91
Accoun_5	0.82	0.88
Accoun_6	0.80	0.89
Cronbach Alpha		0.91
Inform_3	0.75	0.74
Inform_4	0.78	0.78
Inform_5	0.78	0.78
Inform_7	0.84	0.84
Cronbach Alpha		0.83

[a] For standardized variables.

135

Table 13
Multiple Regression Coefficients

Independent Variables	Dependent Variables				
	Prodc	Orgmp	Ldship	Attitd	Duratn
Participativity	.36*	.34*	.33*	.23*	.41*
Individuality	-.08	-.06	.20*	.12	-.04
Interdependability	-.08	-.06	.01	.11	.18*
Informationality	-.10	.29*	.13***	-.01	.06
Accountability	.51*	.31*	.15**	.41*	.40*

ᵃ	N = 201
*	p < 0.01
**	p < 0.05
***	p < 0.10

136

Hypothesis 2 addresses the relationship between individuality and the TQM diffusion, which states that the individuality is positively associated with the cultural indicator of TQM diffusion. Table 13 indicates support for this hypothesis. It is seen that individuality is significantly associated with leadership change ($r = 0.20$, $p < 0.01$). The explanation is that individuality, which is closely related to autonomous organizational environments, depends on leadership and management styles.

Hypothesis 3 emphasizes the relationship between interdependability of organizational self-production and the cultural indicator of TQM diffusion. This hypothesis is also supported. From Table 13, it is seen that interdependability is significantly associated with the expectation of change duration ($r = 0.18$, $p < 0.01$).

Hypothesis 4 relates informationality of organizational self-production to TQM diffusion. It is concluded that informationality is positively associated with both operational and cultural indicators of TQM diffusion. In Table 13, informationality is significantly correlated with organizational improvement ($r = 0.29$, $p < 0.01$) and leadership change ($r = 0.13$, $p < 0.10$).

Hypothesis 5 states that accountability of organizational self-production is positively associated with both operational and cultural indicators of TQM diffusion. This is also supported in this research. It is seen from Table 13 that accountability is associated with productivity improvement ($r = 0.51$, $p < 0.01$), organizational improvement ($r = 0.31$, $p < 0.01$), leadership change ($r = 0.15$, $p < 0.05$), attitude change ($r = 0.41$, $p < 0.01$), and expected duration of change ($r = 0.40$, $p < 0.01$).

Hypothesis 6 differentiates two general approaches to TQM implementation, quality awareness training (Qtrain) and process reengineering (Reengn), which states that the reengineering approach would have a wider impact on the TQM diffusion than the quality awareness training approach does. This hypothesis is also strongly supported. From Table 14, it is seen that the averages of productivity improvement (prodc), organizational improvement (orgmp), expected duration of change (duratn) of TQM diffusion indicators, and averages of participativity (partip), interdependability (interd), informationality (inform), and accountability (accoun) of organizational self-production dimensions are significantly different. This supports hypothesis 6; the reengineering approach has more impact on TQM diffusion than the general quality awareness training approach. It is interesting to observe that the average scores of reengineering in Table 14 are directly higher than those of quality awareness training variables, even though they are not statistically significant. This is possibly due to the nature of organizations, specifically service/governmental facilities and manufacturing organizations.

Table 14

Comparison of the Quality Training Approach with the Process
Reengineering Approach

Variables	Means	
	Qtrain	Reengn
TQM Diffusion		
Productivity	4.54	5.25*
Organizational	4.24	4.77**
Leadership	4.86	5.05
Attitude	4.53	4.82
Duration	4.57	5.26**
Self-Production		
Participativity	4.49	5.11**
Individuality	4.69	4.76
Interdependability	5.69	6.13**
Informationality	4.28	4.92*
Accountability	4.84	5.68*

* $p < 0.01$

** $p < 0.05$

139

DISCUSSION AND FUTURE RESEARCH AGENDA

Total Quality Management (TQM) represents a new paradigm of management thinking because of its emphasis on customers, employees, process, and continuous improvement. However, a successful implementation, which implies the diffusion of TQM into organizational culture, depends on the organizational change effort during the TQM implementation process. Most TQM failures are not due to the TQM itself, but rather to the inadequate understanding of the organizational change process. In other words, the TQM implementation as an organizational change process depends upon a process-oriented theory of organizational change.

