UNIVERSITY OF SHEFFIELD

SCHOOL OF EAST ASIAN STUDIES

An Empirical Study of Cultural Values in Total Quality Management: A Chinese Culture-Specific Model

by

Carlos Noronha

In partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Faculty of Social Sciences

August 2000

Abstract

Although total quality management (TQM) has been so widely adopted, its theoretical underpinnings remain relatively unexplored as compared to other management theories. A frequently pointed out research gap is on the cultural side of TQM as a human-oriented management philosophy.

TQM is known to begin mainly in Japan and the United States. However, the cultural values of the Japanese and the American people are very different. In Japan, the importance of group harmony is stressed, while the Americans mainly value individual creativity and achievements. Even so, companies in these different cultures have succeeded in implementing TQM and have achieved world class performance. It is reasonable to believe that when TQM, as a culture-free system itself, is being implemented in a particular cultural setting, it must accommodate to a certain extent the local culture. That is to say, Japanese-style TQM is obviously different from American-style TQM and a culture-specific TQM indeed exists.

As TQM and ISO 9000 have recently become some of the hottest managerial issues in mainland China and the overseas Chinese regions, this empirical study is concerned with the influence of Chinese cultural values on TQM. In particular, the operations of ISO 9000 certified companies in mainland China, Hong Kong, and Taiwan and the cultural values of their Chinese managers were analyzed.

Grounded on sociological and psychological theories, quantitative (structural equation modeling) and qualitative (case studies and interviews) research methods were employed to devise a general theoretical model of cultural

influence on TQM. Furthermore, using Chinese cultural values as a case, the specificities of a Chinese-style TQM were uncovered. The study has not only contributed its modest share towards the theoretical development of TQM but has also paved way for understanding indigenous managerial psychology from a different perspective.

Acknowledgments

I wish to express my deepest gratitude to my supervisor Dr Harukiyo Hasegawa who has provided me with constant guidance and support over the past four years. In fact, without the help and encouragement from Prof. Nelson António, Prof. Oliver Yau, Prof. Hideo Inohara, the Mochimaru family, and especially Prof. Tetsuo Abo, my doctoral study would not have been possible.

My sincere thanks are also due to my thesis examiners Prof. Gopal Kanji and Dr Robert Taylor, the Macau Foundation, my case study interviewees, and questionnaire respondents. Furthermore, my few but distinguished colleagues and friends, especially Zhao, have all assisted and enlightened me so much.

Last but not least, this work is dedicated to Florence.

Table of Contents

List of Tables

List of Tables (continued)

List of Figures

List of Abbreviations

ABASE	Abasement
ADAPT	Adaptiveness
ADF	Asymptotic distribution-free
AGFI	Adjusted goodness-of-fit index
AMOS	Analysis of Moment Structure
ANOVA	Analysis of variance
ANSI	American National Standards Institute
APO	Asian Productivity Organizations
ASQC	American Society of Quality Control
BPR	Business process reengineering
CCV	Chinese cultural value
CFA	Confirmatory factor analysis
CFI	Comparative fit index
COCCV	Common Chinese cultural values
CWTQC	Company-wide total quality control
df	Degrees of freedom
DoD	U.S. Department of Defense
EFA	Exploratory factor analysis
EQA	European Quality Award
GFI	Goodness-of-fit index
GLS	Generalized least square
HARPE	Harmony with people
HARUN	Harmony with the universe
HKQAA	Hong Kong Quality Assurance Agency
HKQMA	Hong Kong Quality Management Association
INTDP	Interdependence
ISO	International Organization for Standardization
JUSE	Union of Japanese Scientists and Engineers
KMO	Kaiser-Meyer-Olkin test
KS	Kolmogorov-Smrinov statistic
MBNQA	Malcom Baldrige National Quality Award
ML	Maximum likelihood
PDCA	Plan-do-check-act
QC	Quality climate

List of Abbreviations (continued)

QCC	Quality control circle
QFD	Quality function deployment
QM	Quality methods
QP	Quality processes
QPS	Quality of products and services
QR	Quality results
QWL	Quality of work life
RESPC	Respect for authority
RMB	*Renminbi*
RMR	Root mean residual
RMSEA	Root mean square error of approximation
SEM	Structural equation modeling
SINCE	Sincerity/suspicion
SMC	Square multiple correlation
SPC	Statistical process control
SPCD	Statistical process control and diagnosis
SPCDA	Statistical process control, diagnosis, and adjustment
SPSS	Statistical Package for the Social Sciences
TLI	Tucker-Lewis index
TQC	Total quality control
TQM	Total quality management
5S	*seiri* (organization), *seiton* (neatness), *seiketsu* (standardization), *seiso* (cleaning), *shitsuke* (discipline)

Glossary

bu yao lien	不要臉
chung	忠
chung yung	中庸
de	德
hsiao	孝
hsiao k'ang	小康
jen	仁
li	禮
lien	臉
mei you mien-tsu	沒有面子
mien-tsu	面子
pao	報
renqing	人情
sheng	圣
shudao	恕道
ta t'ung	大同
tao	道
tian	天
wairen	外人
wu lun	五倫
yang	陽
yin	陰
yuarn	緣
yuarnfen	緣份
zijiren	自己人

Chapter I

Introduction

1.1. Theoretical Foundation of Culture-Specific TQM

The present study examines the relationship between national culture and Total Quality Management (TQM) with special reference to Chinese culture so as to identify the characteristics of a "Chinese-style TQM" model.

During the past ten years or so, TQM has been receiving widespread acceptance by the various sectors of the economy including manufacturing, servicing, government, health care, and education. This TQM phenomenon is worldwide. Probably few would disagree that no other management issue since Frederick Taylor's Scientific Management at the beginning of the century has created such a profound impact as what the TQM movement has achieved (Ross, 1993). Kanji (1990) has even described TQM as bringing about a second industrial revolution.

Dean and Bowen (1994) have pointed out in the first special issue on total quality of the prestigious *Academy of Management Review* that there is a need to stimulate more research on TQM at the theoretical level. Stemming from its predecessor, statistical quality control, TQM has been practice-oriented and the audiences have long been consultants and practitioners rather than management theorists. However, given its cross-functional nature, TQM actually embraces and has common roots with many of the familiar management theories of organization, leadership, and human resource management. To encourage more theoretical inquiries into TQM will, in one way or the other, enhance our knowledge on management theories. As Whetten (1989) has stressed, the most

valuable fruit of theory development is to borrow different perspectives from other fields, thus challenging accepted theories and to reconceptualize our views on individuals, groups, and organizations. Furthermore, there is a need to develop theories in order to better understand the differences between successful and unsuccessful TQM implementations. Cameron and Sine (1999) pointed out that there have been a handful of documentations about failed TQM endeavors and they have attributed the lack of unanimity of the key dimensions of quality in the organizational studies literature as one of the important reasons for such failures.

In fact, according to Peterson and Cameron (1995), only three percent of the published articles on TQM up to 1995 in the United States were empirical in nature and not many have employed rigorous research methods. Thus, it can be seen that although TQM has been practiced so widely for a reasonably long period of time, it is still considered an ambiguous concept and the lack of theory development for TQM implies space for improving the integration of TQM research and practice. Although it is until quite recently that some convergences as to the theoretical underpinnings of TQM have been established (e.g. Anderson *et al.*, 1994; Cameron & Sine, 1999), the need to understand more about TQM from other related perspectives, sociological and cultural, should prove helpful towards the theoretical development of TQM as an essential organizational phenomenon.

Just as management theories are prescriptive rather than imperative, TQM theory should be contingent, varying according to the respective organizational context (Dean & Bowen, 1994). TQM has often been regarded by many as a management philosophy or a paradigm shift for the modern managers. One cannot simply view TQM as a set of imperative techniques or practices which can be

directly applied to solve corporate problems in any setting. This mechanistic mode (Spencer, 1994) of TQM is only a limited part of the broad philosophy. In diagnosing the core elements of TQM such as customer focus, continuous improvement, and teamwork, the importance of the human factor must come to the fore. Human beings are nothing more than actors of their underlying cultural values. The cultural factor is obviously important in management theories of leadership, human resource management, and of course in TQM. In particular, the doctrines of the quality gurus such as Crosby (1979, 1986), Deming (1986), Feigenbaum (1991), Juran (1951, 1988, 1989, 1992, 1995), and the Japanese quality masters such as Imai (1991), Ishikawa (1985, 1990) and Mizuno (1979, 1988), have all emphasized the importance of cultural and human factors in successful quality management.

One of the drawbacks in the current theory development for TQM is the lack of empirical research in addressing the relationship between national culture and TQM in spite of anecdotal evidences that such cultural influences are clear. This research gap has been pointed out by Chapman (1998) in *Total-Quality-Culture*, an internet discussion forum funded by the United Kingdom's Higher Education Funding Councils. It becomes obvious when one reviews the current literature of cultural influences on management. Two areas of interest to the present study have been frequently examined.

The first area is concerned with the impact of national cultures on organizations, or the shaping of organizational cultures by the respective national cultures. Hofstede's (1980) landmark study on work related values can be seen addressing this area. His four, and later five major dimensions of culture namely,

power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, and long-term versus short-term orientation, were used to describe the work related values of the people of different cultures. To a certain extent, organizational cultures can thus be explained by these national cultural dimensions. Another example is Schein's (1985) analysis of organizational culture. According to his three-level mode of organizational culture (basic underlying assumptions, espoused values, and artifacts), organizational culture is organization-specific and exists as a sub-culture of the higher level national culture. As argued by Hampden-Turner and Trompenaars (1993), corporations located in the same nation, region, ethnic group, or cultural group tend to share similar components of corporate culture. It is not difficult to locate a vast literature concerning the influences of national cultures on organizational cultures.

The second area of interest is on the reciprocal impacts of organizational cultures and TQM. In fact, no seminal publications to date with an authority comparable to that of Hofstede or Schein can be appropriately located. This could be largely due to the lack of TQM theory development as stated earlier. Nevertheless, many studies in this aspect have described a so-called quality culture (Hildebrandt *et al.*, 1991) or a total quality culture (Kanji & Yui, 1997) which integrates many of the principles and practices of TQM with the concepts of corporate culture (Deal & Kennedy, 1992) or organizational culture (Schein, 1985). For example, Kanji and Yui (1997) have argued that a total quality culture leads to a higher level of customer delight and that this culture is dependent upon the nature of the organization's environment.

Thus, it is obvious that there exist a lot of research opportunities to explain TQM activities in a particular cultural setting influenced by its national culture directly or through the respective organizational cultures. Though few in numbers, some attempts have been seen addressing this area. However, most of them suffer from a rather low degree of representativeness or generalizability due to the lack of empirical research (e.g. Maccoby, 1994; Martinsons, 1996; Napier, 1997; Martinsons & Hempel, 1998), or the use of a limited number of research subjects (e.g. W.H. Chen & Lu, 1998; Roney, 1997; Jenner *et al.*, 1998), or the incomprehensiveness of research findings (e.g. Lo, 1998, 1999). It is clear that more empirical studies taking a more holistic approach have to be conducted in order to narrow this obvious research gap.

In attempting to delineate the association between national culture and TQM, it appears insightful here to draw upon the classical sociological theory of an action system. According to Parsons (1951: 4), the object world can be classified as composed of three classes of social objects namely, the "social" referring to the actor or the collectivity, the "physical" referring to entities which do not interact with the actor, and the "cultural" referring to symbolic elements of the cultural tradition not internalized as constitutive elements of the actor's personality. A culture emerges and becomes part of an action system of the actor when symbolic systems mediate communication between actors (p. 5). Thus a social system or a partial social system functions when a plurality of individual actors interact through commonly understood and shared cultural symbols. A value is therefore defined as an element of a shared symbolic system which serves as a standard for selection among alternative orientations intrinsically open in a

certain situation. Through such a mechanism, value orientation serves as a device in articulating cultural traditions into an action system (p. 12).

Putting such an understanding of value orientation into the context of an economic organization, Parsons further elaborated that the value orientation of the organization (the sub-value system), is always defined by that of the social system (a higher order or super-ordinate value system). Unless the organization is deviant or disintegrated from the super-ordinate system, the value system of the organization must imply basic acceptance of the more generalized values of the super-ordinate system (Parsons, 1956: 67). This value system in turn formulates the operative codes which governs the organization in making organizational policies as well as allocative and coordination decisions and actions. Thus, we are reassured of the position that the everyday organizational activities of organizational members are, to a certain extent, governed by such underlying value orientations, or in other words, cultural values.

Applying this Parsonian framework to the attempt to associate national culture and TQM, a proposition can thus be stated. The national culture (the super-ordinate value system) operates as an influence on the organizational culture (the sub-value system) which formulates the operative codes in putting TQM into concrete actions. However, based on the transcendent view on quality (Garvin, 1988) which regards quality as a property which is difficult to define and can be understood only through experience, TQM appears to be itself a set of philosophy with its own existence. Thus, in the implementation of TQM in a particular cultural setting, the fusion effect of the respective national culture and TQM as a culture itself is of great importance.

This fusion effect can be analyzed and further elaborated by means of an "emic-etic" analysis. Derived from linguistics, Pike (1954) used the emic-etic concept to describe human behaviors across cultures. In simple terms, emics refer to specificities valid only for one culture or one culturally defined class of people. On the other hand, etics refer to universalities across different cultures. This emic-etic theory was then applied to devise approaches for cross-cultural studies. Berry (1990) defined a three-step approach namely, "imposed etic" when a researcher begins to analyze a culture from his or her own cultural viewpoint, "emic" when the researcher discovers principles specific only to a particular culture, and "derived etic" when universalities are discovered through a comparison of the imposed etics and emics. This three-step approach has been enjoying much popularity among cross-cultural researchers. Uemura (1998) employed the emic-etic analysis to explain the transferability of Japanese-style management overseas. Drawing largely on Abo's (1994) study on the Japanese transplants in America, Uemura argued that two emic systems (e.g. full Japanese model as emic A and full American model as emic B) when put together will give rise to a hybrid system (e.g. Japanese-American hybrid C) but not a full absorption of one by the other. Three possible combinations may arise, a high diversity hybrid, a middle diversity hybrid, or a low diversity hybrid. Uemura further employed Rugman's (1981) internalization theory and argued that when two emic systems contact each other, the more advantageous system between the two will be transferred to the other when there is little protection barrier. On the other hand, when there is little etics or commonalities, a drastic change will occur.

Uemura's theory is in line with Abo's argument. Abo pointed out that there has been a strong impression that Japanese-style management concerns characteristics peculiar to the Japanese culture and it seems that the more emphasis people place on linking management theory and culture, the more limited is the potential for its international transfer. However, given the ongoing debate in reality, the strong link between management theory and culture cannot be ignored. It essentially becomes a matter of recognizing that cultural trends lend themselves to a variety of expressions in different periods and under changing conditions. Also, certain aspects of culture can be isolated in terms of quantitative differences which may be compared internationally. As a result, a meaningful study of international transfer must identify which aspects of the system are most subject to change, and evaluate the degree of change that takes place (Abo, 1994: 14-15). In other words, the socio-cultural influence on any management system is an undeniable element and effective transfer of systems must adapt the technology to the local country principally defined by its socio-cultural background (p. 235).

The emic-etic theory that Uemura has pointed out or the "application-adaptation" model of Abo both refer to the fusion of two management systems which are embedded in two distinct national cultures. The effect of the fusion or the hybrid thus depends on the commonalities between the two systems. Now, if one applies the emic-etic theory to the relationship between national culture and TQM, the situation is slightly different. The national culture in question represents a particular set of value orientations pertaining to a country, for example, China. On the other hand, TQM itself can also be regarded as a culture possessing its own emic aspects. Here the point is that TQM itself as a culture does not incline toward

any particular country or national culture. TQM as a culture itself is transcendent (Garvin, 1988). For example, Roney (1997), in her analysis of implementing TQM in Poland, pointed out that TQM itself is embedded with its own set of cultural beliefs, norms, values, and assumptions. This is consistent with Beyer *et al.*'s (1996 in Roney, 1997) description of TQM as a "pre-packaged culture". Although Roney agreed that TQM can be regarded as a culture itself, she also pointed out that TQM is embedded with cultural values and assumptions which are consistent with its culture of origin, which is predominantly Japanese. This statement is in contrast with the transcendent characteristic of TQM. If TQM itself is more consistent with Japanese culture, it means that when TQM is fused together with a distinct culture, say, American management system, a high diversity hybrid will arise and this may inhibit the effective implementation of TQM. This is probably not the case. For instance, Emery (1978 in Napier, 1997) believed that the quality movement could be emulated wherever there are human beings and it is not a peculiar product of Japanese culture. Furthermore, Kanji and Yui (1997), in their study of total quality culture, have argued that organizational culture is influenced by such dimensions as national background, ideology, and personality of the organizational members. Moreover, organizational culture can influence and can also be influenced by TQM principles [based on Kanji's (1994) pyramid model of TQM explained in section 2.2.] which exist as a quality culture. Thus, the argument of the fusion effect leading to culture-specific TQM appropriately addresses the reciprocal influences between organizational culture and quality culture.

It is clear that TQM is being successfully implemented in Western companies which prize individual autonomy highly as well as in Asian companies which value good interpersonal relationships rather than individual rights (Maccoby, 1994). In other words, TQM as a culture itself is not country specific. Rather, TQM is mutable and can quickly adapt to the respective national culture in question. Thus, for TQM to succeed in America, an American-style TQM influenced by the American culture must be formed. For TQM to succeed in Japan, Japanese-style TQM, as what Ishikawa (1985) had coined, must appear. In terms of the present study, for TQM to be effectively implemented in Chinese societies, there must be a Chinese-style TQM. However, one should not wipe out the possibility that there may exist certain commonalities or etic aspects among these three hybrids. American-style TQM, Japanese-style TQM, and Chinese-style TQM should be regarded as three distinct hybrids resulting from the fusion of TQM with the respective national cultures. The existence of a culture-specific TQM system echoes the argument of Boyer (1998) and Hasegawa (1998) that hybridization or hybrid management is a principle of genesis or transformation, resulting in a distinct system through interactions with the local social and cultural setting.

Ishikawa (1985) pointed out that there are many ways of looking at Japan's postwar economic miracles, but in the final analysis, human factors must come to the fore. Japanese-style management has somehow found the secret of harnessing the energy of its people very effectively. This has been accomplished in large measures by a device called TQM. On the other hand, Clegg *et al.* (1986: 12-13) have identified four Confucian traits to be active among Chinese societies.

(1) Socialization within the family unit in such a way to promote sobriety, education, and seriousness about tasks, job, family, and obligations; (2) a tendency to help the group; (3) a sense of hierarchy; (4) a sense of complementarity of relations. If Ishikawa's argument was true for the case of Japan, Chinese regions can also achieve world class industrial performance through the creation of a distinct Chinese-style TQM embedded in these important indigenous cultural traits. Just as Japanese-style TQM and American-style TQM can succeed, Chinese-style TQM can also excel.

Chinese culture has been chosen as the subject in the present study. The reason is that in the process of globalization of business today, mainland China and the overseas Chinese regions such as Hong Kong and Taiwan have been regarded as lands of opportunities and potentials. For example, the national productivity indices of 18 Asian countries were topped by Taiwan, Singapore the third, and Hong Kong fourth (APO, 1997). Also, the recent agenda of mainland China entering into the World Trade Organizations has undoubtedly affirmed China as an important player of the world economy. The fast adaptation and absorption of new technologies and management concepts by the Chinese is not and has never been surprising. Nowadays many regard the label of "made in Hong Kong" or "made in Taiwan" as a sign of high quality which can compete with their Western counterparts.

These Chinese regions have also been feverishly pursuing TQM activities and are gradually developing towards a much higher level of maturity. In Taiwan, the history of quality activities could be traced back to the early 1970s. The movement matured mainly from 1988 onwards, when the government-sponsored

national quality promotion program has played a vital role in converting Taiwan's enterprise from being production-driven to being customer-driven (C.C. Lee *et al.*, 1996: 128). In Hong Kong, the quality movement also started during the 1970s with the establishment of the Hong Kong Productivity Council and the Hong Kong Quality Assurance Agency and other quality conscious bodies. Most companies joining the quality movement now see quality, usually in the form of a certified quality management system like the ISO 9000, as a minimum qualification for survival (T.C. Cheng, 1996: 167; T.Y. Lee, 1998). In the case of mainland China, the open door policy in the late 1970s laid the corner stone for its industrial and economic development today. Although slower than its Asian counterparts, quality consciousness has increasingly become the focal point of business in China today. Followed by the rapid and large-scale foreign direct investment of multi-national companies and the installation of the China State Bureau for Technical Standards implying an initiative from the central authority, China has joined the league of quality movement in Asia.

It is hoped that the present study will provide a modest contribution towards the theoretical and practical aspects of TQM implementation. Theoretically, the study aims to develop a Chinese culture-specific TQM model which characterizes the transcendent and mutable forms of TQM itself as a self-existing set of philosophy in line with the organistic and cultural modes of organizations. Grounded on sociological and psychological processes, the culture-specific model helps to better understand and to raise the awareness of cultural influences on organizations. There have been many reports on the failure of TQM programs due to the direct implementation of techniques imported from foreign

soil. However, the question lies on what kind of adaptations have to be made for effective implementation. Also, when adaptations are being made, which cultural value is more sensitive to TQM and as such how should TQM activities be modeled in order to suit the culture? By referring to the model as suggested in this study, practitioners are able to grasp a basic understanding of the association between cultural values and TQM and can thus formulate better strategies for modeling their own TQM implementations.

1.2. Research Objectives

From what has been presented above, the need for more comprehensive studies relating culture, especially Chinese culture, and TQM is justified. In this exploratory study, Chinese cultural values and TQM as key ingredients to organizational development, were extensively investigated based on three Chinese regions. This study has utilized structural equation modeling methods to analyze the relationships among Chinese cultural values and elements of TQM as exemplified by successful implementations of ISO 9000 standards and to suggest a model to identify the various complex inter-relationships within.

In essence, the primary objectives of this study were:

(1) to add to the existing literature of national cultural influence on TQM so as to make a modest contribution to the theory development of TQM;

(2) to broaden the understanding of TQM companies currently operating in three Chinese regions namely, mainland China, Hong Kong, and Taiwan;

(3) to confirm and broaden the understanding of Chinese cultural values of TQM companies viewed as partial social systems operating in a general super-ordinate society; and

(4) to suggest a model explaining the inter-relationships among Chinese cultural values and TQM so as to help companies understand better their positions and to provide a sign of culture-awareness when implementing TQM.

1.3. Assumptions of the Study

The study was based upon the following assumptions:

(1) For the sake of obtaining matched samples, companies which have obtained ISO 9000 certifications for over three years were assumed to be practicing TQM, although it is known that ISO 9000 is only one of the many aspects of TQM.

(2) The subjects who answered the attitudinal questionnaires would interpret the instrument items correctly and respond accurately and honestly.

(3) The procedure for selecting the research subjects was valid and the results could be generalized to the population.

(4) Any uncontrolled variables of the study were randomly distributed over the entire sample.

1.4. Methodology and Organization of the Thesis

The methodology employed for this empirical study involved three distinctive phases. The first phase was to assess the current TQM practices of companies in mainland China, Hong Kong, and Taiwan which have obtained ISO 9000 certifications. Three samples of ISO 9000 companies in the three regions with at least three years of certification history were obtained from an administration of mailed questionnaires. The sampled companies in each region were grouped under large companies (over 200 employees) and small companies (less than 200 employees) in order to analyze company size effects. For company type effects,

the companies in each region were grouped under manufacturing companies and service companies.

Two research instruments, in the form of attitudinal questionnaires, were administered among the quality managers or officers of the sampled companies in this phase. (1) A modified 73-item version of the "Quality and Productivity Self-Assessment Guide for Defense Organizations version 1.0" originally developed by the U.S. Department of Defense (DoD, 1992). The original English instrument was translated into Chinese and was followed by a process of back-translation. (2) A 45-item Chinese Cultural Value instrument developed by Yau (1994). In this case, the original Chinese version supplied by Yau was administered. 473, 613, and 1,200 sets of instruments were sent to companies in mainland China, Hong Kong, and Taiwan. The numbers of useable questionnaires returned were 117, 79, and 189 respectively.

The Statistical Package for the Social Sciences (SPSS 6.0) was utilized to analyze the data. Methods employed to assess data reliability and validity included split sample reliability test, Cronbach's alpha procedures, item-to-total correlation, and item bias identification. Factor analysis was applied to the data to extract inputs for the second phase of the study. Several tests of multivariate analysis of variance were also conducted to analyze the effect of industry type and size.

The second phase of the study involved the generation of a comprehensive model explaining the inter-relationships among the extracted factors. Here, the structural equation modeling software AMOS 3.62 otherwise known as Analysis of Moment Structure (Arbuckle, 1997) was employed. The parameters of the

model and the entire model itself were then subject to various tests of significance and goodness of fit.

The final phase involved presenting three qualitative case studies of ISO 9000 companies operating in Hong Kong and mainland China to complement the quantitative findings in the previous phases. The findings of the quantitative and the qualitative inquiries were then cross-analyzed in order to identify the special characteristics of a Chinese-style TQM model. Detailed information about the research methodology employed can be found in Chapter III.

Chapter I of this thesis has provided a theoretical foundation for the study. Specific research objectives, assumptions, and methodologies were also briefly discussed.

A review of relevant literature on TQM and Chinese cultural values is presented in Chapter II. A general framework of TQM is drawn based on the doctrines of renowned American and Japanese quality experts. Related issues such as ISO 9000 certifications and the impact of TQM on firm performances are also reported. As for the discussion of cultural values, several representative studies are reviewed, followed by a discussion concerning Chinese cultural values. Finally, some hypothesized relationships between TQM and Chinese cultural values are raised.

Chapter III, research methodology, firstly identifies the samples of the research and developed several hypotheses to be tested. Then, the origin and structure of the research instruments are explained. Finally, a hypothesized model explaining the relationships between TQM and Chinese cultural values is suggested for testing.

In Chapter IV, analysis and discussion, the results of the TQM survey and the Chinese cultural value survey are reported and subjected to several statistical processes. The structural equation model suggesting the relationships between TQM and Chinese cultural values is then tested.

In Chapter V, three case studies reporting ISO 9000 companies operating in Hong Kong and mainland China are presented. The cases help to complement and to cross-validate the quantitative findings and to suggest the characteristics of a Chinese-style TQM model.

Finally, Chapter VI presents the conclusions and a brief summary of the research. Contributions and limitations as well as some recommendations for further research are also discussed.

Chapter II

Literature Review

This chapter provides a thorough review of literature relevant to the present study. The review consists of the following major subject areas: (1) concepts, definitions, and a framework for TQM; (2) TQM implementation issues such as ISO 9000 certification and the impact of TQM on firm performance; (3) studies on cultural values, with particular attention to Chinese cultural values; and (4) a critical review, leading to the development of a hypothesized theoretical model, of some attempts at linking national culture and TQM.

2.1. Total Quality Management

This section firstly provides the concept of quality which the present study has adhered to. Then, several definitions of TQM are reviewed and their essentials extracted. Finally, the framework for TQM which the present study has focused on is explained with literature support.

2.1.1. The Concept of Quality

Defining quality is a difficult task because there exist many different interpretations. Quality can be understood as continuous improvement. Quality can mean excellence. Quality can mean meeting customer requirements. However, one of the most commonly followed fundamental concept of quality is Garvin's transcendent view on quality. Under this view, quality is defined as "innate excellence, both absolute and universally recognizable, a mark of uncompromising standards and high achievement" (Garvin, 1988: 41). Although such a definition is clearly abstract and too vague for practical purposes, the transcendent view acts as an ultimate guiding principle under which pragmatic

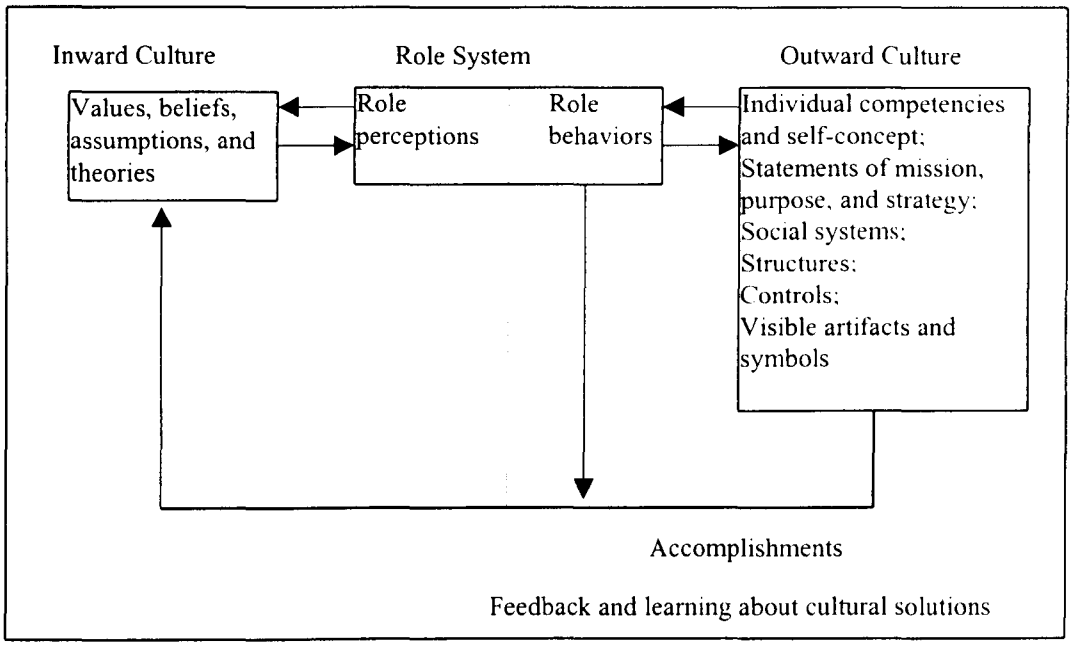
definitions of quality based on product (e.g. minimization of product variability), manufacturing (e.g. engineering and manufacturing practices), user (e.g. customer orientation), and value (e.g. cost and price) can be devised (pp. 39-48).

In any organization, based on the transcendent view on quality, quality is created by a quality culture. Goetsch and Davis (1994: 122) defined a quality culture as "an organizational value system which results in an environment that is conducive to the establishment and continual improvement of quality and it consists of values, traditions, procedures, and expectations that promote quality". Any specific quality processes, quality management tools, and quality results or outcomes should be viewed as subsets of the broad guiding principle. The transcendent view on quality as a cultural variable coincides with the nature of management theory which is contingent rather than imperative. Just as Cameron and Sine (1999: 10) have argued, treating quality as a cultural variable has the advantage of diminishing the ambiguity and inconsistency associated with the multiple definitions and dimensions of quality.

The management practices congruent with the principles of a quality culture focus on building internalization of quality values in all organizational members (Bright & Cooper, 1993: 22). Throughout the organization, the role of management is essential in putting the culture at work by concretizing the transcendent view on quality. Figure 2.1. is important for understanding how management bridges the gap between inward culture and managerial performance. Here, the responsibility of the management is to function on the middle ground, that is, the role systems. Role perceptions reside inside the minds of people (inward culture) as beliefs about what one is responsible for doing. If conditions

are right, these perceptions lead to role behaviors (outward culture), which are actions to accomplish the role perceptions (Bounds *et al.*, 1994: 134-135). In creating a quality culture in an organization, the transcendent view on quality must be instilled in the inward culture. The managerial role of the leaders is to transform the principle into outward culture elements, concretizing them into structures and actions such as quality processes, quality methods, and quality results.

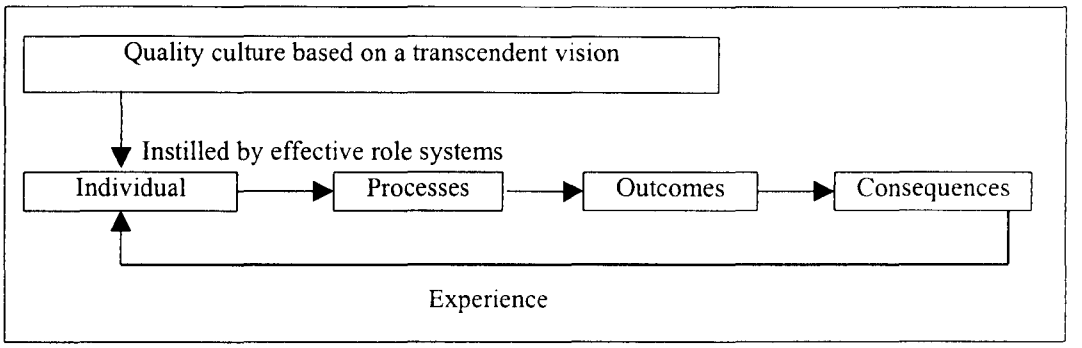
Figure 2.1. The relationship of roles and culture (Bounds *et al.*, 1994: 134).



Shuster's (1990) approach to defining quality can be seen supportive to this argument. He stressed that individual people is an indispensable element in any quality framework. It is the individual who initiates a quality process, which results in outcomes, creating consequences to be experienced by the individual again. It is clear here that a quality culture is the product of people and it must be based on some guiding principles or visions best expressed from a transcendent viewpoint. Throughout the present study, the transcendent approach to quality was followed. Any pragmatic aspects of quality are seen as products of this central

vision and they are concretized into actions by effective role systems of the management. The following figure depicts the concept of quality based on the transcendent and cultural viewpoint.

Figure 2.2. The concept of quality.



2.1.2. Definitions of TQM

It is rather difficult to mark the birth of quality control historically. Juran (1989) stated that strategies for managing quality have already been adopted since mankind's early civilization. For example, the inspection of incoming food. However, it would be much more practical to mark the birth of quality control since the time Frederick Taylor introduced scientific management in around 1875 when the concept of mass production and the division of labor began to appear in the American industrial sector (DeVor *et al.*, 1992: 8). Walter Shewhart marked another important era of quality development in 1925 when he developed the statistical approach to study manufacturing process variations (Shewhart, 1931). Statistical process control, as it was then named, was used extensively during the Second World War for military purpose.

Nevertheless, many prefer to mark the birth of quality control during the post-war Japan period from 1945 onwards when the General Headquarters led by MacArthur established the Civil Communication Section with the objective of reviving the infra-structure of Japan ruined by the war. In 1946, the Union of

Japanese Scientists and Engineers (JUSE) was established, followed by a nation-wide campaign of training in quality control methods. In 1950, William Edwards Deming visited Japan and offered seminars on statistical process control for Japanese industrialists. This was quickly followed by the visit of another American quality expert, Joseph Juran in 1954 whose teachings had placed more emphasis on top management leadership rather than statistical methods. Quality management development in Japan fostered rapidly on a nation-wide scope.

The late 1970s and early 1980s witnessed the rapid evolution of quality management systems in the West, especially the United States. This was largely due to the fact that the Japanese were able to integrate many of the American concepts of quality control into their own system, creating a unique Japanese-style quality management. In concrete terms, Japan was able to sustain two oil crises followed by the large-scale export of economical motor vehicles and electronic appliances. The combination of increased consumer interest in quality and foreign competition have forced American management to become more concerned with quality (Gitlow, 1994: 6). It is often said that quality management was then re-imported to the United States from Japan, which then became a worldwide phenomenon. Ishikawa (1985) even stated that Japan had transformed quality management into a new product which was then widely exported to nations overseas.

Dale *et al.* (1990: 3-4) suggested that the evolution of quality systems can be roughly divided into four fairly discrete stages namely, inspection, quality control, quality assurance, and total quality management. Today, Total Quality Management or TQM, as it is often called, is practiced widely by all kinds of

organizations worldwide, no matter manufacturing or service, large or small. TQM has been accepted as a viable and effective management system, confined not only to the inspection department, but to the entire organization (Ishikawa, 1985: 20-21). One very important point to note is the integration of the human factor into the system which was once thought of as totally technical and mechanical.

Armand Feigenbaum was perhaps the first to coin the term "Total Quality Control (TQC)". According to his definition, TQC is "an effective system for integrating the quality development, quality maintenance, and quality improvement efforts of the various groups in an organization so as to enable marketing, engineering, production, and service at the most economical levels which allow for full customer satisfaction" (Feigenbaum, 1991: 6). His definition has stressed the importance of an organization-wide impact. The term TQC was used in the present study interchangeably with TQM.

In Japan, Shigeru Mizuno stated that TQC has to involve everyone and all activities from corporate management to entry-level workers in everything from design to manufacturing, inspection, sales, procurement, energy management, accounting, and personnel (Mizuno, 1988: 17). TQC is undoubtedly an integrative strategic framework of any organization. According to JUSE, TQC requires that from top to bottom in a company, each person in each department must be quality minded (Dale, 1994: 80). The essence is to stress the "T" in TQC. That is to say, quality is everybody's job. Participation must become company-wide (Ishikawa, 1985: 21).