Traditional organizational studies are dominated by so-called structural-functionalism, which (1) emphasizes that human organizations are open systems, comprised of various subsystems, described by its functions, and represented by its physical pattern or structural arrangement, and (2) ignore that organizational members as human beings are capable of reflecting and interpreting what they are doing in the organizational context and the reflection and interpretation generate meanings that account for the important aspect of organizational studies (Putnam, 1982, 1983; Weick, 1979b). The structural-functionalism is a linear and causal model, so organizational change efforts influenced by the model are directed to superficial aspects, such as the organizational structural adjustment or mission restatement. Past practice has proven that

140

the organizational change theories shaded by the structural-functional view are "flawed" (Beer et al., 1990a).

Organizational self-production developed in this research is a process-oriented theory, which is based on so-called process thinking, including dissipative structure theory (Prigogine & Stengers, 1984), chaos theory (Gleick, 1987), autopoiesis (Maturana & Varela, 1980, 1987), and cybernetics (Wiener, 1948; Ashby, 1956). The central assumptions of the organizational self-production model include that (1) organizational members are agents, not robots, and are capable of reflecting and interpreting what they do in organizational contexts; (2) the reflection and interpretation of organizational members generate meanings and accounts for an important aspect of organizational inquiry; (3) human organizations have a dual feature. On the one hand, organizations are physical beings, comprised of people, equipment, and technologies, and can be studied by observing its tangible patterns and physical structures. On the other hand, organizations also exists as processes and dynamics, creating values, assumptions, meanings, and culture, and must be studied by determining its meaning generation mechanisms; and (4) the dual aspect of organizational processes are intertwined, and the mutual dependence determines a human organization as a self-organizing entity. Therefore, human organizations not only transform inputs into outputs, fulfilling its production objectives, but also self-produce their own rules, assumptions, values, and culture, so that they are capable of maintaining themselves as organizations while carrying out their production functions.

The organizational self-production process takes place through four mechanisms: participation, involvement, and interaction of organizational members; reflection and interpretation of organizational members on their participation, involvement, and interaction; organization-self knowledge based on specific reflections and interpretation; and action under the organization-self knowledge. The four mechanisms are supported by the organization-individual dialectic. This dialectic states that organizations are the whole, and individual members are the parts; between the whole and the parts, a rich dynamic is maintained. Parts constitute the whole, and the whole influences the parts. This dynamic process is "measured" in five dimensions: participativity, individuality, interdependability, informationality, and accountability.

The central theme of this research is that a TQM effort will be successful and effective--it will bring out operational results, such as improvements of productivity, customer satisfaction, cost reduction, and organizational adjustment, and cultural changes, such as leadership changes, attitude changes, and positive expected change duration--if it is implemented through the organizational self-production process. To the contrary, if organizational self-production mechanisms are not taken into consideration within the implementation program design, the TQM will most likely fail, indicated by a feeling of "imposing" on employees, excessive organizational activities, cost increase, and fade-out. This theme was expressed in the form of 6 hypotheses. Specifically, hypothesis 1 states that the participativity of organizational self-production is positively associated with both operational and cultural indicators of the TQM diffusion. Hypothesis 2 states that the individuality of organizational self-production is positively associated

with the cultural indicator of the TQM implementation. Hypothesis 3 states that the interdependability of organizational self-production is positively associated with the cultural indicator of the TQM diffusion. Hypothesis 4 states that the informationality of organizational self-production is positively associated with both operational and cultural indicators of the TQM diffusion. Hypothesis 5 states that the accountability of organizational self-production is positively associated with both the operational and cultural indicators of the TQM diffusion. Finally, hypothesis 6 states that the approach of process reengineering through applying QC tools has wider influence on organizational self-production process, which results in the TQM diffusion, than the approach of general quality awareness training does.

This research was aimed at accomplishing three objectives concerning the relationship between the TQM implementation and organizational self-production process. First, the research intended to develop and verify the organizational self-production model, which allows an in-depth exploration of personal views and perceptions. The focus was on examining the existence of the five dimensions defined in the theoretical development section. Second, the research was to test 6 hypotheses described above, demonstrating an alternative approach to TQM implementation. Third, this research was also concerned with the impact of the research itself on the TQM implementation process by using survey feedback.