The U.S. Department of Defense suggested TQM as both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. Their definition is that TQM is "a disciplined management process under the leadership of the top executive, involving everyone in the organization in a cooperative effort to achieve a quality product or service through continuous process improvement combined with continuous life cycle cost reduction to satisfy customer needs and maximize combat capability" (DoD, 1990). Again, it is seen that the human factor plays a major role in TQM. The activity of everyone participating in the achievement of one objective is especially significant and valuable, leading to their taking ownership of TQM (Umeda, 1996: 4).

At the international level, the International Organization for Standardization defines quality management as the responsibility of all levels of management but must be led by top management. Its implementation involves all members of the organization (ISO, 1994a: 14).

Kanji's general definition of TQM which is simple and clear serves as a good summary of the above discussions. According to him, "Quality" is to satisfy customers' requirements continually; "Total Quality" is to achieve quality at low cost; "Total Quality Management" is to obtain total quality by involving everyone's daily commitment (Kanji, 1990: 5). In order to develop the TQM process, the organization has to be guided by seven basic rules of actions. (1) The approach: management-led, (2) the scope: company-wide, (3) the scale: everyone is responsible for quality, (4) the philosophy: prevention not detection, (5) the standard: right first time, (6) the control: cost of quality, and (7) the theme:

continuous improvement (p. 7). A point of particular interest to the present study is that he also argued that organizations in the United States did not follow completely the Japanese method in developing quality processes, instead they have considered their country's basic cultural issues and have thus developed their own quality culture. This important point has been rejoined by Powell's (1995) empirical study which stated that most of the "hard" features of TQM like process management and benchmarking do not necessarily produce advantages for the firm. Rather, certain tacit and behavioral features such as organizational climate as influenced by the respective national culture can produce substantial advantages.

2.2. A Framework for TQM

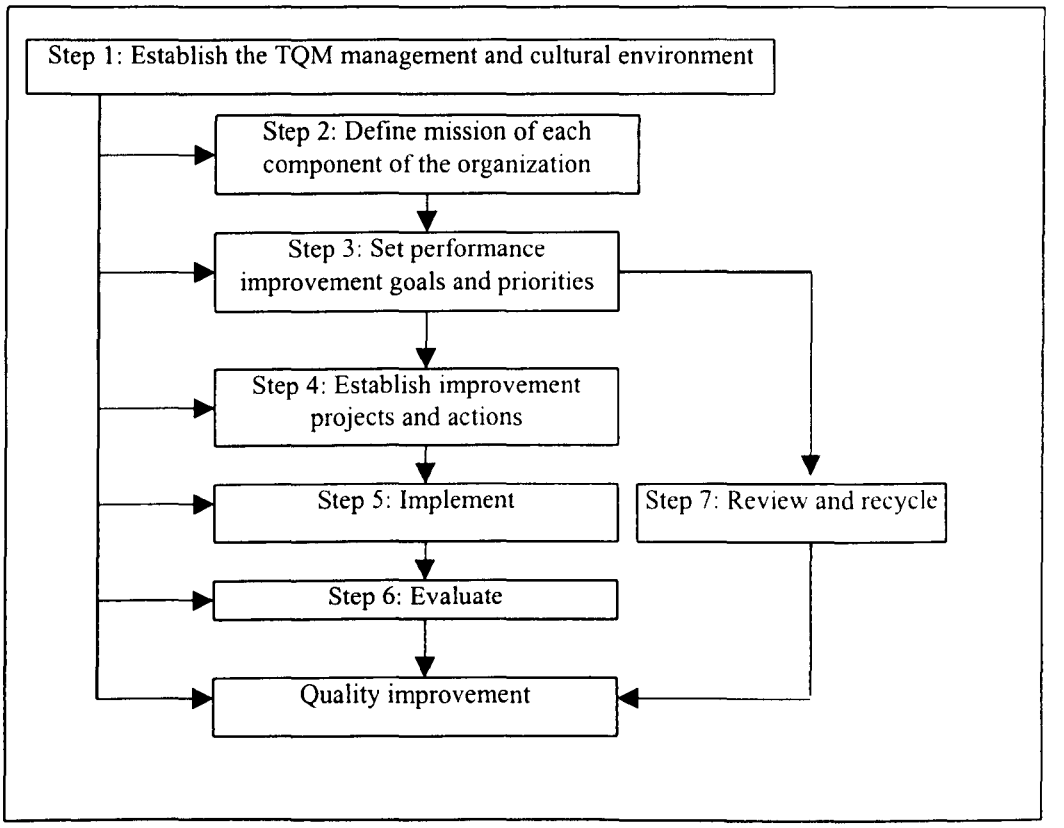
In this section, the basic assumptions of TQM are firstly reviewed. A suitable framework which matches the assumptions is then selected for adherence for the present study. Then, key elements of TQM as suggested by several writers are identified. Finally, common elements are grouped together and fitted into the framework.

Hackman and Wageman (1995: 310-311) have identified four major assumptions in the TQM philosophy. Firstly, quality is assumed to be less costly than poor workmanship and is essential for the long-term survival of the organization. Secondly, employees naturally care about quality and will take initiatives to improve it as long as they are provided with the tools and training that are needed and are respected by management. Thirdly, organizations are systems of highly interdependent parts, and the problems they face cross traditional function lines. Lastly, quality is viewed as ultimately and inescapably the responsibility of top management. The first assumption is in line with the

transcendent view on quality because quality should be viewed as an ongoing pursuit in the life of any organization. The second, third, and last assumptions are central to the major theme of the present study. That is to say, the importance of the human factor and subsequently, cultural factors, in TQM activities. It is necessary to select a suitable framework for TQM in line with the emphasis on the human factor. The framework referred here can be understood as expressions of the philosophy at the outward culture level.

The TQM model of the U.S. Department of Defense (DoD, 1990) is adopted as the framework of TQM for the present study. This model has been the basis of the prestigious Malcom Baldrige National Quality Award in the United States and also the ISO 9000 international quality standards. It is depicted in the following figure.

Figure 2.3. TQM model of the Department of Defense (DoD, 1990).



The above model can be explained by four inter-related quality variables, namely, (1) quality climate (step 1), (2) quality processes (steps 2 and 3), (3) quality methods (steps 4 and 5), and (4) quality results (steps 6 and 7). These four variables are in line with the four major sections of the "Quality and Productivity Self-Assessment Guide for Defense Organizations version 1.0" (DoD, 1992) (see Chapter III for more details). As seen in the figure, the four variables are all closely inter-related and the quality climate has profound influence on all other practical aspects. A literature search is now provided to identify key elements of TQM which would fit into this four-variable framework.

Kanji (1994: 106-113) has suggested a pyramid model of TQM which states that TQM is about continuous improvement of individuals, groups, and organizations directed by leadership. The foundation or base of the pyramid is built upon four basic principles namely, (1) delight the customers, (2) management by fact, (3) people-based management, and (4) continuous improvement. Each of these principles is translated into practices using two core concepts. To delight the customers, customer satisfaction and internal customers must be emphasized. Management by fact is achieved by applying appropriate internal quality measurement methods and focusing on business process management. People-based management is through teamwork. Managers of an organization must also ensure that everything is necessary in place to allow people to make quality. Finally, continuous improvement emphasizes on prevention and the continuous improvement cycle. As the four basic principles are constantly reinforced by practicing these eight concepts, the eventual fruit to be reaped by the organization is business excellence at the apex of the pyramid.

Goetsch and Davis (1994: 14-18) have identified ten key elements in TQM. They are briefly explained here.

(1) Customer focus: Internal and external customers form the driver for total quality.

(2) Obsession with quality: The organization must become obsessed with meeting or exceeding the definition of quality.

(3) Scientific approach: In addition to people's skills, involvement, and empowerment, the scientific approach in structuring work and in decision making and problem solving must be adopted.

(4) Long-term commitment: TQM is not just another management innovation which reaps short term results. It is a whole new philosophy.

(5) Teamwork: The quality company fosters teamwork and partnership with the workforce and their representatives for creating external competitiveness.

(6) Continual improvement systems: Continual improvement of the system is fundamental to continually improving the quality of products and services.

(7) Education and training: In a quality organization, everyone is constantly learning.

(8) Freedom through control: Involving and empowering employees through well-planned and carried out control is fundamental to total quality.

(9) Unity of purpose: Adversarial management-labor relations are irrelevant when there is unity of purpose for total quality.

(10) Employee involvement and empowerment: Employee involvement and empowerment increases the likelihood of good decisions and promotes ownership of decisions.

Dale *et al.* (1994: 10-13) have identified eight similar key elements of TQM. They are also summarized here.

(1) Commitment and leadership of the chief executive officer: Top management must take charge personally, provide directions and exercise forceful leadership.

(2) Planning and organization: Developing and concretizing a clear and long-term strategy for TQM.

(3) Using tools and techniques: Enhancing quality awareness in employees by letting employees apply effective problem-solving tools and techniques.

(4) Education and training: Formal education and training programs should be viewed as an investment in developing the ability and knowledge of employees and helping them realize their potential.

(5) Involvement: Employees must be viewed as assets which appreciate over time.

(6) Teamwork: Teamwork is the key feature of involvement and that communication must be effective and widespread.

(7) Measurement and feedback: Both internal and external indicators must be measured continually for meeting objectives and bridging gaps.

(8) Culture change: It is necessary to create an organizational culture that is conducive to continuous quality improvement and in which everyone can participate.

Similar key ingredients have been suggested by Talley (1991: 31-40) after identifying the common threads of three quality gurus namely, Crosby, Deming, and Juran. They are (1) management leadership and commitment, (2) strategy, (3) training, (4) participative problem-solving, (5) measurement, (6) statistical process

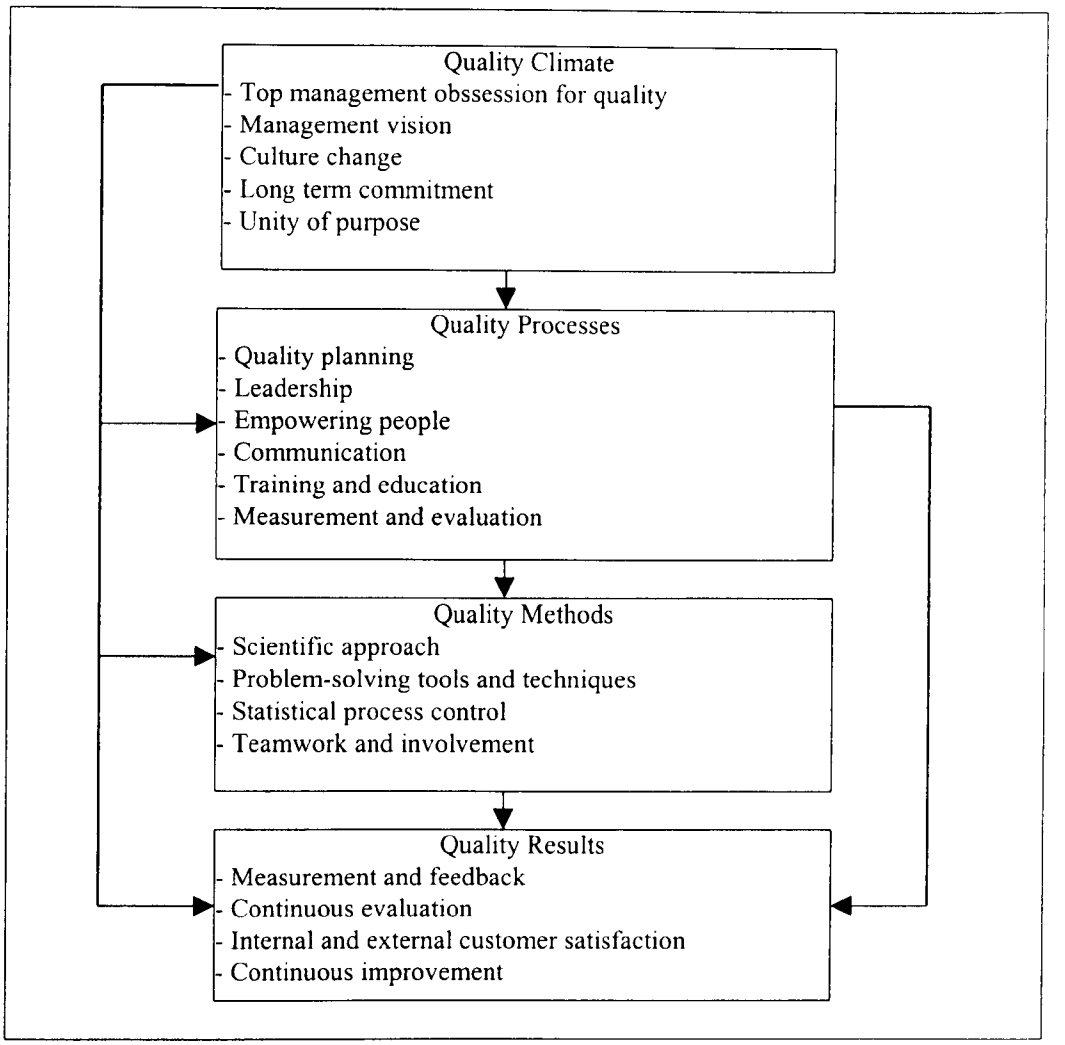
control, (7) continuous company-wide improvement, and (8) customer satisfaction.

Brocka and Brocka (1992: 22-44) have also identified eight primary elements of TQM which they call the "pillars of TQM". They are (1) organizational vision, (2) barrier removal, (3) communication, (4) continuous evaluation, (5) continuous improvement, (6) customer/vendor relationships, (7) empowering the worker, and (8) training.

Similarly, Prescott (1995: 22-23), has identified ten essential features of world class quality organizations. In brief, they are (1) senior management commitment to total quality, (2) customer-centered strategy, (3) flexible leadership style, (4) supply of qualified, competent, and flexible people, (5) effective utilization of resources, (6) productivity and flexibility are the best of the competition, (7) high customer rating, (8) high employee satisfaction, (9) involvement in community activities, and (10) high investor satisfaction.

It is not difficult to identify some common ingredients from the key elements suggested by the various writers on quality. It is now possible to draw up a comprehensive framework of TQM by fitting them into a four-variable framework. The following figure depicts this comprehensive framework.

Figure 2.4. A comprehensive framework for TQM.



2.3. TQM based on the Doctrines of Quality Experts

The major doctrines of selected renowned quality experts are reviewed in this section. In line with the TQM framework suggested in 2.2., the emphasis is on what the quality experts have to say especially on human issues and social and cultural factors influencing TQM.

William E. Deming

The early teachings of Deming during his visits to Japan in the 1950s placed a lot of emphasis on the use of statistical quality control. At the same time, he had strongly emphasized the importance of human factors in quality management. He believed in worker participation in decision making and the responsibility of

management is to help people work smarter, not harder (Brocka & Brocka, 1992: 65). Deming stressed that Western-style management must transform and this transformation can only be accomplished by man, not by hardware (Deming, 1986: 18). The famous Deming's 14 points for management have been the central guide for many quality organizations. The 14 points are given here in summarized headings. (1) organizational vision, (2) new management philosophy, (3) process improvement, (4) minimization of total cost, (5) continuous improvement, (6) job training, (7) leadership, (8) elimination of fear, (9) teamwork, (10) elimination of slogans and exhortations, (11) substitution of management by numerical goals with leadership, (12) abolishment of annual or merit rating, (13) education and self-improvement programs, and (14) organizational-wide commitment. It can be seen that all the points have put tremendous emphasis on human factors and relations.

In particular, Deming called for the instillation of a new philosophy in the American industry (points 1 and 2). This can only be achieved when top management demonstrates a genuine interest and commitment for life to quality and productivity. Furthermore, external human relations are essential. For example, he suggested that minimization of total costs can be achieved by building a long-term relationship of loyalty and trust with a single supplier (point 4). Deming also adopted Shewhart's plan-do-check-act (PDCA) cycle for continuous improvement (point 5). The PDCA cycle should be viewed as an ongoing and constant learning process without end. Furthermore, Deming advocated the humanization of management thorough elimination of fear, leadership, training, and teamwork (points 6, 7, 8, 9, 10, & 13). Pride of

workmanship which increases the job satisfaction of workers is crucial (points 11 & 12). In brief, Deming's doctrines have stressed the importance of vision and philosophy, learning, and humanization in the quality organization.

Joseph M. Juran

Juran had stressed the importance of top management commitment and leadership. He called upper management amateurs and it is necessary to convert them into professionals through a cultural change which requires their own active participation (Juran, 1992: 13).

In fact, Juran's teachings have emphasized a lot on the concept of cultural patterns proposed by the anthropologists Margaret Mead and Ruth Benedict. According to him, every organization is also a human society and evolves a pattern of beliefs, habits, practices, and values. Any change in this cultural pattern is deemed to bring in threats and resistance (Juran, 1992: 77-78, 429-433). It is thus the responsibility of the upper management to lead a cultural change in the organization and to unfreeze resistance to change.

In particular, he recommended very humanistic ways in the progression of a cultural change. For example, (1) participation, (2) stripping off unnecessary technical and cultural baggage, (3) working with leadership, (4) treating people with dignity, (5) minimizing the impacts of cultural change, (6) putting oneself in other's shoes, (7) making use of humanistic ways such as persuasion and facilitation (Juran, 1995: 169-173). Furthermore, he believed that managerial breakthrough is by the acquisition of new knowledge through never-ending training. In brief, Juran is a firm believer of the cultural approach to managing quality in organizations.

Armand V. Feigenbaum

Feigenbaum's doctrines are basically on the importance of organizational-wide participation and impact of TQM. He stressed that truly effective TQM enters deeply into the fundamental concepts of an organization and that every employee of an organization, from top management to the production line worker, will be personally involved in quality (Feigenbaum, 1991: 13). Feigenbaum also emphasized the importance of human factors in achieving total commitment. For example, some essential issues include quality education as an ongoing process, creation of quality mindedness, participation approach based on behavioral science developments, formalized training in quality management, and effective communication within the organization (pp. 200-229). Nevertheless, Feigenbaum's doctrine on quality management can be summarized in his three steps to quality namely, organizational commitment, modern quality technology, and quality leadership (Brocka & Brocka, 1992: 73).

Philip B. Crosby

Crosby is probably best known for his emphasis on "zero defect", which represents a complete change of management mentality from quality "control" to quality "management". Crosby has equated quality management with prevention (Brocka & Brocka, 1992: 61). He claimed that three important elements, namely, determination, education, and implementation are the "quality vaccine" for organizations striving for quality. Again, it is not difficult to notice that his emphasis is again on human factors. Determination is achieved only through top management commitment. Education and implementation both require organizational-wide participation. Most important of all, Crosby has emphasized

that an organization must learn and all its members must also learn to take appropriate roles. Furthermore, Crosby (1979) has suggested 14 points for management similar to those of Deming's. Essential points include long-term management commitment, cross-departmental collaborations, zero defects, and organizational-wide participation and involvement.

Shigeru Mizuno

Parallel to Feigenbaum in the United States, Mizuno was perhaps the first in Japan to coin the term "company-wide TQC" (CWTQC). Similar to other quality experts, Mizuno stressed the importance of management commitment, employee participation, and education. One of his most influential technique in managing quality is "quality function deployment" (QFD). QFD is essentially a systematic approach to quality functions by examining thoroughly the who, what, when, where, why, and how in corporate functions (Mizuno, 1994: 8).

Kaoru Ishikawa

Often known as the father of Japanese-style TQC, Ishikawa's teachings were extremely important to the maturity of the quality movement in Japan. Similar to Deming, Ishikawa was famous for his teachings of statistical methods in quality control. During the 1960s and 1970s, his *Guide to Quality Control* (Ishikawa, 1982) was almost treated as the bible for manufacturing companies in Japan. The popular "seven tools", namely the Pareto chart, fishbone diagram, histogram, check sheet, scatter diagram, flowchart, and control chart, have been practiced worldwide. However, statistical methods were not Ishikawa's only contribution to the quality movement. He was probably the first in Japan to stress the importance of human factors in managing quality. For example, quality control circles (QCC)

have been regarded as one of the most powerful aspects of TQM. According to Ishikawa, QCCs are not only devices for generating employee suggestions or enhancing group dynamics. The basic ideas behind QCC activities include higher level achievements such as respect for humanity and building a worthwhile and pleasant workplace through fully unleashing human capabilities (Ishikawa, 1985: 140). True quality requires a completely new vision, leadership, and commitment of management (pp. 121-136).

Ishikawa also had a lot to say about the cultural aspects of TQM. In explaining the difference between Japanese and Western experiences in quality, he stressed that quality control activities cannot be conducted in a social and cultural vacuum and they have to develop within the framework of different societies and cultures (p. 23). In particular, several cultural aspects that he had suggested appear to be very important to the present study.

Firstly, he stated that Japan's vertical society implies strong line relationships among manufacturing, design, marketing, and purchasing activities in the business organizations. On the other hand, due to the characteristics of a vertical society, staff functions including quality control requires more improvement (p. 24). Secondly, he believed that elitism and class consciousness have been inhibiting the quality movement in certain countries such as France and Indonesia. He even attributed elitism akin to Taylorism, which in this sense inhibits true total participation in the organization (pp. 25-26). Thirdly, he also believed that countries which use the Chinese script or Japanese *kanji* in writing generally possess a workforce which is more willing to learn and diligent and this could associate directly or indirectly with the success of quality activities (p. 29).

Fourthly, Japan as a homogeneous nation, provides easier communication systems when conducting quality activities. He cited an example of a German factory which had to use eight different languages for communication (pp. 29-30). Also, education has been a key point in the success of Japan's quality movement. Ishikawa stressed that the love of education since the Meiji Restoration had a strong influence on providing a workforce which is literate and shows high aptitude for mathematics. Therefore, educating people in Japan on quality techniques and concepts has been much easier than other countries with high illiteracy (p. 30). Finally, Ishikawa believed in the influence of religion on the implementation of quality activities. He claimed that trust among people can be easily achieved because according to the teachings of Confucianism and Buddhism, man is by nature good. He compared this with the management philosophy of Western nations which has not been showing trust among workers in organizations (pp. 31-32).

Although some may not agree totally with what Ishikawa has stated especially with his argument concerning religion, what is important here is that he firmly believed that culture does have a strong influence on quality management activities, which is the central objective of investigation in the present study.

Genichi Taguchi

Taguchi has been well known for his statistical engineering approach to quality control which encompasses a number of relatively advanced mathematical techniques such as the use of experimental design for quality control. The "Taguchi method", as it is commonly called for convenience, has been regarded as a further step in traditional statistical process control and has been employed by

many manufacturing companies worldwide. His central philosophy to the definition of quality is in stark contrast to common concepts such as "fitness for use", "conformance to requirements" or "customer satisfaction" circulated in the West. His definition is that a lack of quality represents a "loss to society" (Taguchi, 1986). This "loss to society" is then measured by a "loss function", a mathematical expression helpful to organizational decision-makers in understanding the impact of quality on monetary profitability and loss.

What is important in terms of Taguchi's teachings to the present study is that his methods, although purely mathematical in nature, do have a cultural aspect. For example, his definition of "loss to society" is obviously culturally oriented, reflecting two common oriental values namely, aspiration for perfectionism and working for the collective good (Goh, 1993: 188). While American quality gurus talk about pleasing the customer, Taguchi thinks of helping society, a manifestation of Japanese cultural habits that reflect the inclination towards uniformity, harmony, and predictability (p. 195). Also, Taguchi suggested the use of standard orthogonal arrays, liner graphs, and interaction tables in his method. This approach has been said to reflect the Japanese cultural propensity for uniformity and doing things by standard examples (p. 194).

2.4. ISO 9000 Quality System Certification

It is rather difficult to measure how successful an organization is in terms of its quality management because it is clear that TQM is more a philosophy than an instrument. Therefore, one usually focuses on whether an organization has achieved some form of internationally acknowledged award or certification.

However, it should be noted that any form of quality award must be made up of some sets of criteria which are bound not to perfectly reflect an organization's maturity in TQM. Nevertheless, the criteria of some very influential quality awards and certifications such as the Deming Application Prize in Japan, the Malcom Balridge National Quality Award (MBNQA) in the United States, or the ISO 9000 International Standards for Quality Management are under constant review and revision to accommodate the ever wider arrays of quality concepts.

The Deming Application Prize is probably the earliest award of its type. In commemoration of William Edwards Deming, it has been organized by JUSE since 1953 and has been the most prestigious quality award in Japan. Parallel to the Deming Prize in terms of prestige in the United States is the MBNQA created by the U.S. Department of Commerce in 1987. Its award criteria have become a working tool for many organizations (Bounds *et al.*, 1994: 26). The European counterpart for the Deming Prize and the MBNQA is the European Quality Award (EQA). It was introduced in 1992 and was developed by the European Foundation for Quality Management, the European Commission, and the European Organization for Quality (Prescott, 1995: 171-172).

Given the increasing importance of the globalization of business, the need for a set of internationally recognized quality standards has become inevitable. Since the late 1980s, the term ISO 9000 has become a catchword. In 1987, the ISO, whose members are now composed of 135 national standards bodies, published the ISO 9000 series of quality management and assurance standards. The ISO 9000 has been widely adopted by the European Community countries. Today, ISO 9000 is commonly accepted everywhere. Even countries like the

United States and Japan which have their own prestigious quality awards cannot bear to ignore it.

According to the ISO, the lack of worldwide compatible standards has led to technical barriers to trade. The purpose of the ISO is to rationalize international trading through the avocation of world standards. An internationally recognized set of standards can serve as the language of trade in the process of trade liberation of the free market economies and cross-boarder investments. Also, global standards are indispensable for accumulating quantitative information leading to the development of new technology. Furthermore, developing countries need standardization for building infrastructures and improving productivity, market competitiveness, and export capability (ISO, 1994b).

Basically, the ISO 9000 is a family of standards for internal quality management as well as external quality assurance purposes. They include ISO 9001 (Quality systems: model for quality assurance in design, development, production, installation, and servicing), ISO 9002 (Quality systems: model for quality assurance in production, installation, and servicing), and ISO 9003 (Quality systems: model for quality assurance in final inspection and testing). Furthermore, the ISO 9004 provides guidance on quality management and quality system elements but it is not for certification purpose.

There has been a steady acceleration of growth in ISO 9000 certifications worldwide. The 1993-1994 Mobil Survey (ISO 9000 News, Jan., 1994) revealed that there were at least 70,517 ISO 9000 certificates issued in 76 countries until the end of June 1994, representing an increase of 18,722 certifications as compared to the number as in September 1993. In Hong Kong, the Hong Kong

Quality Assurance Agency has issued until July 1996 613 certificates (HKQAA, 1996). However, one should not ignore the various private independent certification bodies operating. A conservative guess of the actual number to date could be twice the number reported by the HKQAA in 1996. Furthermore, according to the information provided by the Bureau of Commodity Inspection and Quarantine of the Ministry of Economic Affairs in Taiwan, the number of certificates issued to date is over a thousand, not to mention again those independent certification bodies.

2.4.1. Integrating ISO 9000 with TQM

According to Iizuka (1996: 4-5), ISO 9000 does not assess the organization's results and performance. Rather, it assesses what kind of activities are being managed and how are they being managed. From the assessment viewpoint, ISO 9000 is conformity assessment, not an award or recognition of an organization's performance. Therefore, it is likely that one may question the usefulness of ISO 9000 relative to the Deming Prize or the MBNQA. In fact, they should be viewed as different but complementary to each other. According to a winner of the MBNQA in the United States, the ISO 9000 standards and the MBNQA criteria are two ends to the same goal. ISO 9000 can be viewed as the baseline for a company to maintain a good quality system. In other words, ISO 9000 helps to build up a foundation for an organization's TQM activities (Bureau of Business Practice, 1992: 115-117).

On the other hand, Kanji (1998) has pointed out that important TQM principles such as delighting the customer and continuous improvement are not an integral part of the ISO 9000 standards. Also, assuring quality by using one

standard only for different types of industries is only a general and vague approach. ISO 9000 itself does not guarantee that one's product or service is of high quality or free from defect. Therefore he has proposed a framework for process innovation in order to enhance the effectiveness of ISO 9000 and its relationship with TQM principles. Under this framework, process innovation is based on three aspects of TQM principles namely process definition, process improvement, and process management. In integrating process definition with ISO 9000, one must first define suitable processes under which the ISO standards are to be implemented. The primary role here is to build the foundation for continuous improvement of ISO 9000. Then the defined processes must be geared on a set of goals for process improvement. Benchmarking can be used here to help identify factors which should be incorporated in the process improvement. Finally, the requirement clauses of ISO 9001 can be divided into three main areas for process management namely, organization and quality system, customers, and design, product and services. Thus, if an organization incorporates these three types of process management with ISO 9000, a reasonable first step towards TQM can be achieved. Moreover, Kanji has also suggested that self-assessment of an organization's TQM process over time should be integrated with the internal auditing requirement of ISO 9000, hence using the ISO standards to build up a foundation for continuous process improvement.

Iizuka (1996: 13-20) has also provided some insights as to integrating ISO 9000 with TQM. Firstly, ISO 9000's external quality assurance by third party assessment has not been specified in TQM. It provides a valuable experience and challenge for the organization engaging in TQM. Secondly, ISO 9000 can be used

to enhance TQM primarily through external pressures from a third party or a certification body which demands continual quality system review. In the beginning, an organization may have applied for ISO 9000 registration simply because of customer demand. Later on, the organization should see that adopting ISO 9000 is helpful in invigorating its internal quality management system.

Another point suggested by Iizuka is of particular importance to Japan. However, organizations in other nations can also take this as a reference. He pointed out that the independence of management functions such as planning, implementation, and verification, characterized by ISO 9000 was not viewed as imperative in Japanese-style management. Following ISO 9000 allows Japanese companies to experiment and accommodate management systems different from theirs. This is in line with the proposal of the Japan Productivity Center for Socio-Economic Development to redesign the Japanese management systems and practices (Japan Productivity Center for Socio-Economic Development, 1994; Miyai, 1995). ISO 9000 can also open a path to TQM. As Iizuka has argued, after undergoing external quality audit three or four times, a number of companies that have obtained ISO 9000 registration reported that they wished to be evaluated by quality standards much higher than those under ISO 9000. In other words, they feel the need to embark on the TQM journey.

2.4.2. The Benefits of Implementing ISO 9000

As ISO 9000 essentially aims at improving the quality management system of an organization, appropriate implementation of ISO 9000 is often believed to help the organization to enhance its internal operations. According to a survey conducted by T.Y. Lee (1994), ISO 9000 mostly helps intrinsically in uplifting team spirit

and reducing employee conflicts. Extrinsic benefits such as improvement of business performance was however not so highly acknowledged. This is not difficult to understand because ISO 9000 is only a first step in TQM which represents a long-term endeavor. Substantial extrinsic impacts can be reaped only if the company continues to embark in TQM after the ISO certification. According to the survey, over 70% of the sampled companies expressed that they would engage in TQM. Although the sample size of this survey was obviously insufficient for generalization, it nevertheless has provided some insights. The following table depicts the most acknowledged benefits obtained after implementing ISO 9000 according to the survey conducted on two industry types.

Table 2.1. Benefits obtained after implementing ISO 9000 (T.Y. Lee, 1994, translated from Chinese).

Benefits acknowledged	Service (N = 19)	Manufacturing (N = 16)
Uplifting team spirit	84%	81%
Reduction of customer complaints	79%	50%
Increase in efficiency	74%	69%
Reduction of employee conflicts	63%	69%
Reduction of wastes	53%	63%
Acceleration of work processes	37%	38%
Establishment of better relationship with suppliers	37%	50%
Improvement in business performance	21%	38%

The conclusions of the survey are useful in understanding some practical aspects of implementing ISO 9000. They are listed as follows.

(1) ISO 9000 is applicable to any industry.

(2) ISO 9000 certifications can be obtained by companies of any size.

(3) It is not necessary to increase manpower in order to obtain ISO 9000 certification.

(4) As quality management is a long-term endeavor, companies should not expect too much extrinsic benefits in the short term.

(5) The cost of implementing ISO 9000 is not too high.

(6) Pre-certification internal audits are very useful to the company (T.Y. Lee, 1994: 75).

In a subsequent study by the same author using a larger number of sampled companies in 1996 (T.Y. Lee, 1998), it was consistently found that the most acknowledged benefits of implementing ISO 9000 were still the enhancement of team spirit and the reduction of staff conflict. The importance of ISO 9000 as a good starting point for engaging in the TQM journey is nonetheless justified.

2.5. Impact of TQM on Organizational Performance

Some insights as to the impact of TQM activities on organizational performance are given in this section. A number of commonly found difficulties in and misconceptions about the implementation of TQM are also provided in the final part of this section.

2.5.1. Extrinsic Impacts of TQM

It is possible to classify the impacts and benefits of implementing TQM into two main types namely, extrinsic and intrinsic. Extrinsic benefits are commonly known in the form of real economic benefits such as the reduction of costs and lead time and the increase in product profitability and market share. Hansen (1994) pointed out that the main economic benefit of TQM is the increase of the gain/cost ratio. Gains are increased mainly through the marketing of new products and services as well as the improvement of existing products and services. Specifically, the improvement of products and services, the reduction of time to market, the gaining of new customers and the retaining of existing customers, the

exploitation of reputation, and the improvement of facility utilization are commonly acknowledged. On the other hand, costs of various kinds can be reduced.

Reviewing what the quality gurus have said is important in understanding the basics of such economic benefits. In 1950, Deming pointed out a chain reaction model involving quality, productivity, lower costs and market captivation during his lectures in Japan. According to him, the improvement of quality leads to decreased cost due to less rework, fewer mistakes, delays, and snags, and better use of machine time and materials. This in turn leads to improved productivity, followed by the captivation of the market with better quality and lower prices. The organization is thus able to stay in business and to provide more and more job opportunities (Deming, 1986: 3).

Economic benefits brought by TQM can also be appreciated through the concept of "cost of quality". The concept was firstly proposed by Feigenbaum and was later refined by Juran. The two basic components of the concept are the cost of conformance and the cost of non-conformance. The former includes prevention costs (e.g. cost of quality planning) and appraisal costs (e.g. material inspection and quality audit costs). The latter includes internal failure costs (e.g. rework and trouble-shooting or fire-fighting) and external failure costs (e.g. costs of goods returned and lost market share). Juran believed that a sound quality management system can reduce all of the above costs. He also pointed out that in the beginning of any quality program such costs may increase spontaneously as sporadic spikes. However, in the long run, all the costs can be minimized (Juran, 1988, 1989, 1992).

Feigenbaum has also suggested an even wider scope of extrinsic benefits. For example, he argued that the costs of quality and safety today account for an increasingly significant proportion of the gross national product. Product and service quality is fundamental to business health, growth, and economic viability (Feigenbaum, 1991: 5). Taguchi's (1986) "loss to society" concept can be seen parallel to Feigenbaum's suggestion.

2.5.2. Intrinsic Impacts of TQM

Kano (1994: 44) has suggested two fundamental impacts of TQM namely, quality of product and services (QPS which aims to contribute to others) and quality of work life (QWL which aims to contribute to oneself). The most fundamental intrinsic impact of TQM is the improvement of employees' and workers' QWL. As TQM is everybody's job, employee and worker participation helps to uplift sense of belonging and motivation. As reported by Hackman and Wageman (1995: 317), most TQM organizations create employee suggestion systems, and have quality meetings between managers and employees as well as focus groups to solicit ideas about quality. The widespread use of "quality days" and other celebrations of quality-related events and achievements further reinforce the aspiration in many organizations to involve every member in quality improvement processes. The change from the traditional top-down approach to a bottom-up approach can enhance group dynamics and promote coordination and integration of productivity activities. They further reported that frequently observed organizational forms of employee involvement include self-directed or autonomous work teams, job enrichment, quality circles, task forces and cross-functional teams, and labor-management action teams. Other common methods

include employee suggestion systems, brainstorming, team building, and theme groups.

Of all the methods to enhance employee involvement cited, the most popular is probably the quality control circle (QCC). QCCs have their root in Japan since 1962 (Ishikawa, 1985: 152). The QC Circle Headquarters in Japan published a booklet entitled *The Fundamentals of the QC Circle* in 1970 and defined a quality circle as "a small group which acts spontaneously within the same area to perform quality control activities. This small group will continuously, as part of the company-wide quality control activity, conduct self and mutual improvement and performance control and improvement of their workplace using quality control techniques, with all members' participation" (Sugimoto, 1979: 61-66). Today, the use of quality circles in organizations engaging in quality is common worldwide.

Ishikawa was often noted as an important figure in the quality circle movement. He cited ten useful guides in conducting successful quality circle activities namely, (1) self-development, (2) voluntarism, (3) group activity, (4) participation by all employees, (5) utilization of QC techniques, (6) activities closely connected with the workplace, (7) vitality and continuity in QC activities, (8) mutual development, (9) originality and creativity, and (10) awareness of quality, of problems, and of improvement (Ishikawa, 1985: 140-143).