In order to accomplish the research objectives, both qualitative and quantitative instruments were designed to collect research data. In 4 participating organizations, a total of 32 interviews were conducted, and 201 questionnaires were collected. Through

the content analysis of interviews and the statistical analysis of surveys, evidence indicates that the model is valid and that the hypotheses are supported.

Based on the theoretical and empirical results, I make the following conclusions:

Conclusion 1. Organizational self-production theory as a process model developed in this research has a sound theoretical foundation. Different from the traditional organizational studies, which emphasize tangible patterns and causal relationships, such as organizational culture, this model is capable of recognizing the importance of the individual-organization dynamic, through which organizational culture emerges. In other words, the organizational self-production theory is concerned with organizational culturing processes, not the culture per se. The model is also operational, directing attention to the five dimensions of organizational processes, namely, participativity, the degree to which organizational members are involved in the organizational processes; individuality, the degree to which organizational members develop individualized quality vision and meanings; interdependability, the degree to which organizational members develop mutual awareness and relate their personal views to the organizational one; informationality, the degree to which organizational members access various information through open communication channels; and accountability, the degree to which organizational members develop their sense of commitment, responsibility, and contribution. The empirical evidence, from both open-ended interviews and organizational questionnaire surveys, proved that the five dimensions exist in terms of factor loadings and frequency distribution. Therefore, the organizational self-production theory is a valid and reliable model for organizational research.

Conclusion 2. Most organizations have implemented some parts of TQM methods, such as teamwork, suggestion systems, statistical process control, and company-wide quality awareness training in order to improve the competitiveness. However, Total Quality Management (TQM) implementation is an organizational change process. Claiming what tools have been implemented doesn't necessarily mean that these tools are actually working in the workplace. Observations in the field indicate that sometimes what is there is only the form, no essence has been developed yet. This is why most TQM programs fail. Interviews conducted in this research revealed that most TQM methods do not really work as they are supposed to because of the lack of supporting mechanisms in the workplace. The existing system is not capable of involving organizational members in the change process, not capable of developing an individualized vision of quality, not capable of relating the individualized vision to the whole organization, not capable of accessing or receiving relevant information concerning what is going on within the organization and how well they are performing, and not capable of facilitating the formation of a sense of commitment, responsibility, and contribution. The diffusion of TQM implies workplace reengineering.

Conclusion 3. In addition to the validity of the organizational self-production model, the research also proved that effective TQM implementation can be achieved through the organizational self-production process. Statistical analyses indicate that the five organizational self-production constructs, participativity, individuality, interdependability, informationality, and accountability, are all positively associated with either operational or cultural indicators, or both, of the TQM diffusion. Specifically, the

participativity is positively associated with productivity improvement ($r = 0.36$, $p <$ 0.01), organizational improvement ($r = 0.34$, $p < 0.01$), attitude change ($r = 0.23$, $p < 0.01$), leadership change ($r = 0.33$, $p < 0.01$), and the expectation of change duration ($r = 0.41$, $p < 0.01$); the individuality is positively associated with leadership change ($r = 0.20$, $p < 0.01$); the interdependability is positively correlated with expectation of change duration ($r = 0.18$, $p < 0.01$); the informationality is positively associated with organizational improvement ($r = 0.29$, $p < 0.01$) and leadership change ($r = 0.13$, $p < 0.10$), and the accountability is positively associated with productivity improvement ($r = 0.51$, $p < 0.01$), organizational improvement ($r = 0.31$, $p < 0.01$), leadership change ($r = 0.15$, $p < 0.05$), attitude change ($r = 0.41$, $p < 0.01$), and expectation of change duration ($r = 0.40$, $p < 0.01$). It is also shown that the process reengineering approach to the TQM implementation has a wider impact on organizational change than the general quality awareness training approach does. However, this research does not intend to interpret the result in terms of causal relationships between the organizational self-production variables and TQM diffusion indicators because the research was not designed that way. Rather, it provides an alternative framework to conceptualize the assessment of TQM implementation.