Based on familiar organizational behavior theories looking into processes and outcomes, Kido's (1986) and Nita's (1978) quality circle models have been frequently referred to. As reported by Onglatco (1988: 36), Kido's conceptual model specifies that small group activities yield first-level outcomes such as

increased participation in decisions, strengthening of group functions, changes in work content, and promotion of developmental activities. These lead to second-level outcomes, such as enhanced volition, goal clarity and centralization, and acquisition of skills and knowledge. These outcomes in turn lead to final effects, in terms of hard and soft outcomes. Hard outcomes are in the forms of reducing rates of defects and costs and increase in safety and operation rates. Soft outcomes include social, work, and growth satisfaction. Nita's conceptual model of circle activity effects is on a more macro level as compared to Kido's. Circle activity effects are divided into direct improvement outcomes and indirect organizational outcomes. The former refer to better product and service quality, cost reduction, and other tangible outcomes which the activity yields in the form of long or short term economic benefits to the organization. Indirect outcomes, on the other hand, refer to outcomes that arise from undertaking the activity process itself, like for example, improved communication in the workplace (pp. 36-37). It can be seen that apart from extrinsic benefits, TQM activities mainly enhance the psychological factor which plays an important role so that group members feel a sense of belonging and fulfillment.

TQM recognizes that people are motivated by something more than economic benefits. The old economic model of the firm which only focuses on profit maximization and personal goal satisfaction must be abandoned. The new TQM paradigm envisages a convergence of the long-term interests of employees, shareholders, and customers. By improving quality, the organization creates a secure future for itself and its employees. In line with the transcendent view of quality which the present study has been emphasizing, quality is a form of

perfection that has intrinsic value. A quality product is a work of art in the sense that it embodies the human quest for perfection. In this sense, TQM represents a return to the values of craftsmanship that have fallen victim to twentieth century management methods (Grant *et al.*, 1994: 31).

2.6. Difficulties and Misconceptions about TQM

As stated repeatedly, TQM is a philosophy rather than a management technique or tool. Therefore, the maturity of TQM leading to success in any organization is a long-term endeavor. It can easily take up to ten years to put the fundamental principles, procedures, and systems of TQM into place (Lascelles & Dale, 1994: 316). Failures are typically reflections of misunderstandings about the central philosophy of TQM.

According to a research on the difficulties faced by organizations in their quality improvement efforts by Dale (1991), organizations found difficulties both in introducing and sustaining TQM activities. In particular, the lack of top management commitment and vision and a "flavor of the month" type attitude are significant obstacles to introducing TQM. Furthermore, pressures and constraints in terms of time, workload, and resources, and the lack of continuous commitment are the main inhibitors to sustaining TQM. Kanji (1996), using a real life case of a medium-sized service company, has vividly illustrated twelve main pitfalls which affected the company's TQM implementation. All the problems actually started with the managing director, confirming that top management commitment and leadership are the most important of all. The dozen of problems include: (1) lack of constancy of purpose, (2) failure to adopt a new philosophy, (3) failure to institute change in the organization, (4) refusal to provide industry-recognized

training to the workforce, (5) management by fear and intimidation, (6) barriers among departments, (7) lack of a learning culture, (8) unrealistic overwork, (9) failure to make decisions based on objective evidence, (10) not taking a company-wide scope of quality improvement, (11) putting teamwork to second importance, and (12) policies created in secret (p. 342).

To round up, four main barriers as reported by Lascelles and Dale (1994) can summarize the main pitfalls of implementing TQM.

(1) The nature of management leadership: The leadership style of many top managers is often transactional rather than transformational (Lascelles and Dale, 1994: 320). That is to say, they merely react to events rather than shaping future events. This is obviously in contrast with the main principle of TQM which emphasizes on integrating quality into design through well sought out quality planning. This traditional way of management results in many lost opportunities due to trouble-shooting or fire-fighting. To be successful in TQM, managers have to shift their management focus from the traditional to a new paradigm.

(2) Fear of change: Changing from the traditional to a new management paradigm requires substantial effort. Change consists of two elements, namely the intended change and the social consequence of the intended change. The social consequence becomes a trouble when there is a clash between the culture of the change advocates and that of the recipients (Juran, 1992: 430). Juran thus recommended some rules to deal with cultural resistance. For example, the recipient society should be provided with participation and enough time to accommodate changes. Any change should start on a small scale and should be kept flexible. A favorable social climate should be created by top management

through setting themselves as good examples. Any change should be woven into the existing and acceptable part of the cultural pattern. Problems raised by the recipient society should be treated positively and constructively. That is to say, people must be treated with dignity and trust (pp. 433-434).

(3) Inadequate skills and resources to facilitate improvement: This relates mainly to how and what kind of training is being deployed to the organizational members. For example, lack of emphasis on inter-departmental and cross-functional skills, over-reliance on training packages provided by consultants, and the launching of too many quality improvement initiatives at the same time making things difficult to manage (Dale & Boaden, 1994) should be avoided. Ishikawa (1985: 141) had appropriately addressed the problem on training. He stated that technical training alone is not enough. As TQM is a philosophy rather than a technique, training must be accompanied by education.

(4) A lack of information to support the improvement process: The effectiveness of the quality improvement process is dependent on the availability of relevant, reliable, and objective information and the communication methods used (Lascelles & Dale, 1994: 327). Organizations wishing to obtain ISO 9000 certifications should pay particular attention to this point. For example, document and data control and the control of quality records are specific requirements of ISO 9001. TQM itself is essentially a philosophy. However, the concretization of the philosophy is largely based on scientific methods of management. Price (1984: 328) appropriately suggested three rules namely, no measurement without recording, no recording without analysis, and no analysis without action.

2.7. Studies on Cultural Values

In this section, some representative definitions of values and culture are given and discussed. The particularities of the Chinese cultural values are also explained. Then, a critical review of several studies which have attempted to associate national culture and TQM is conducted. Finally, Chinese cultural values, as in the context of TQM, are presented in order to provide a theoretical background for the hypothesized model to be tested in the study.

2.7.1. Defining Value

The concept of value-orientation (F. Kluckhohn & Strodtbeck, 1961) is commonly used in cross-cultural management studies (Negandhi, 1986). It stems from the original definition of value by C. Kluckhohn whereby "a value is a conception, explicit or implicit, distinctive of an individual or a group, of the desirable which influences the selection from available modes, means, and ends of actions" (C. Kluckhohn, 1951: 395). Several other representative definitions of value are compared here. For example, Parsons (1951: 12) defined a value as "an element of a shared symbolic system which serves as a criterion or standard for selection among the alternatives of orientation which are intrinsically open in a situation". Rokeach (1973: 159-160) defined a person having a value as "having an enduring belief that a specific mode of conduct or end-state of existence is personally and socially preferable to alternative modes of conduct or end-states of existence". Hofstede (1980: 19) defined a value as "a broad tendency to prefer certain states of affairs over others". Finally, Yang (1986: 115) defined it as "the core component of a class of generalized attitudes concerning what is desirable or

undesirable, which directs behavior on a long-term basis towards some goals in preference to others". Several points of commonalities can be highlighted.

(1) There is a degree of awareness or a continuum of implicitness or explicitness (F. Kluckhohn & Strodtbeck, 1961: 5). As argued by Bem (1970: 16), values can be either non-consciously taken for granted or taken as a direct derivation from experience or some external authority.

(2) There is a motivational element expressed as an orientation to the improvement of a gratification-deprivation balance of the actor (Parsons, 1951: 12) which leads to an evaluative process requiring structural conceptualization. Parsons' (1951) motivational orientation of the actor includes the cognitive, the cathectic, and the evaluative aspects. F. Kluckhohn and Strodtbeck (1961) included similar cognitive, affective, and directive aspects in the transactional process. Thus values influence behaviors and actions.

(3) In line with the point mentioned above, there is a desired versus desirable dichotomy. Hofstede (1980) warned that the two should not be equated in order to avoid positivistic fallacy (Levitine, 1973) even though behaviors or actions are influenced by values.

(4) There is also a time orientation so that a value is described as enduring or sticky. Hofstede (1980) described this characteristic as a mental program while Rokeach (1973) differentiated between terminal values and instrumental values.

(5) The values held by a person collectively form a "value system" or "value hierarchy". Though hierarchical in nature, a person may simultaneously hold different and even conflicting values (Hofstede, 1980: 19). Also, due to the hierarchical arrangement of values, each value is like a mathematical vector

possessing both "intensity" and "direction" (p. 20), or "intensity" and "modality" (C. Kluckhohn, 1951: 413-414).

In order to compare values cross-culturally, it is necessary to examine the value-orientations of each culture. F. Kluckhohn and Strodtbeck's value-orientation concept was built upon three assumptions. Firstly, "there is a limited number of common human problems for which all peoples at all times must find some solutions". Secondly, "while there is variability in solutions of all problems, it is neither limitless nor random but is definitely variable within a range of possible solutions". Thirdly, and most important of all, "all alternatives of all solutions are present in all societies at all times but are differentially preferred" (F. Kluckhohn & Strodtbeck, 1961: 10). Thus, five questions have been singled out in particular to observe the total range of variations in five orientations. They include: (1) Human nature orientation: what is the character of innate human nature? (2) Man-nature orientation: what is the relation of man to nature and super-nature? (3) Time orientation: what is the temporal focus of human life? (4) Activity orientation: what is the modality of human activity? (5) Relational orientation: what is the modality of man's relationship to other men? (p. 11). The range of variations postulated for the five orientations can be represented in the following table.

Table 2.2. The five orientations and the range of variations postulated for each (F. Kluckhohn & Strodtbeck, 1961: 12).

Orientation	Postulated Range of Variations					
Human nature	Evil	Evil	Neutral	Mixture of good-and-evil	Good	Good
	Mutable	Immutable	Mutable	Immutable	Mutable	Immutable
Man-nature	Subjugation-to-Nature		Harmony-with-Nature		Mastery-over-Nature	
Time	Past		Present		Future	
Activity	Being		Being-in-becoming		Doing	
Relational	Lineality		Collaterality		Individualism	

2.7.2. Defining Culture

Grounded on C. Kluckhohn's definition of values, and concluding their review of various definitions found in the anthropological literature, Kroeber and C. Kluckhohn defined a culture as "consisting of patterns, explicit and implicit, of and for behaviors (ways of thinking, feeling and reacting) acquired and transmitted mainly by symbols including embodiments in artifacts, traditional (historically derived and selected) ideas and especially their attached values; cultural systems may be considered as products of actions and as conditioning elements of future actions" (Kroeber & C. Kluckhohn, 1952: 181; C. Kluckhohn, 1951: 86).

Two important points concerning culture should be noted here. Firstly, values are among the building blocks of culture (Hofstede, 1980: 25). Parsons, in his study of action systems, pointed out that value-orientation is the logical device for articulating cultural traditions into an action system (Parsons, 1951: 12). Thus, culture is the result of value systems, and behaviors and actions are influenced by culture. Secondly, culture has a collective sense. As argued by Parsons again, culture is "transmitted", "learned", and "shared" (Parsons, 1951: 15). Thus,

Hofstede, in simple, treated culture as "the collective programming of the mind which distinguishes the members of one human group from another" (Hofstede, 1980: 25). From these explanations, it can be understood that although no single individual possesses all the cultural characteristics of the group to which one belongs, culture is a concept resting on the human collectivity level. Furthermore, the "super-organic" concept of Kroeber (1917) is of fundamental importance to the theoretical assumptions of culture. He argued that culture is super-organic, above and beyond its biological and psychological bases, having an independent existence at its own level. It remains relatively stable and unchanged irrespective of a large turnover in membership within each new generation.

It is also possible to delineate the cultural patterns of different societies, nations, and groups by identifying the dimensions of cultures through analyzing the different combinations of value-orientations (F. Kluckhohn & Strodtbeck, 1961). Parsons' famous "pattern variables" outlined below offered to achieve this objective (Parsons, 1951: 67. Words in parentheses from Hofstede, 1980: 45-46):

(1) The gratification-discipline dilemma: affectivity (need gratification) versus affective neutrality (restrain of impulses);

(2) The private-collective interest dilemma: self-orientation versus collectivity-orientation;

(3) The choice between types of value-orientation standards: universalism (applying general standards) versus particularism (taking particular relationships into account);

(4) The choice between modalities of the social object: achievement (judging others by what they do) versus ascription (judging others by who they are);

(5) The definition of scope of interest in the object: specificity (limiting relations to others to specific spheres) versus diffuseness (no prior limitations to nature of relations).

It is important here to clarify some issues on the different levels of analysis in cultural studies. First of all, it has been reassured from the above discussions that values or value systems are part of a culture and that culture is understood in the collective sense. Hofstede pointed out that the study of culture and personality, often termed "psychological anthropology", is based on two different levels of analysis. The study of culture pertains to a human collectivity, while the study of personality pertains to an individual. Based on Guilford's (1959) definition of personality (the interactive aggregate of personal characteristics that influence the individual's response to environment), he defined culture as "the interactive aggregate of common characteristics that influence a human group's response to its environment" (Hofstede, 1980: 25). Similarly, Inkeles and Levinson (1954: 988) have argued that concepts such as F. Kluckhohn's value-orientation refer to patterning in the culture rather than in the individual personality.

In other words, it is possible to have two inter-related levels of analysis. As pointed out by Bond, analyses in the study of values can be conducted based on the individual level and the cultural level. Although people often speak of individuals holding values, not of countries holding values, it is possible to characterize the values of a country through averaging the scores given to a set of values by a representative sample of persons from that country (Bond, 1996: 211). Several important studies are based on the cultural level in this way. For example, Hofstede's (1980) mammoth project and many of its continuations, the Chinese

Value Survey (The Chinese Cultural Connection, 1987), and the Schwartz Value Survey (Schwartz & Bilsky, 1987, 1990). Nevertheless, Bond pointed out that individual-level studies of values can also be performed based on findings from cultural-level studies of values. For example, in Bond (1988), he presented the individual-level analysis of the data collected by the Chinese Cultural Connection.

2.8. Chinese Cultural Values based on a Value Orientation Framework

There has been a number of studies on Chinese cultural values based on an evaluative-attitudinal approach during the past decades. Most studies agree with the classical eco-cultural model (Berry *et al.*, 1992) in which culture is a result of the social system, which is itself characterized by the subsistence system (e.g. agricultural, gathering, fishing, pastoral, or hunting) influenced by the ecological environment as well as the genetic traits of the race. For example, Yang (1986: 162) provided a simplified cultural-ecological view of the Chinese culture. He argued that the Chinese agricultural system has led to a social structure emphasizing hierarchical organization, collectivistic functioning, generalized familization, structural tightness, and social homogeneity. Furthermore, dominant moral and religious thoughts or doctrines such as Confucianism, Taoism, and Buddhism helped shape the Chinese character. These have led to a social-oriented character of the Chinese as exemplified in the collectivistic, other, and relationship orientations as well as the submissive, inhibited, and effeminate dispositions.

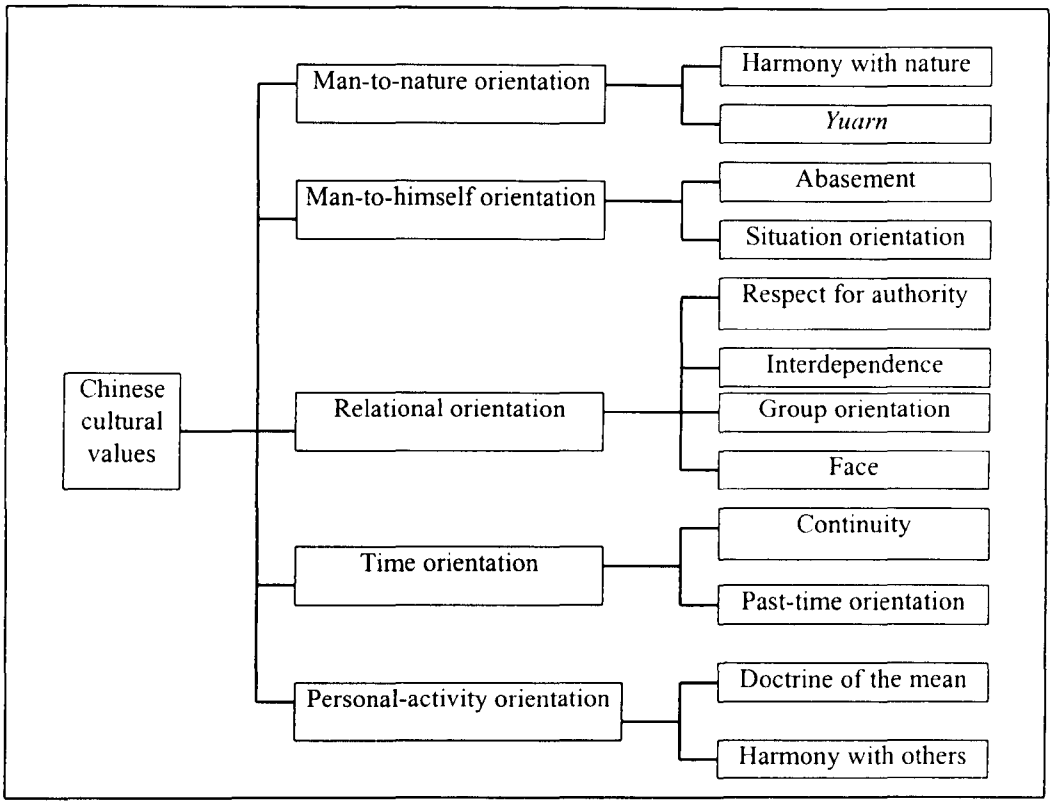
Such characteristics are in line with the traditional cultural pattern of the Chinese as described by Parsons. For example, based on different combinations of his pattern variables, he pointed out that the traditional Chinese value of

collectivism is a result of an emphasis of collective achievements and roles involving responsibilities towards collectivities (Parsons, 1951: 96). A combination of particularism and achievement is demonstrated in the classical Chinese cultural pattern emphasizing on a harmonious order to maintain or restore men's responsibilities (p. 111). Also, the classical Chinese social structure can be said to be organized primarily around the relational reference points of kinship sometimes extending beyond the conjugal family to the local community. It is characterized by the continuity with ancestors, the ordering of hierarchical relationships, and a general orientation to collective morality emphasizing responsibility for the functioning of collectivities, all the way from the Emperor's responsibility for the society as a whole, to the father's responsibility for his family (p. 195). The Chinese system tended to be both collectivistic and authoritarian as superiority of status was also closely connected with responsibility. The weakness of universalism and the emphasis on attendant specificity made it difficult for achievement to become individualistically oriented (p. 197).

2.8.1. Chinese Cultural Values in Relation to Confucian Teachings

Yau (1994) has attempted to classify typical Chinese cultural values according to the value-orientation framework and obtained a number of specific values as shown in the following figure. Each of the Chinese cultural values are briefly explained with examples drawn mainly from the teachings of Confucius and some empirical studies on Chinese psychology.

Figure 2.5. Classification of Chinese cultural values (Yau, 1994: 68).



(1) Harmony with nature

Based on the eco-cultural model (Berry *et al.*, 1992), the ancient Chinese who were primarily peasants watched closely the transformations of nature, in particular the operations of the four seasons which regulated their farming activities. They gradually developed a belief that natural phenomena were closely related to human affairs (Lu, 1983: 45-46, 48). Confucius' essential doctrine of "oneness (harmony and union) between Heaven and man" is likely to be derived from this eco-cultural property. In his Doctrine of the Mean, it contained the following passage:

> "What Heaven/Nature (*Tian*) imparts to man is called human nature. To follow our nature is called the Way (*Tao*). Cultivating the Way is called education."

The Chinese believe that nature has the "Way" (*Tao*). They regard man as a part of nature, and believe that man should not try to overcome or master nature but has to learn how to adapt to it so as to reach harmony (Yau, 1994: 46). This is seen parallel to Weber's descriptions of adaptation to the world but not mastery over the world (Parsons, 1951: 111). As Morris and Jones (1955: 527) revealed their findings in their "Ways to Live" survey, Chinese respondents ranked the highest preference rating for way number 13 namely, "Obey the cosmic purposes".

However, it is not to say that the Chinese are so pessimistic that they do not actively pursue a desirable life or that they do not resent on things lost in life. Instead, they believe that misfortunes in life are to be followed by luck in the future or even in the next life as the Chinese saying goes, "Man has three misfortunes and six fortunes in life". This is only when the Way is followed and harmony with nature maintained. The following quote from the Analects is clear about the point.

> You Zi said, "In practicing the rules of propriety, it is harmony that is prized. This is what is so precious in the ways of the ancient kings. They followed this principle in things small and great. Yet it is not to be observed in all cases. To know how such harmony should be prized, yet manifest it without regulating it by the rules of propriety, is something which should not be done." (The Analects, 1, 12)

The Chinese put a lot of emphasis on morality and man has to be responsible for maintaining the given social structure as a going concern. This can be seen reflected in the teachings of Confucius in the Analects. For example,

> The Master said, "Wealth and rank are what every man desires, but if they cannot be obtained except at the expense of the Way, he does not accept them. Poverty and low station are what every man detests, but if it can only be done at the expense of the Way, avoiding them is not for him. The nobleman who departs from humanity - how can he be worthy of the name of noble man? Never for a moment does the noble man forswear his humanity. Never is he so harried that he does not cleave to this, never so endangered that he does not cleave to this." (The Analects, 4, 5)

(2) *Yuarn*

Yuarn, the pre-determination of relationships with things or people in life by a super-natural force too sophisticated for the ordinary man to understand, stems from the concept of *Karma* in Buddhism. Yau (1994: 69) pointed out that after almost two thousand years of assimilation, its meaning has deviated from its original. He mentioned that *yuarn* has two senses. Firstly, as things in life such as friendship and marriage are dependent upon *yuarn*, it leads to tragic consequences when such relationships shall cease. Secondly, *yuarn* has a positive sense in that it leads to the development of self-reliance so that people actively seek for *yuarn* (p. 70). For example, R.P.L. Lee (1985) has noted how one can accumulate *yuarnfen* (predestined affinity) through behaviors in life, and it is important to involve oneself in relationships and search out a suitable partner (Goodwin & Tang, 1996: 297).

Cheung explained the concept of *yuarn* from another point of view based on the attribution process in psychopathology. She argued that *yuarn* acts as an important external attribution for success or failure in interpersonal relationships

among the Chinese. It helps to maintain interpersonal harmony by attributing the success or failure of relationships to forces beyond one's personal control, thus protecting one's face and saving the face of others (Cheung, 1996: 201-202). Similarly, Yang and Ho (1988) argued that a successful individual will tend to ascribe his or her success to the intervention of a significant other, the maintenance of good social relations, collective efforts, and *yuarn*. On the other hand, *yuarn* was found to be an attribution to failures (Yu, 1996: 243-244). *Yuarn* was also believed to be one explanation of why the Chinese report less positive self-concept than do other Westerners who frequently report a pattern of ego-defensive attributions (Leung, 1996: 256). Drawing from studies conducted in Taiwan and Hong Kong (Yang & Ho, 1988; Huang *et al.*, 1983), Crittenden (1996: 266) stated that the idea of *yuarn* remains alive in the modern Chinese culture, but with a lessened religious connotation than in the past.

(3) Abasement

The ordinary Western meaning of abasement carries a certain sense of humiliation and degrade. On the other hand, the Chinese see abasement as an expression of modesty, humbleness, and politeness. They are used to believing in modesty and self-effacement, two important virtues that a child, as well as a subordinate, uses to cultivate his or her mind (Yau, 1994: 48). As pointed out by J.P. Cheng (1990: 182-183), propriety, humility, and sincerity are moral aims of the teaching of Confucius.

Yang (1967 in Yang, 1986: 109-111), on applying the Edwards Personal Preference Schedule to student samples in America, China, and India, found that the Chinese scored relatively high on the abasement scale. A plausible reason for

this phenomenon lies in the central doctrine of Confucius. The so-called "Five Cardinal Relations (*Wu Lun*)", namely those between sovereign and subject, father and son, elder brother and younger brother, husband and wife, and friend and friend, are constructed in hierarchical patterns. In each case, the senior member is accorded a wide range of prerogatives and authority with respect to the junior (Bond & Hwang, 1986: 215). Thus in the past, a Chinese would address oneself as "the unworthy" and "the unfilial" in front of the teacher and the parent respectively (Yau, 1994: 71). Although such names are no more common today (though they still exist sometimes in formal writings), the sense of respect for higher authority still prevails. This can be seen reflected in Hofstede's findings concerning the large power distance found in Chinese societies (Hofstede, 1980). Nevertheless, even Confucius himself, so renowned as a sage, was so humble to say:

> "The *sheng* (sage) and *jen* (love); how dare I rank myself with them?" (The Analects, 7, 23)

(4) Situation orientation

Yau (1994: 71) claimed that the situation-oriented and pragmatic characteristic of the Chinese is a result of their child-rearing practices in which a child is taught not only by the parents, but also by a host of extended or joint family members (e.g. paternal and maternal grandparents, uncles and aunts, cousins, and others), so that the child is exposed to many different points of view. This appears to be a natural consequence as the traditional Chinese is used to co-habitation with more than one generation of family members, as the popular Chinese saying "Three generations in a house" goes.

Comparatively speaking, the Chinese appear to be less dogmatic and tend to be more flexible in following a learned principle. Yang (1986), in his discussion of the temperamental characteristics of Chinese personality, pointed out that the Chinese have been characterized as valuing common sense and utilitarian ways of thinking highly. Drawing from the empirical studies conducted by Hellersberg (1953) and Sue and Kirk (1972), he concluded that the common international image of the Chinese as a practical-minded people is supported. Yau (1994: 71) quoted Lao Tsu's doctrine of the Way to illustrate this cultural value of realism:

> "A man must follow his instinct, ...for there is no principle that is right in all circumstances, or any action that is wrong in all circumstances."

The practical-mindedness or realism of the Chinese gives rise also to the positive and committed attitude of the Chinese. Lu (1983) mentioned about the cultural characteristic of "this-worldliness" of the Chinese. He pointed out that Confucianists do recognize spiritual beings in the form of *yang* and *yin* (positive and negative spiritual forces). However, these spiritual beings would never be allowed to interfere with human activities. Thus, for a Confucianist, immortality of race and culture rather than the soul is what one strives for. This explains why the Chinese are this-worldly; why they are concerned with the cultivation of one's virtue in order not to shame their ancestors and to pass on something which may be proud of to their descendants; and why they esteem scholarship. He quoted from Lin (1935: 401) the following description of the Chinese pagan: "one who starts out with this earthy life as all we can or need to bother about, wishes to live intently and happily as long as his life lasts".

(5) Respect for authority

This cultural value is largely built upon the "Five Cardinal Relations" of Confucius mentioned above. The mechanism of the relations is based on Confucius' teaching on the rules of proper behavior or propriety (*li*) so that rights and responsibilities for each are entailed. Harmony would be realized if each member of the unit was conscientious in following the requirements of his or her role (Bond & Hwang, 1986: 215). Confucius' teachings have especially emphasized on respect for sovereignty, respect for teachers, and filial piety. Some quotes from Confucius are given as examples.

> "I imitate, follow, and observe the virtue of King Wen, And daily there is tranquillity in all the regions" (The Book of Poetry, 4, 1, ode 7)
>
> "Take your pattern from King Wen, And the myriad states will repose confidence in you" (The Book of Poetry, 3, 1, ode 1, 7)
>
> "There are three essentials in our lives, and they should be regarded as the same in importance: parents who beget us, teachers who teach us, and the kings who feed us." (The Narratives of the States, *Chin Yu*)
>
> "The Master said, 'Those who love their parents dare not show hatred to others. Those who respect their parents, dare not show rudeness to others." (The Book of Filial Piety, *T'ien Tzu*)
>
> "Filial piety is the root of virtue, and the origin of culture...To establish oneself and walk according to the right way (*Tao*), in order to glorify one's parents: this is the culmination of filial piety. Filial piety begins with serving one's parents, leading to serving one's king, and ends in establishing oneself..." (The Book of Filial Piety, *K'ai Tsung Ming I*)

Bond and Hwang (1986: 216) pointed out that there is a potential danger involving such a considerable inequality of power since abuse of one's superior position can put the opposite party in serious jeopardy. Nevertheless, Yang described that the highly authoritarian attitudes of the Chinese can be inferred from their extremely strong sense of filial piety. One main component of authoritarianism is the unconditional submissiveness to authority. Drawing from studies by Chu (1967), Hiniker (1969), and Yang (1970), he reported that the Chinese are rather skillful in showing deference towards whomever they consider an authority. The best policy is always to behave like a subordinate and to treat the other as an authority, unless the person clearly knows that he himself is the authority in the relationship (Yang, 1986: 127-128). This is obviously a result of combining the values of abasement and respect for authority together.

(6) Interdependence

Confucius once said, "All within the four seas are brothers" (The Analects, 12, 5, 4). Weber (1951) stated that the Chinese depend enormously on particularistic type of trust which intentionally leave people in their personal relations as naturally grown. According to S.L. Wong (1991: 13-25), there is a high level of system as well as personal trust in Hong Kong and this could explain to a large extent the business success of Chinese entrepreneurs in Hong Kong and the overseas Chinese communities.

Yau pointed out two elements which are important to the flexibility of the Chinese in terms of inter-personal relations. There are also logical reasons to believe that these two elements serve to enhance personal and system trust. The first element is the principle of "doing favors" (*renqing*). Favors done for others

are often considered as social investments for which returns are expected (Yau, 1994: 73). The reciprocal exchange of favors serves as a lubricant in the Chinese way of doing business. However, the concept of "*renqing*" should not be thought to be too instrumental. In Chinese society, when one has either happy occasions or difficulties, his or her acquaintances are expected to offer a gift or render some substantial assistance (Gabrenya & Hwang, 1996: 313-314). This in fact represents a way of proper conduct, propriety (*li*), and love (*jen*).

The other important element is "face" (*lien* and *mien-tsu*). Hu (1944: 45) defined "*lien*" as something that "represents the confidence of society in the integrity of ego's moral character, the loss of which makes it impossible for him or her to function properly within the community" and "*mien-tsu*" as "a reputation achieved through getting on in life, through success and ostentation". Face management is essential to maintaining the existing role relationships and preserving interpersonal harmony (Gao *et al.*, 1996: 289). In Chinese society, saying someone "doesn't want face" (*bu yao lien*) is a great insult to the person's moral character meaning that he or she is nasty, shameless, and immoral. However, saying someone "has no face" (*mei you mien-tsu*) simply means that he or she does not deserve honor or glory (Gabrenya & Hwang, 1996: 313). Confucius' teaching on propriety has put particular emphases on the principle of forgiveness (*shudao*) as he once said, "Do not to others what you would not want done to yourself" (The Analects, 15, 23; The Doctrine of the Mean, 13, 3). The most common practice of this principle of forgiveness is by avoiding to hurt another's face in social interactions (Gabrenya & Hwang, 1996: 313).

"The mountain and the water will meet some day". This very popular Chinese saying best demonstrates the emphasis on interdependence and trust. The Chinese, probably due to their belief in *yuarn*, strongly believe that people and even enemies will meet some day and may need each other's assistance. In order to avoid any potential conflict and embarrassment, it is best to treat each other with propriety and not to go too far (the doctrine of the mean) as the following saying of Confucius goes:

> "The man of love (*jen*), wishing to be established himself, seeks also to establish others; wishing to be enlightened himself, seeks also to enlighten others" (The Analects, 6, 28, 2)

(7) Group orientation

Hofstede defined "individualism" as pertaining to "societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family". He also defined "collectivism" as pertaining to "societies in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty" (Hofstede, 1991: 51). He saw the difference parallel to Tönnies' sociological concepts of *gemeinschaft* and *gesellschaft* (Hofstede, 1980: 213). According to his findings, Chinese societies are less individualistic, hence more collectivistic, than their Western counterparts. However, the Hofstede data were collected almost a quarter century before and there has been an abundance of cross-cultural research on individualism versus collectivism. Triandis and his colleagues have analyzed data collected from ten cultures which were included by Hofstede as either individualistic or

collectivistic. The results indicated that Chinese societies still possess a high level of collectivism as compared to other cultures. For example, they found an extreme rejection to "separation from in-groups" in Hong Kong and China; low scores for "independence" in China; and very high scores for "dependence" and "family integrity" in Hong Kong and China. (Triandis *et al.*, 1993: 378-379).

There is probably no denial for the highly collectivistic nature of the Chinese culture. Some historical and cultural explanations discussed earlier serve also to explain this phenomenon. It is possible to further the analysis by discussing the Japanese collectivistic character since Japan has been found similar to Chinese societies in Hofstede's (1980) as well as Triandis *et al.*'s (1993) studies. Japanese collectivism, or the inhibition of individualism for the maintenance of harmony, is often thought to be a manifestation of the "Seventeen Article Constitution" of Prince Shotoku (De Mente, 1991: 4-5). In the last article, it was read: "Matters should not be decided by one person alone. They should be discussed with many others. In small matters, of less consequence, many others need not be consulted. It is only in considering weighty matters, where there is a suspicion they might miscarry, that many others should be involved in debate and discussion so as to arrive at a reasonable judgment." (de Bary, 1988: 31-32). In fact, de Bary pointed out that most of the language used in the Seventeen Articles were drawn from Confucian texts and much of the specific institutional arrangements were constructed based on Chinese models.

Although it is true that Confucius did emphasize interdependence and group orientation, it is important here to explore the extent of the scope of the so-called "group" in the Chinese sense. Confucius described the ideal society in

terms of two stages namely, the first stage of "small tranquillity" (*hsiao k'ang*), and the highest stage of "great harmony" (*ta t'ung*). In the first stage, the family is the basis of social and political organization (J.P. Cheng, 1990: 195). True love (*jen*) as taught by Confucius is not yet achieved in this stage of small tranquillity. When each one regards as his parents only his parents, and treats as his children only his own children, universal and undifferentiated love would be impossible. The stage of great harmony represents the highest stage of social evolution. It is when love permeates human society; everyone loves all others, just as naturally as he loves his own parents or his children or himself. Everybody, regardless of age, sex, or different conditions of life, is properly taken care of by the society under a perfect system (p. 201).

It seems that the Chinese normally possess a narrower view of Confucius' great tranquillity. There is a distinction between the in-group (*zijiren*) and the out-group (*wairen*) in the relational personalism of the Chinese (Gabrenya & Hwang, 1996: 311). The former is normally dominated by the kin in-group, which represents the "first, last, and only" source of security in traditional China (p. 310). However, the in-group often includes friends, colleagues, and co-workers whom Hwang (1987) described as members of the "expressive ties". The out-group clearly includes strangers, and of course, foreigners. Socialization from the out-group into the in-group is a matter of time and of course, *yuarn*. However, it is not to say that the Chinese way of clearly distinguishing between *zijiren* and *wairen* will lead the former to treat the latter in inhuman or unjust ways. Based on the belief in harmony and propriety, people treat one another by *li*. The following quote from the Analects is clear about the point.

> Sima Niu said sadly, "All men have brothers, I alone have none!" Zixia said, "I have heard that life and death are determined by fate, that wealth and honors depend upon the will of Heaven. A superior man attends to business carefully and does not trip; he is respectful to others and observant of propriety. All within the world will be his brothers. How can a superior man feel distressed about his lack of them?" (The Analects, 12, 5)

(8) Continuity

Yau (1994: 79) quoted the popular Chinese proverb "If you have been my teacher for a day, I will treat you like my father forever" to demonstrate the Chinese believe that inter-relations with objects and people are continuous. Based on their emphasis on respect for authority and filial piety, as well as *yuarn*, it appears natural that such a sense of continuity should prevail. The value can be appropriately analyzed in terms of two aspects namely, loyalty to the superior and the attitude towards learning. In the organization, an employee expends effort at work not only because of the instrumental attractiveness of the job, but also of his or her moral commitment to fulfill a duty and to contribute to the collectivity (Hui & Tan, 1996). This is not only a reflection of the Confucian emphasis on loyalty (*chung*) between the sovereign and the servant, but also a manifestation of the emphasis on reciprocity (*pao*), the repayment of a favor by the recipient (Yang, 1967; Hui & Tan, 1996). Thus, relationships between superiors and subordinates, teachers and students, parents and sons are naturally continuous. In the past, and also commonly in the present, continuity extends beyond a lifetime as exemplified in the Chinese emphasis on ancestral worship and burial and mourning rituals.

Given this emphasis on continued relationships with things and people, the Chinese see particular importance in perpetual learning, which has been the central doctrine of Confucius. It is a commonly accepted principle in life the popular Chinese saying "There is no end in learning". The sense of continuity can be seen in the following quotes from Confucius.