Conclusion 4. The consequence of the Conclusion 3 is that the organizational self-production model can serve as a theoretical base for workplace reengineering. Workplace reengineering derived from a previous concept proposed by Lawler (1992, 1986), Hammer (1991), and Hammer and Champy (1993), and Zuboff (1985), but further developed throughout this research. Evidence collected for testing Hypothesis 6 indicated

that the reengineering approach is superior to the general quality awareness training approach in term of both operational and cultural impacts. The very reason lies in the significantly different emphasis on organizational self-production mechanisms. The workplace reengineering approach stresses that, in order to effectively implement new management techniques, such as TQM into organizational processes, supporting mechanisms need to be developed first at the workplace level, such as information transferring and interdepartmental cooperation. Effective workplace reengineering programs can be designed by following the organizational self-production theory. Specifically, the workplace needs to be modified in order to facilitate continuous participation and involvement of all organizational members through job redesign and process changes; the workplace needs to be redesigned in order to provide an autonomous environment so that organizational members develop their personal views on quality and productivity; the workplace needs to be redesigned in order to facilitate mutual awareness and interdepartmental cooperation so that organizational members are capable of perceiving the larger picture of the organization; the workplace needs to be redesigned to facilitate information flow through open communication channels, especially work-related information flow; and the workplace needs to be redesigned to facilitate the development of organizational members' sense of commitment, responsibility, and contribution (Zhao, Richards, & Steier, 1992; Zhao & Steier, 1993b).

Conclusion 5. An important by-product of this research is the validated and reliability-tested instruments for assessing organizational self-production of the TQM implementation. This 22-item scale measures five aspects of organizational process:

participativity, individuality, interdependability, informationality, and accountability. Based on their relationship with TQM diffusion, the scale can be utilized to assess whether an implementation is effective and where the effort needs to be directed.

This research also has some limitations that should be taken care of in future research. First, the number of participating organization was limited to four. Considering the large population of organizations with TQM implementations, this sample size is relatively small for drawing conclusions across organizational or industrial boundaries, especially for measuring the TQM diffusion indicators. One future research goal is to expand the current research through a larger sample size. A nation-wide survey could be conducted including most organizations with TQM programs.

Second, one possible bias exists for testing hypothesis 6, which involves the nature of organizational processes. Based on the design of this research, it is impossible to draw a broader conclusion--than across industrial boundary--whether the wider impact caused by the TQM implementations was due to reengineering efforts or the nature of organizational processes, either in service or manufacturing. A future research effort is needed to explore the effect of the process nature and its relationship with the TQM implementation.

Third, organizational self-production theory as a new model for organizational studies is only tested and studied through observing the TQM implementation process. In order to make it a valid organizational model, the model needs to be studied in a general sense, and some specific scales need to be developed. Its implications for

organizational change, organizational effectiveness, and organizational culture studies also

needs to be explored.

Fourth, the workplace reengineering approach, which emerged from this research,

needs to be simplified so that all middle managers, first-line supervisors, and employees

are able to utilize it in the workplace. The relationship of workplace reengineering with

on-job and competence-based training also needs to be studied.

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150

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APPENDIX A

Interview Protocols

INTRODUCTION

"Hi, My name is John Zhao, from Old Dominion University. I am working, with _____, on a research project on Total Quality Management in your organizations. I want to ask you some questions about your feelings and perceptions you have on TQM implementation, roles you have played in it, and suggestions you have. Please be as open and honest as possible, and be assured that your participation is voluntary and your input is considered confidential. In other words, no on in this organization will have access to your individual input. Do you have any questions at this point?"

"For research validity and reliability reason, and my native language is not English, I would like to tape our discussion. The taping is only for technical reason. As I said, no one will have access to it, and I will keep it confidential. Do you mind? Do you have any other requirements for this?"

"Okay, before we begin the actual interview, I would like you to fill out this background information sheet."

(Do the interview)

164

Appendix A (cont'd)

BACKGROUND INFORMATION SHEET

NAME: _____

DEPARTMENT:_____

UNIT:_____

POSITION: _____

RESPONSIBILITIES:

_____

_____

_____

HOW LONG HAVE YOU BEEN IN THIS ORGANIZATION?:_____

HOW LONG HAVE BEEN IN THIS POSITION?: _____

(FOR RESEARCHER USE ONLY)

INTERVIEW DATE: _____

INTERVIEWEE: _____

CODE ASSIGNED: _____

TRANSCRIPTION: _____

Appendix A (cont'd)

Interviews for TQM Background Information

Date_____

Code_____

1. I know that some TQM methods have been implemented in your organization. Please share with me when and how TQM has been implemented?

2. What parts or components of TQM are implemented in your organization?

3. What are your personal roles and responsibilities in the implementation process?

4. What external consulting services have been used for designing the implementation program?

5. What objectives are expected to be achieved through implementing TQM?

6. What improvements have been achieved at this point in terms of

    (1) Operational Results (market share, profitability, product/service quality, cost reduction etc.):

    (2) Customer/client Satisfaction:

    (3) Employee Relations (attendance, satisfaction, commitment, and loyalty):

7. Some people believe that implementing TQM will bring about deeper organizational change such as cultural and value changes. To your personal knowledge, does TQM implementation have such deeper effects on organizational processes? If so, what are they?

8. Do you think these changes will be lasting in the organization, or merely temporary? Why?

9. A successful TQM implementation depends on many factors. In your experience, what are these factors and how do they affect the implementation in your organization?

10. Does the TQM philosophy affect your personal thinking and practice? If so, how?

11. Do you have any comments on any issues and on this interview?

Appendix A (cont'd)

Manager/Supervisor Interviews

Date_____

Code_____

1. From the information sheet you just filled in, I can see that you have a broader responsibility for your unit. If someone in your unit said "we are doing quality work", what does "quality" mean to you?

2. What mechanisms have been used in order to make a quality work?

(Transition)
3. In some companies, some parts of Total Quality Management methods such as team work and QC tools are organized together as a program, and employees are required to learn these methods through attending training programs. Are you aware of such a Quality program being implemented in your department? If so, what do know about it?

4. How is the quality program related to your own work?

(Transition)
5. It is believed that TQM will affect most aspects of people's working life. During the quality program, have you experienced any changes in the way work is done in your unit? If so, what are these changes? (Also reflect on question #2).

(Transition)
6. One TQM method is team work, that is, five to seven employees work together to achieve a common goal. Are there any work teams in your unit? If so, what do they do?

7. Are you a team member? If so, please share with me your experience.

(Transition)
8. Some quality experts say that employees play an important role in total quality management. In your opinion, what roles do your employees play in making quality work?

(Transition)
9. One of the TQM philosophies is that employees should be encouraged to make suggestions for continuous improvement. Do you have a suggestion system in your department? If so, how does it work?

10. Have your employees made any suggestions for improvement? How do you encourage your employees to make suggestions?

(Transition)
11. To your knowledge, does this department have a quality goal? If so, what is it?

12. To what extent do you feel that all people here understand and share the goal?

13. What are other units/departments' roles in achieving this quality goal?

(Transition)
14. In your personal opinion, is it important to make information available to employees? Why?

15. What types of information are important to your employees in order to make quality work?

16. With regard to the quality program, what mechanisms have been used in order to make the information available to your employees?

(Transition)
17. With the quality program implemented here, is there any evidence that employees feel increase in responsibility for, and contribution to, the overall achievement of quality? How?

(Transition)
18. It seems to me that the quality program has affected many aspects of your organizational processes. To sum up, what major improvements have been achieved in your department through this quality program? Please be specific.

19. Do you feel that some further efforts are needed in the future in order to make quality work? If so, what efforts are needed? Please be specific.

(Transition)
20. As I said before, TQM may affect every aspect of your working life. In addition to your working life, what is the effect on your own managerial thinking and practice?

21. Do you have any comments and suggestions regarding this interview?

Appendix A (cont'd)

Employee Interview

Date_____

Code_____

1. First, I would like to know something about you work and responsibility.

2. If someone in your unit said "we are doing quality work", what does "quality" mean to you?

3. In some companies, some Total Quality Management methods such as team work and QC tools are organized as a program, and employees are required to learn these methods through attending training programs. Are you aware of the Quality program being implemented in your department? If so, what do know about it?

(Transition)
4. It is believed that TQM will affect most aspects of people's working life. During the quality program, have you experienced changes in how the work is done in order to make a quality work? If so, what are these changes?

(Transition)
5. One TQM method is team work, that is, five to seven employees work together to achieve a common goal. Are there any work teams in your workplace? If so, what do they do?

6. Are you a team member? If so, please share with me your experience.

(Transition)
7. In some companies, employees are encouraged to participate in the quality process through suggestion systems. Do you have a suggestion system in your workplace? If so, how does it work?

8. Did you make any suggestions? If so, what were they? Why did you make suggestions?

(Transition)
9. Do you think that the whole department has a quality goal? If so, what do you know about it? And how do you know it?

10. Do you agree with this goal? Why or why not? Do you feel your peers agree?

11. Do you feel you are a part of the total quality of this department? How?

(Transition)
12. With regard to the quality program in your workplace, do you feel an increase in the information you are receiving? If so, what information?