> "Is it not pleasant to learn with a constant perseverance and application? Is it not delightful to have friends coming from distant quarters? Is he not a man of complete virtue, who feels no discomposure though men may not take note of him?" (The Analects, 1, 1)
>
> The philosopher Tsang said, "I daily examine myself on three points - whether, in transacting business for others, I may have been not faithful; - whether, in intercourse with friends, I may have been not sincere; - whether I may have not mastered and practiced the instructions of my teacher." (The Analects 1, 4)

(9) Past-time orientation

The Chinese have been well known for their being conservative and historically-minded as compared to most Westerners. F. Kluckhohn and Strodtbeck (1961: 14-15), pointed out that historical China was a society which gave preference to past-time orientation while the Americans place an emphasis upon the future more strongly than other people. This is true as manifested by the Chinese emphasis on respect for authority and filial piety as discussed in the previous section.

This past-time orientation does have its positive aspect. On administering a Chinese version of the Morris and Jones (1955) "Ways to Live" survey to Chinese university students in Taiwan, Yang (1972 in Yang, 1986: 119) found that the

respondents ranked the highest preference rating for way number 1 namely, "Preserve the best that man has attained". In reality, it is known that the Chinese are vigilant in learning good things from history and are keen in preserving them. Even Confucius himself was an enthusiastic learner who took good examples from the past. In order to make his teaching more authoritative and effective, Confucius had sometimes to borrow the authority of the ancient ideal rulers (J.P. Cheng, 1990: 192). The following quote from "The Great Learning" typically exemplifies the importance of learning from the past.

> In the Books of Poetry, it is said, "Ah! the former kings are not forgotten." Future princes deem worthy what they deemed worthy, and love what they loved. The common people delight in what delighted them, and are benefited by their beneficial arrangements. It is on this account that the former kings, after they have quitted the world, are not forgotten. (The Great Learning)

(10) The doctrine of the mean and (11) Harmony with others

"The Doctrine of the Mean" (*Chung Yung*) is one of the essential teachings of Confucius which has been embraced by the Chinese until the present. All his teachings were consistent with this doctrine. In his teachings on love (*jen*), or the rules of propriety (*li*), or filial piety (*hsiao*), he emphasized both social and individual, motive and consequence, mind and action, as well as acquired experiences and innate tendencies (J.P. Cheng, 1990: 288). Confucius mentioned about "the state of equilibrium" where there are no stirrings of pleasure, anger, sorrow, or joy. Practicing the doctrine is an example of cultivating moral virtue

for the self. Not following the mean leads to distortion in social harmony as well as moral deterioration.

> Confucius said, "The Superior Man embodies the course of the Mean; the mean man acts contrary to the course of the Mean." (The Doctrine of the Mean, 2, 1)
>
> "The superior man accords with the course of the Mean. Though he may be all unknown, unregarded by the world, he feels no regret. It is only the sage who is able for this." (The Doctrine of the Mean, 2, 1)

In other words, the value is manifested in a balanced life. A virtuous man would never be allowed to be led astray by extreme desires or passions. He would rather be led by common sense than by any unprofitable adventures (J.P. Cheng, 1990: 289). Therefore, the Chinese are taught not to let primitive passions and impulses be completely repressed or unrestrictedly satisfied (Yau, 1994: 80-81) for this will disrupt harmony with others. In the Analects, the following quote is clear.

> Zigong asked, "Who is better, Shi or Shang?" The Master said, "Shi goes too far; Shang goes not far enough." Zigong said, "Than Shi is better, I suppose." The Master said, "Too far is no better than not far enough." (The Analects, 11, 16)

This ethical way of being was found to be reflected in Yang's (1972) administration of the Morris and Jones (1955) "Ways to Live" survey in which the respondents ranked a high preference rating for way number 10 namely, "Control the self stoically." (Yang, 1986: 119).

2.8.2. Modern Chinese Cultural Values

After a rather detailed explanation of some important Chinese cultural values, the question of whether such apparently traditional values still prevail nowadays has to be addressed. Given the Chinese have been constantly influenced by societal modernization, it is obvious that a possibility of change in basic values exists. The following discussion attempts to answer the question by persuading that the fundamental values of the Chinese are still relevant today. This is largely a result of constant reinforcement of traditional values in the education system and even in the national directives of Chinese societies. Though there may be changes, they should actually be thought of in terms of the degree of change. It must be emphasized again here that underlying values do not change drastically as raised in the theories of Rokeach (1973), Hofstede and Bond (1988), and Yau (1994), which the present study has strictly adhered to.

The discussion starts firstly with a brief overview of the relevance of Confucian moral values to Chinese societies nowadays. Perhaps the most obvious and appealing example is the impact of Confucianism on Singapore, which is dominated by ethnic Chinese for around 77% of the total population. Lu (1983: 88-89) strongly believed that although most Singaporeans are English-educated, they still retain contacts with their cultural experiences and traditional values through their familial and social associations. There is clearly a skepticism that Confucian values are nowadays incompatible with the emphasis upon science, technology and economic growth. However, the question depends very much on how people look at the matter (p. 89). The Singaporean Government's formulation of the People's Action Party is concerned with preserving the traditional values of

the Singaporean people by constantly reinforcing them through various official blessings. For example, in reinforcing family cohesiveness and filial piety, the Singaporean Government has given special priority in housing allocation to those who live with their parents (p. 86). In terms of political leadership, Mr Lee Kuan Yew, former Prime Minister of Singapore, spelt out basic principles based on Confucian values for leaders to follow (p. 102). Lu argued that such promotions of Confucianism do not aim at introducing "new values" to the people because Confucian values have always been exerting influences upon Singaporeans (p. 91). In other words, the underlying value assumptions of the modern ethnic Chinese Singaporeans are still Confucian in nature. Clearly enough, there has been an overall tendency for Singapore to preserve what is good for the moral development of its people. Lu further argued that it is enough to follow the Confucian perspective and to be inspired by the Confucian moral examples. It would be actually against the spirit of Confucianism to follow the minute details of Confucian moral codes (p. 108).

It is believed that a similar situation can be found in other Chinese societies like Hong Kong and Taiwan. Although unlike Singapore which uses direct governmental interventions, reinforcement of Confucian values can be seen mostly in the form of formally integrating the Confucian classics in most Chinese primary and secondary school texts. The child is often encouraged to memorize the classics and to manifest his learning through building relationships based on Confucian principles. Redding (1990: 48) argued that Confucian education is nevertheless still a major force in Hong Kong, a dominant one in Taiwan, and an officially sponsored one in Singapore. Even in mainland China today, classical

Confucian teachings are often contained in the textbooks used by primary schools and even international schools.

It is probably the latent characteristic of cultural values which has made the modern Chinese to be unaware of its existence. That is also a possible reason why Chinese societies are constantly reinforcing such values in different ways. There is no doubt that Confucian traditionalism remains, but in new contexts (Redding, 1990: 52). Confucianism is not simply a creed which has been selected from some competing philosophies. It is a way of life encompassing the ultimate standards for Chinese social and political order. Nevertheless, Confucianism for China represents the most powerful and universally accepted indigenous tradition, one that is irreplaceable by even Taoism and Buddhism (Smith, 1973: 232).

The argument that traditional Chinese cultural values are still relevant and active in the hearts of the modern Chinese can also be supported by quoting the findings of several representative studies. Bond (1996) pointed out three important studies of values at the cultural level relevant to the present discussion. They are the Hofstede (1980) project, the Chinese value survey (The Chinese Culture Connection, 1987), and the Schwartz value survey (Schwartz & Bilsky, 1987; 1990).

The Hofstede project revealed that Chinese societies like Hong Kong, Taiwan, and Singapore were united in their high power distance, low individualism, low uncertainty avoidance, and medium masculinity ratings. Similarly, the Chinese value survey showed that Singapore, Taiwan, and Hong Kong were high on Confucian work dynamism. The Schwartz survey found the mainland Chinese especially high on the importance of attribution to hierarchy

and master values. Of course, differences among the four major Chinese societies have been found. However, such findings are quite sufficient to persuade that the modern Chinese do possess Confucian type cultural values. Bond (1996) even further integrated the findings of the three surveys and came up with four factors namely, (1) Individualism-Hierarchy (the opposition of universalistic, open values with traditional, authoritarian emphases); (2) Orderly Autonomy (a strong emphasis on stability as well as individual freedom); (3) Discipline-Assertion (the focus of achievement and satisfaction as opposed by an emphasis on restraint and a long-term focus); and (4) Achievement factor (emphasis on achievement-oriented concerns). From the results, there appears to be an emphasis representing the enduring features of Confucianism.

Although it is quite comfortable to conclude here that traditional Chinese cultural values are still relevant and active, it would be wise to remain conservative by pointing out and accepting that there have been certain changes due to societal modernization. However, the changes here refer to a matter of degree. In other words, the fundamental essences still remain.

Yang, after reviewing numerous studies on Chinese personality conducted since 1948, concluded that there have been both increasing and decreasing trends in some important evaluative-attitudinal characteristics of the Chinese personality. For example, preference for achievement, individualistic relationship, and self-indulgence, aesthetic values, belief for internal-control, and democratic attitudes are among the increasing trend. Preference for inner development, collective relationship, social restraint and self-control, theoretical, social, and religious values, belief for external-control, and authoritarian attitudes have been decreasing

(Yang, 1986: 161). In Yang (1996: 487-488), he expanded the list to include some 30 evaluative-attitudinal characteristics with decreasing emphasis and 27 with increasing emphasis. In general, he argued that the decreasing characteristics may be summarized under the concept of the social-oriented personality and those increasing under the concept of the individual-oriented personality. The changes suggested by Yang appear inevitable. However, Confucianism, like capitalism, is a matter of what one does. Its power is widespread and extremely difficult to delineate (Redding, 1990: 47). Nevertheless, it should be remembered that Confucian traditionalism have been shaken off, counteracted, or subtly amended in the course of history. One thing is clear, the tradition still remains but probably in new contexts (p. 52).

2.9. A Hypothesized Model of Chinese Cultural Values and TQM

In the previous sections, TQM and Chinese cultural values as the two main subjects of the present study were examined in some length. It is now appropriate to associate the two together. However, before attempting to state the propositions leading to a testable model explaining the inter-relationships between Chinese cultural values and TQM, the following section has critically reviewed several studies which have attempted to study TQM in a Chinese cultural context.

2.9.1. Studies on Chinese cultural values and TQM

As pointed out earlier, studies on the influence of national culture on TQM are scarce. Studies which have specifically associated Chinese cultural values and TQM are even more difficult to find. On the other hand, studies which have employed samples of Chinese companies in regions such as Hong Kong and Taiwan are not difficult to locate. For example, W.H. Chen (1997) has employed a

sample of 105 Taiwanese companies to examine the leadership and human resource management aspects of TQM in Taiwan. Although the author did not study specifically how Taiwanese culture as an indigenous one affects such managerial processes in TQM, he has appropriately signaled the need to examine human factors underlying TQM in Chinese regions as the economy of the Asia Pacific rim has become increasingly important.

In another study by the same author (W.H. Chen & Lu, 1998), the importance to look into traditional Chinese cultural values, namely Confucian values in TQM has been highlighted. The authors have argued that there is no universal model of quality transformation and the implementation of TQM has to be culture specific. Using an in-depth analysis of one Taiwanese company, the authors have demonstrated how TQM could be effectively implemented by following "The Great Learning", an important ancient Confucian philosophy. Though the study has illustrated the fact that Chinese philosophy may play an important role in guiding the Chinese firm along the path of quality transformation, the coverage of the various important Chinese values is clearly insufficient.

Recognizing this obvious research gap, Jenner *et al.* (1998) conducted an in-depth interview with ten joint ventures between American firms and Chinese state enterprises with an objective of assessing whether the cultural attributes of Chinese state enterprises constitute serious obstacles to the introduction of TQM. The findings were intriguing although there were some areas which warrant a critical review.

Firstly, the researchers interviewed only the American managers of the joint ventures and concluded that nine out of the ten joint ventures were felt under-performing by the American managers. In particular, the American managers attributed the reason to that the culture of the Chinese partners could not be reformed (Jenner, 1998: 194). This conclusion is questionable. Based on the emic-etic theory as discussed earlier, these joint ventures are thus hybrids. Concluding that the culture of the Chinese partners does not fuse properly with TQM from the viewpoint of the American managers is probably an imposed-etic approach. A comprehensive approach should start with an imposed-etic process whereby the researchers look into the joint ventures from an American viewpoint. After this, they should draw out the emics or specificities of the American as well as Chinese cultures. Lastly, they should then draw out the commonalities or etics of the two systems. Of course, differences between the two distinct systems can also be drawn out during this stage thus determining whether diversity is high or low. However, the researchers have only investigated from an imposed-etic viewpoint, thus "Americanizing" TQM and ignoring the transcendent nature of TQM as a culture itself.

Another area which warrants clarification is their argument that TQM can be used as an agent for cultural transformation in the Chinese state owned enterprises. This argument appears sound and true indeed. However, there are doubts concerning the process of cultural transformation as stated by the researchers. They pointed out that one out of the ten joint ventures interviewed had successfully implemented TQM and used it as a change agent in transforming the enterprise's culture. What they argued as its reason of success is that rather

than attempting to change the culture of the Chinese enterprises before implementing TQM, this enterprise implemented TQM first. Given the imposed-etic viewpoint that the researchers have taken, the above method merely meant a replacement of the Chinese cultural values by the Americanized TQM culture in the enterprise. Based on Uemura (1998) and Abo's (1994) theories, a hybrid arises as a fusion of two systems but not a complete absorption of one by the other. Although the internalization theory states that the more advantageous aspects of one system will be taken over by the other, it is the central idea of the present study to argue that a successful hybrid should be able to mutually absorb the advantageous aspects of each other. If one system completely absorbs the other or if one system has to completely transform in order to adapt to the other, there is nothing called a hybrid then. In other words, American-style TQM, Japanese-style TQM, and Chinese-style TQM will all be the same.

The researchers then went on to point out five cultural aspects of Chinese state enterprise which are inconsistent with five major TQM principles (pp. 196-201). They are listed out as follows:

1. Confucianism and Maoism tend to value stability over change. The former also encourages formal patterns of communication within a hierarchical structure. This is inconsistent with TQM's primary function of management as providers of support towards continuous improvement.

2. Influenced by Maoism, Chinese state enterprises primarily focus on serving the needs of the state. TQM, on the other hand, emphasizes on satisfying the need of internal and external customers.

3. Confucianism and Maoism discourage free expression of ideas. TQM, on the other hand, requires commitment of all workers in the organization.

4. Influenced by Maoism, Chinese state enterprises tend to isolate workers and to discourage worker participation. Any deviations from the official doctrines are not allowed. Distrust is created. TQM requires all organizational units to continually improve and to drive out fear.

5. Influenced by Confucianism, Chinese enterprises tend to discourage alliances with any organizations which do not have close familial ties with key employees. TQM requires all organizations associated with the enterprise to equally involve in continuous improvement.

To support the above incompatibilities, the researchers cited many examples of Maoist communist practices in the state enterprises. This is probably not so appropriate because many of these practices have become irrelevant after the reform of the state enterprises which began in the early 1980s. As Laaksonen (1988) and Child (1994) have already pointed out, the economic reform since Deng Xiaopeng's open door policy has brought the management of Chinese enterprises into another era. Nevertheless, what is important to the present study is that due to the imposed etic approach that the researchers have employed, many of the underlying Chinese cultural values have became obstacles instead of opportunities for the successful implementation of TQM. Of course, one should not ignore the possibility that many Chinese state enterprises may still adhere to certain communist management practices. However, as can be seen later on in the case studies conducted, managers of Chinese state enterprises are admitting that such past practices are no more appropriate at present and that gradually they are

revisiting the important Confucian traits which are more in line with fundamental TQM principles. It is obviously healthier to employ a derived etic approach in which commonalities between Chinese culture and TQM are identified so as to better understand the characteristics of a Chinese-style TQM.

Generally speaking, the study of Jenner *et al.* has raised some possible difficulties in implementing TQM in a Chinese setting. However, as a study of the cultural influence on TQM, it has focused more on cultural manifestations rather than underlying cultural values. Another study more in line with the present research which has systematically designed a Chinese culture-specific research instrument to test the association of Confucian values and TQM was conducted by Lo (1998, 1999). Claimed to be the first attempt to investigate the appropriateness of using Confucian principles in quality management in Chinese based organizations, Lo found out that Chinese managers do find Confucian principles relevant in managing quality and they do practice them in reality. Following the Fishbein behavioral intention model (Fishbein & Ajzen, 1975), he designed an instrument composed of 19 Confucian principles and administered it to 90 Chinese managers in Hong Kong. In particular, he identified two areas in which Chinese staff and managers feel positive towards the successful implementation of TQM. The first is the importance of a strong leadership through the Confucian trait of *de*, which means virtue, goodness, kindness, morality, favor, or ethics. In order to have faithful followers, they believe that it is important for quality managers to act in accordance with the commonly accepted ethical values and principles governing the conduct of the group (Lo, 1999: 552). Another important area is the ability to work in harmony through the existence of a well-balanced

hierarchy in the company. This hierarchical relationship helps to identify the roles and responsibilities of every member which in turn lead to mutual and complementary obligations and co-operation.

The study of Lo was probably still in its preliminary stage and thus warranted further analyses and replications to ensure reliability. It is also a pity that only two areas of importance were identified namely, leadership and harmony. The study could reap a more comprehensive finding if it could be adhered to a more comprehensive theoretical framework, for example, F. Kluckhohn and Strodtbeck's value orientation framework.

Comparing the findings of Jenner *et al.* and Lo, it is interesting to see that the former employed an imposed etic view on the association of Chinese cultural values and TQM, and the latter, an emic view. The findings were nearly opposite. For instance, Lo found that Chinese staff and managers actually favored a formal hierarchical organization and they felt that this is positive towards the implementation of TQM. On the other hand, Jenner *et al.* suggested that the hierarchical structure inhibits communication among the organizational members. Lo indicated that a paternalistic leadership based on Confucian traits is essential for the successful TQM endeavor while Jenner *et al.* argued that this obstructs innovation and participation by organizational members. These two examples have appropriately signaled the need for more emic or derived etic studies on the association of Chinese cultural values and TQM.

To date, perhaps Roney's (1997) study is more objective and derived etic in nature. In studying the relationship between Polish culture and TQM, she has identified consistencies as well as inconsistencies between the two. In line with

the present research, she has proposed management not to attempt to change the host culture in order to pave way for the successful implementation of alien management approaches such as TQM. Rather, a systematic evaluation of the inconsistencies will facilitate for a flexible and successful planning and implementation. As she has concluded in her study, changes will occur in Polish firms, and they may resemble the values of TQM, but it will likely be in Poland's own image, signifying the emergence of a distinct hybrid, or Polish-style TQM.