13. How did you get the information?

(Transition)
14. With regard to the quality program, do you feel an increase in your responsibility for, and contribution to, the total quality in this department? If so, how did you become aware of it?

15. How do your peers feel about the responsibility and contribution?

(Transition)
16. In your opinion, what are the major impacts of the Quality program on this department? Why?

17. If you are invited to make suggestions for improvement in this department, what would you suggest to your management?

18. Do you have any comments and suggestions regarding this interview?

APPENDIX B

Survey Questionnaire

<u>INSTRUCTIONS</u>

This survey is designed to obtain your opinions about changes in your organization through implementing the Quality Improvement Process. Your honest opinions are important and sincerely appreciated. Please read each question carefully before responding.

Your individual answers to questions will not be given to anyone in your organization. Please do not sign your name to this survey. The information you provide will be combined with the information of other people in this organization to assess general attitudes and opinions of organizational members.

There are no right or wrong answers. The <u>Best</u> answer is the one which reflects your honest and accurate opinion.

Question 1 is concerned with the length of your participation in Quality (TQM) process. Please circle one choice out of four.

1.   How long have you been involved in the Quality process?

    1 Not at all
    2 Less than one year
    3 One year to two years
    4 Three years to four years
    5 Five years or more

Questions 2 through 13 are concerned with components or elements of TQM implemented in your organization. Each question asks you to what extent certain components or elements of TQM are applied in your workplace. Please circle the number which reflects your personal opinion in terms of the following scale:

    4 Used in the whole organization
    3 Used in some units, including my unit
    2 Used in only my unit
    1 Not used at all
    A I don't understand the question

		4	3	2	1	A
2.	Work is accomplished through work teams.	4	3	2	1	A
3.	I have worked with people from different departments in this organization as a (cross-functional) team.	4	3	2	1	A
4.	I have opportunities to work on different jobs through job rotation.	4	3	2	1	A
5.	I have applied statistical (Statistical Process Control) techniques in my workplace.	4	3	2	1	A
6a.	I have used one or more of the seven Quality Control tools to solve working problems in my workplace.	4	3	2	1	A

6b.   If so, check those you have used:

        1 Fishbone diagram (Cause-and effect)
        2 Control chart
        3 Check sheet
        4 Pareto diagram
        5 Histograms
        6 Scatter chart
        7 Graphs

8.   I have used one or more of the Seven New Quality Control tools such as matrix diagrams in my our workplace.   4   3   2   1   A

9.   I have used Taguchi method or Design of Experiments method for product development.   4   3   2   1   A

10.   I have applied Quality Function Deployment (QFD) method to the product/service development process.   4   3   2   1   A

11.   There are suggestion systems (such as Ideabank and/or suggestion box) in my workplace.   4   3   2   1   A

12.   There are management training programs dealing with quality in our organization.   4   3   2   1   A

13.   If your answer to question 12 is 2, 3, or 4, circle the training programs you have been involved in; if the answer is A or 1, go to question 14 directly.

        1 Quality Awareness
        2 Quality Tools and Techniques
        3 Team Working
        4 Managerial Training
        5 Special task training (Such as PC courses)
        6 Multiple job skills

Questions 14 through 46 are concerned with cultural changes through the Quality Improvement Process.
Each question asks you to what extent the culture has changed since the Quality Process was initiated.
Please circle the number which reflects your personal opinion in terms of the following scale:

7 *Very Significantly*
6 *Significantly*
5 *Much*
4 *Some*
3 *Little*
2 *Very Little*
1 *None*

Degree of Change

14.	Products and services provided to our clients have been improved.	7	6	5	4	3	2	1
15.	Products and services are delivered to our clients in a timely manner.	7	6	5	4	3	2	1
16.	Errors have been reduced.	7	6	5	4	3	2	1
17.	Production costs of our organization have been lowered.	7	6	5	4	3	2	1
18.	Clients' satisfaction in general has been improved.	7	6	5	4	3	2	1
19.	The number of complaints from clients has decreased.	7	6	5	4	3	2	1
20.	I feel more satisfied with what I am doing at work.	7	6	5	4	3	2	1
21.	I feel more satisfied with the working atmosphere here.	7	6	5	4	3	2	1
22.	I feel more satisfied with my relationship with my manager and supervisor.	7	6	5	4	3	2	1

7 Very Significantly	6 Significantly		5 Much				4 Some
3 Little	2 Very Little		1 None				

Degree of Change

23.	The structure of this organization makes it easy for information to flow from place to place.	7	6	5	4	3	2	1
24.	The structure of this organization makes it easy for people to work together within a department.	7	6	5	4	3	2	1
25.	The structure of this organization makes it easy to focus on quality.	7	6	5	4	3	2	1
26.	The structure of this organization makes it easy for interdepartmental interaction.	7	6	5	4	3	2	1
27.	Our quality process is periodically evaluated.	7	6	5	4	3	2	1
28.	I can always get assistance from within my organization to improve my work.	7	6	5	4	3	2	1
29.	My performance is evaluated in terms of producing quality products and services in a timely manner.	7	6	5	4	3	2	1
30.	Good performance is recognized by people in this organization.	7	6	5	4	3	2	1
31.	Good performance is always rewarded in this organization.	7	6	5	4	3	2	1
32.	Performance evaluation is based on team performance.	7	6	5	4	3	2	1
33.	Rewards are given to the team which has good performance.	7	6	5	4	3	2	1
34.	Department managers really believe that quality is important to the organization.	7	6	5	4	3	2	1
35.	Management at all levels knows how to achieve quality.	7	6	5	4	3	2	1

7 Very Significantly	6 Significantly	5 Much	4 Some
3 Little	2 Very Little	1 None	

Degree of Change

36. Managers and supervisors are always available when I need them.

7 6 5 4 3 2 1

37. I often see department managers in my workplace.

7 6 5 4 3 2 1

38. Managers often ask me about ways to improve our work.

7 6 5 4 3 2 1

39. Our managers always follow upon suggestions for improvement.

7 6 5 4 3 2 1

40. My manager/supervisor and I respect each other.

7 6 5 4 3 2 1

41. My view about the way to deal with people in this organization is changing.

7 6 5 4 3 2 1

42. I now view my work as more important to the organization than I thought before.

7 6 5 4 3 2 1

43. I think that our organization is developing a new way of doing business.

7 6 5 4 3 2 1

44. I think that our organization is moving in the right direction through the Quality process.

7 6 5 4 3 2 1

45. I am committing more efforts than before to the change in this direction.

7 6 5 4 3 2 1

46. I like these changes and hope they will stay in this organization.

7 6 5 4 3 2 1

Questions 47 through 78 are concerned with changes in your personal feelings about and perceptions of organizational processes through the implementation of the Total Quality Management process. Please circle the number for each question which reflects your personal opinion based on the following scale:

7 *Very significantly*
6 *Significantly*
5 *Much*
4 *Some*
3 *Little*
2 *Very little*
1 *None*

47. The work processes have been changed in my workplace to achieve quality.

7 6 5 4 3 2 1

48. The methods by which I do my job have been redesigned to achieve quality.

7 6 5 4 3 2 1

49. I am encouraged to think about new ways to improve quality.

7 6 5 4 3 2 1

50. Because of the changes in processes and methods, I have more opportunities to make decisions about my job.

7 6 5 4 3 2 1

51. It is becoming possible for us to share responsibilities in the workplace.

7 6 5 4 3 2 1

52. I have my own ways of doing my job and I am allowed to work in those ways.

7 6 5 4 3 2 1

53 Managers believe that I know my job better than anybody else.

7 6 5 4 3 2 1

54. I feel comfortable in making suggestions to improve our work.

7 6 5 4 3 2 1

55. I have the freedom to make changes if necessary to improve quality.

7 6 5 4 3 2 1

| 7 Very Significantly | 6 Significantly | 5 Much | 4 Some |
| 3 Little | 2 Very Little | 1 None | |

56. I am always recognized by my peers and managers when I do a good job.

7 6 5 4 3 2 1

57. I know who our ultimate clients are.

7 6 5 4 3 2 1

58. I believe that it is important to meet and exceed our clients' needs.

7 6 5 4 3 2 1

59. I know my organization's quality vision and goals.

7 6 5 4 3 2 1

60. I can relate my job to the quality goals of the organization.

7 6 5 4 3 2 1

61. I have opportunities to do different jobs.

7 6 5 4 3 2 1

62. I believe that the accomplishment of any job requires cooperation with co-workers.

7 6 5 4 3 2 1

63. I know that what I do in my job will affect other people in this organization.

7 6 5 4 3 2 1

64. I know how my job fits in with other jobs in this organization.

7 6 5 4 3 2 1

65. I am satisfied with the efforts of other departments/units.

7 6 5 4 3 2 1

66. My manager/supervisor knows what information I need.

7 6 5 4 3 2 1

67. I can get the information I need from many sources.

7 6 5 4 3 2 1

68. I know what is going on in this organization.

7 6 5 4 3 2 1

69. I know what is going on in my department.

7 6 5 4 3 2 1

70. I know what is going on in other departments.

7 6 5 4 3 2 1

| 7 Very Significantly | 6 Significantly | 5 Much | 4 Some |
| 3 Little | 2 Very Little | 1 None | |

71. I know what is expected of my work.

7 6 5 4 3 2 1

72. I know how I am performing through information feedback from managers/supervisors.

7 6 5 4 3 2 1

73. I feel that what I am doing is significant to this organization.

7 6 5 4 3 2 1

74. I care about what will happen to this organization.

7 6 5 4 3 2 1

75. In general, I like what we are doing here.

7 6 5 4 3 2 1

76. I am satisfied with my relationship with other people in this organization.

7 6 5 4 3 2 1

77. Working here has become a meaningful part of my life since the Quality process began.

7 6 5 4 3 2 1

78. I have a sense of contribution to the whole process.

7 6 5 4 3 2 1

Questions 79 through 94 are concerned with your definitions of quality. Please choose the number which represents your opinion in terms of the following scale:

> *4   Absolutely agree with*
> *3   Agree with*
> *2   Disagree with*
> *1   Absolutely disagree with*

In my personal opinion, quality is more concerned with

		4	3	2	1
79.	What we do for our clients				
		4	3	2	1
80.	Features of our products or services				
		4	3	2	1
81.	Reliability of our products or services				
		4	3	2	1
82.	Cooperative efforts of different departments in our organization				
		4	3	2	1
83.	The way we are doing things within our organization				
		4	3	2	1
84.	Morale and atmosphere of our organization				
		4	3	2	1
85.	Effectiveness and efficiency of management				
		4	3	2	1
86.	What clients really want				
		4	3	2	1
87.	Less complaints from clients				
		4	3	2	1
88.	Desires and expectations of clients				
		4	3	2	1
89.	Interactions with clients taking place at a certain time				

		4 Absolutely agree with 2 Disagree with			3 Agree with 1 Absolutely disagree with			

90.	Interactions with clients taking place in a certain place	4	3	2	1
91.	A meaning agreed upon clients and us depending on each situation	4	3	2	1
92.	Different ways of understanding Quality in an organization	4	3	2	1
93.	Different meanings of quality in an organization	4	3	2	1
94.	Individual's value and preference based on different background, experiences, and functions	4	3	2	1

Questions 95 through 100 are concerned with your personal information. Choose one which fits your situation.

95.   My current level of responsibility in this organization is
          1 Top Management
          2 Middle management
          3 First-line supervisor
          4 Staff member or professionals
          5 Associates

96.   I have worked in this organization for ____ years.

97.   I have had my current position for ___ years.

98.   I am __ male or __ female.

99.   I am a __ permanent or __ temporary employee.

100.   I work at Department of

          1 Cardholder Accounting and Control
          2 General Operations
          3 Merchant Accounting and Control
          4 Records and Information Service

BIOGRAPHY

Mr. Baizhong Zhao was born in Liaoning Province, the People's Republic of China, on April 3, 1960. He has a B.S. degree in thermal engineering from the University of Architectural Technology in Chongqing, China, and an M.S. degree in thermal/mechanical engineering from Tsinghua University in Beijing, China. He was a lecturer of the Thermal Engineering Department, and the assistant to the president of Northeastern University at Shenyang, China. In August of 1987, Mr. Zhao came to the United States and enrolled in the M.B.A. program of Appalachian State University as an exchange student. In 1990, He earned his M.B.A. and continued pursuing his Ph.D. degree in the Engineering Management Department of Old Dominion University, Norfolk, Virginia. His research interests include Total Quality Management and engineering, cross-cultural and international management, and organizational change management. After graduation, Mr. Zhao plans to live in the Hampton Roads area for a reasonable period of time because of his employment at the Entrepreneurial Center of Old Dominion University.