Another discussion of a similar vein can be found in Martinsons (1996) and Martinsons and Hempel (1998). In comparing the fundamental Confucian values and the principles behind business process reengineering (BPR), the authors have raised a series of propositions stating that Chinese organizations will find more difficulties than their American counterparts in implementing BPR. In particular, due to the underlying Chinese cultural values, Chinese organizations tend to find it more difficult to implement formal process planning, formal process models, and process-based performance appraisals. Also, difficulties are expected at the need to make quantum leaps from the status quo and to apply radical and disruptive forms of process change. However, it was expected that Chinese organizations will find it easier to implement work teams than their American counterparts. Nevertheless, the authors argued that the implementation of "genuine" BPR would require tremendous and unprecedented changes in the fundamental values of the Chinese (Martinsons & Hempel, 1998: 405). As such, BPR has to be re-interpreted as it diffuses into the Chinese business context and there should be a Chinese-style BPR which will encompass less formal planning and documentation, more gradual implementations, and more authoritarian

management (p. 407). This Chinese BPR will vary significantly from the "genuine" American BPR. This objective discussion of the need to re-interpret BPR principles is much in line with the mutual fusion effect between Chinese cultural values and TQM as argued in the present study.

2.9.2. Propositions for the Influence of National Culture on TQM

In the attempt to theorize the impact of national culture on TQM, it may be convenient here to build upon a certain established theory. In response to the Academy of Management's noticing that there has been a lack of theory development for TQM, Anderson *et al.* (1994) proposed a theoretical framework for quality management aiming at organizational improvement after applying the Delphi method and raised a series of inter-related propositions as follows:

Proposition 1: Visionary leadership enables the simultaneous creation of a cooperative and learning organization.

Proposition 2: An organization that simultaneously fosters co-operation and learning facilitates the implementation of process management practices.

Proposition 3: Process management practices simultaneously result in continuous improvement of quality and employee fulfillment.

Proposition 4: An organization's simultaneous efforts continuously to improve its quality and to fulfill its employees lead to higher customer satisfaction.

These four inter-related propositions represent the separate existence of TQM itself as a philosophy. Thus, the result of transforming TQM into a culture-specific TQM or a hybrid system will depend on how the fusion effect works out with the particular culture in question. In other words, it can be further added into proposition 1 the following:

The management vision which simultaneously creates a cooperative and learning organization is affected by the underlying cultural values of the organizational members.

These four inter-locking propositions represent a theoretical framework for cultural influence on TQM. The viability of this theoretical framework can thus be tested using actual data, which is the central activity of the present study. Before putting into test, the four propositions can be re-phrased and some important points highlighted.

Proposition 1: The super-ordinate (national) cultural value system has an influence on the sub-value system (the organization) creating an organizational climate towards quality improvement (quality climate).

Proposition 2: The quality climate in turn determines or directs the processes of quality management (quality processes).

Proposition 3: The quality processes thus derived will lead to the implementation of certain specific quality activities (quality methods).

Proposition 4: The quality methods thus used will lead to consequences (quality results) to be enjoyed or suffered by the members of the organization.

One important point in this proposed theoretical framework is that national culture does not directly affect the quality processes, quality methods, and quality results. It actually works through an important intermediary, that is, the quality climate in the organization. This argument is in line with the fusion effect proposition as stated above since there may be commonalities or etic aspects among so called American-style TQM, Japanese-style TQM, and Chinese-style TQM in terms of elements such as quality processes like planning and training, as

well as quality methods such as the use of statistical process control and so on. What is specific or emic to the three TQM systems will therefore be the kind of organizational climate pertaining to the culture-specific organization in question. As such, national cultural elements will be manifested in different ways among the three culture-specific systems.

From the previous discussion on Chinese cultural values, it can be seen that Confucianism does have an important place in Chinese societies today. The central theme of the study is therefore to find out what will be the characteristics of the hybrid Chinese-style TQM when TQM itself is influenced by these important Confucian values.

2.9.3. Likely Relationships between Chinese Cultural Values and TQM

This section attempts to draw out some likely relationships between Chinese cultural values and TQM. Based on a derived etic approach, if one studies carefully the spirit of TQM and the fundamental principles of the Chinese cultural values, it is possible to delineate some relationships between certain Chinese cultural values and TQM philosophy. The likely links are briefly explained here.

(1) Harmony with nature: In the context of modern business activities, "nature" here can be viewed as the worldwide arena of commercial competition, rather than some supernatural phenomena which the original context refers to. Thus, the value of "harmony with nature" is of particular importance for enhancing adaptation to the worldwide market need for quality. In order to adapt to the "nature", the creation of appropriate visions and organizational cultures which are essential to maintain the adaptation becomes a need for subsistence and survival.

(2) *Yuarn*: As the Chinese believe in *yuarn*, it is likely that they tend to emphasize harmonious relationships both within and outside the organization. This helps to enhance inter-departmental communication and co-operation. Also, customer satisfaction and supplier relationships are highly valued. The concept of "face" is also believed to be highly constructive towards such orientations.

(3) Abasement: The value of abasement leads people to be humble and sincere. Thus, it is an essential agent in encouraging people at all levels to learn new philosophies and to acquire new work skills. Also, quality leadership can be instituted with more ease when employees are sincere and willing to learn.

(4) Situation orientation: The pragmatic orientation of the Chinese builds a sound foundation for them to accept scientific ways to manage quality. Statistical process control, problem solving tools, standardization, and ISO 9000 implementation are thus readily accepted.

(5) Respect for authority: As quality is largely a matter of top management commitment, the respect for hierarchical authorities helps to enhance lower level managers and employees to adhere to directives given from above.

(6) Interdependence: As TQM can be successful only if organizational-wide commitment is present, the value of interdependence serves to enhance unity of corporate objectives. Employees can be educated that quality activities help not only themselves, but also others, thus enhancing involvement.

(7) Group orientation: This value is clearly constructive towards the implementation of quality control circles and other collective activities.

(8) Continuity: The long-term orientation of the Chinese is perfectly in line with TQM's need for continuous efforts in quality improvement (*kaizen*), continuous learning, and continuous evaluation.

(9) Past time orientation: To preserve what is good in the past is the foundation for continuous improvement. In the context of the plan-do-check-act (PDCA) cycle, employees are likely to emphasize on the "check" part (reflections), leading to further improving already acceptable records of quality achievement.

(10) The doctrine of the mean: When people avoid going into extremes by following the mean, they tend to become self-disciplined. Work discipline and work standardization are thus readily accepted.

(11) Harmony with others: When harmony in the workplace is valued, employees express mutual respect. This not only enhances employee satisfaction, but it can also be extended outside the organization to create an orientation towards customer satisfaction and supplier co-operations.

The following table has attempted to map out the likely relationships mentioned. Those Chinese cultural values likely to be in line with or constructive to TQM implementation and practices are depicted. However, it should be noted that although dividing lines have been used, it is not necessary that a particular cultural value is adjacent to certain TQM philosophies or practices. In other words, the relationships among the elements in each row are not linked exclusively.

Table 2.3. Likely links between Chinese cultural values and TQM.

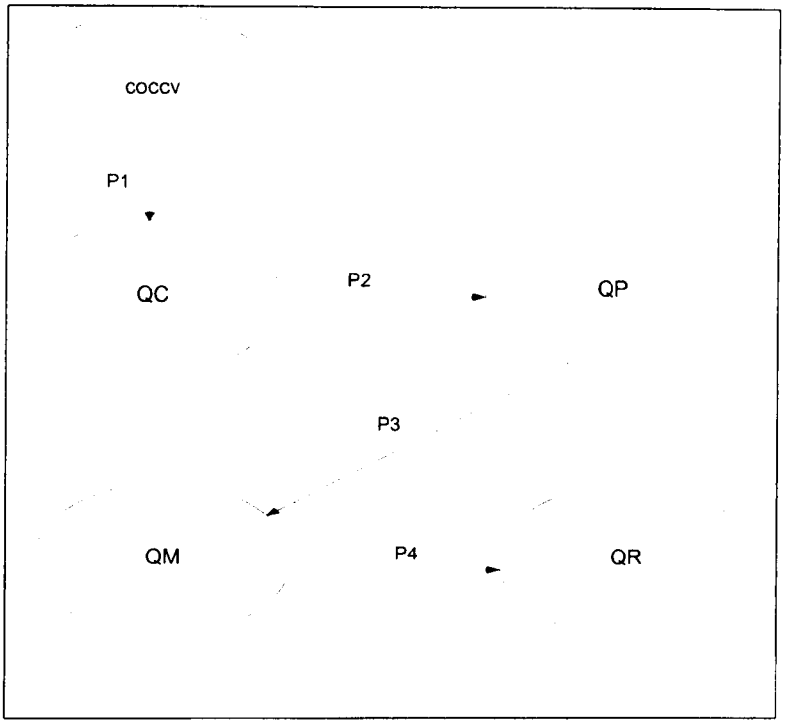
Chinese Cultural Values	TQM Philosophy and Practices
Harmony with nature	Adaptation to the worldwide demand for quality; Quality vision and quality culture.
Yuarn	Pursuit for internal and external customer satisfaction; Inter-departmental communication; Supplier quality and loyalty.
Abasement	Quality leadership; Obsession to learning.
Situation orientation	Scientific approach to quality management; Statistical process control and problem solving tools; Standardization and ISO 9000.
Respect for authority	Top management leadership in quality.
Interdependence	Unity of purpose; Involvement in quality programs.
Group orientation	Teamwork; Quality control circles; Group dynamics.
Continuity	Long-term commitment to quality; Continuous improvement (*kaizen*); Continuous learning; Continuous evaluation.
Past time orientation	Learning from experience; Continuous improvement (*kaizen*); Plan-do-check-act (PDCA) cycle.
The doctrine of the mean	Standardization; Work discipline.
Harmony with others	Internal and external customer satisfaction; Job satisfaction and enrichment.

2.9.4. A Structural Model of Chinese Cultural Values and TQM

The main objective of this chapter is to eventually suggest a theoretical model explaining the association between Chinese cultural values and TQM. To this end, a number of steps were followed. In section 2.1., the basic principles of TQM as known from the current literature were thoroughly reviewed. A suitable framework for TQM incorporating four quality variables namely climate (QC), processes (QP), methods (QM), and results (QR) was then proposed in section 2.2. In section 2.7., definitions of value and culture were presented and explained. The characteristics and relevance of Chinese cultural values were then discussed in section 2.8. based on the theories in 2.7. These steps have led to the suggestion of a four-proposition theoretical framework for cultural influence on TQM as presented in section 2.9.1. as well as the specific hypothesized relationships

between Chinese cultural values and TQM in 2.9.2. The four-proposition framework can now be presented in the form of a testable hypothesized structural model. This structural model is shown in the following figure.

Figure 2.6. A theoretical model of Chinese cultural values and TQM.



In the structural model, the four-proposition framework is presented through the directional arrows P1, P2, P3, and P4. COCCV represents Chinese cultural values exerting an influence on the quality climate (QC) of the organization which in turn acts as an input element for quality processes (QP) and quality methods (QM). The result or output element of this model is represented by the quality results (QR). The entire model incorporating COCCV, QC, QP, QM, and QR therefore depicts a Chinese culture-specific TQM model. In Chapter IV, the structural model will be operationalized and tested for its viability using empirical data.

Chapter III

Research Methodology

3.1. Definition of Population and Identification of Samples

This study has attempted to assess the Chinese cultural values of quality managers and TQM practices of ISO 9000 companies operating in three Chinese regions namely, mainland China, Hong Kong, and Taiwan. However, due to the vast size of mainland China, most of the sampled companies included in this study were taken from the Guangdong province.

One methodological concern warrants special attention here. Hofstede (1980, 1991) has stressed the importance of using "matched samples" in cross-cultural research. The samples taken in this study were matched in terms of three characteristics. Firstly, all respondents must be ethnic Chinese responsible for quality in companies not dominated by non-ethnic Chinese management. This has assumed that all respondents have a similar background as to cultural values. Secondly, all sampled companies in this study have obtained ISO 9000 certifications, meaning that their quality management systems are basically similar. Thirdly, company certification history must be three years or above to assume that they have been practicing TQM to a certain degree. Although ISO 9000 should be considered as only one element of TQM, it is at present the only internationally recognized symbol of quality success. Choosing companies with ISO 9000 certification at least warrants that a certain level of quality management standard is achieved, thus allowing samples to match as closely as possible. Nevertheless, the suggestions of Iizuka (1996) as discussed earlier has provided much support for the three-year criterion.

For the case of Hong Kong, the researcher wrote to two major quality bodies in Hong Kong, namely the Hong Kong Quality Assurance Agency (HKQAA) and the Hong Kong Quality Management Association (HKQMA). The HKQAA is itself the largest ISO 9000 certification body in Hong Kong and a department of the semi-governmental Hong Kong Productivity Council. The HKQMA is a private association. A list containing 613 ISO 9000 certified companies in Hong Kong, in the form of a *Buyer's Guide July 1996*, was obtained from the HKQAA. A partial list of ISO 9000 companies was also obtained from the HKQMA. Upon comparison, information in this partial list was already fully covered in the *Buyer's Guide July 1996*. Thus the 613 ISO 9000 certified companies formed the sampling frame for the region of Hong Kong. It must be stated here that the actual number of ISO 9000 companies in Hong Kong should be more than 613 because there are some independent private certification bodies operating in Hong Kong or abroad. However, no centrally collected documentation could be found to carry such information. Nevertheless, the 613 companies should be representative enough, covering 29 types of commercial activities including both manufacturing and service.

For the case of mainland China, the researcher attempted to identify the population of all ISO 9000 companies operating in China through writing to the China State Bureau of Technical Supervision in Beijing. Unfortunately, no centrally documented information of a full list could be identified. The researcher thus relied on two main sources. Firstly, a database compiled by the researcher in co-operation with the Faculty of Economics and Management of the Wuyi University in Jiangmen city has located 253 ISO 9000 certified companies in the

Guangdong province. Secondly, a list reported in the February 1997 issue of *China Quality* has included another 220 ISO 9000 certified companies scattered in 20 provinces and eight major cities in China. Though none of these two sources represented centrally compiled official information, the researcher decided to use the entire 473 companies as the sampling frame for China.

Concerning Taiwan, the researcher wrote to the Bureau of Commodity Inspection and Quarantine of the Ministry of Economic Affairs in Taiwan and obtained a list of 1,200 ISO 9000 certified companies. Again, a number of independent private certification bodies exist in Taiwan. However, the researcher decided to use this relatively large number of 1,200 companies as the sampling frame for the region.

A set of questionnaire composing of two major research instruments (see 3.2. for details) was sent to each of the companies. The questionnaire administration period started in mid 1997 and lasted for around six months. A follow-up was conducted in February 1998. The final numbers of valid returned questionnaires for mainland China, Hong Kong, and Taiwan were 117, 79, and 189 respectively, thus forming the sample of this study. The overall response rate was around 16.8%. Nevertheless, according to Malhotra (1993) and Yu and Cooper (1983), the response rate in a mailed survey without pre-mailing contacts, prepaid or promised monetary or non-monetary incentives, and so on is typically less than 15%. The sampled companies in terms of type and size can be found in Chapter IV in more details.

3.2. Research Instruments

The survey questionnaire used in this study was made up of two major research instruments, namely a modified version of the "Quality and Productivity Self-Assessment Guide for Defense Organizations Version 1.0" (DoD, 1992) and the original version of the "Chinese Cultural Value Scale" (Yau, 1994). They are now explained and discussed in detail in the following sections.

3.2.1. The TQM Survey - Introduction

In 1993, the Asian Productivity Organization (APO) launched a large-scale national survey on "Quality Management Practices in Manufacturing and Service Sectors". The objectives of the survey were to identify corporate needs through analyzing quality management practices and to enhance the capabilities for carrying out TQM practices in daily operations so as to improve business performance (Umeda, 1996: 4). 11 member countries of the APO participated in the project. They included Bangladesh, Taiwan, Hong Kong, India, Indonesia, Islamic Republic of Iran, Republic of Korea, Nepal, the Philippines, Singapore, and Thailand. The national reports were subsequently reported in 1996.

The "Quality and Productivity Self-Assessment Guide for Defense Organizations Version 1.0" (DoD, 1992) originally developed by the U.S. Department of Defense was agreed to be used as the research instrument in the national survey. During a co-ordination meeting held in 1993 in Thailand, the country experts agreed on modifying the original instrument by reducing the number of questionnaire items from 215 to 73.

In this study, the researcher decided to employ the modified version of the "Quality and Productivity Self-Assessment Guide for Defense Organizations

Version 1.0" due to a number of reasons. Firstly, the APO has successfully employed the instrument in a large-scale national survey, thus giving *a priori* confidence. Secondly, the instrument contained items which cover most of the MBNQA examination criteria and the ISO 9001 quality standards (see 3.2.2.). Although not from a statistical point of view, this has provided basic construct validity. Furthermore, for administering questionnaires, the length of the modified version is more appropriate as compared to using the MBNQA or ISO 9000 criteria directly. Thirdly, in the APO national survey, the instrument was applied to only five corporations in each country. Statistically, the national reports could not be regarded as representative. The same instrument would be administered to relatively larger samples in the present attempt, providing a more challenging and representative study. Also, tests of reliability and validity of the instrument which no published literature has provided would be performed. Finally, a methodological concern has to be addressed here. A pseudo-etic problem arises when an intelligence or personality test developed in one culture is administered to another culture without construct-validation procedures and this should be avoided (Berry, 1969; Triandis, 1972; Triandis & Marin, 1983; Yang, 1986). However, in the present case, the instrument assesses the concrete management practices, but not the personalities or values of the respondents. Furthermore, it was originally developed for organizations which practice standardization or the ISO 9000 quality management system. Therefore, although the instrument was originally designed in the United States, the application of it to Chinese companies should not give rise to pseudo-etic problems.

3.2.2. The TQM Survey - Questionnaire Structure

The modified "Quality and Productivity Self-Assessment Guide for Defense Organizations Version 1.0" contained 73 items assembled around four main quality variables as follows:

(1) Climate (items 1 to 30): assessing the people's perceptions about the organization and/or the work unit.

(2) Processes (items 31 to 57): assessing the organization's or work unit's policies, practices, and procedures.

(3) Management Tools (items 58 to 63): assessing the specific techniques used to promote quality improvements throughout the organization or work unit.

(4) Outcome (items 64 to 73): assessing the organization's mission accomplishment.

The wordings of the items were modified slightly by the researcher to allow for consistency so that all 73 questions were made to anchor on a 1 to 6 Likert-type scale covering (1) strongly disagree, (2) disagree, (3) somehow disagree, (4) somehow agree, (5) agree, and (6) strongly agree. The finalized version modified by the researcher was named the "TQM survey" for convenience.

Since the TQM survey was to be administered to ethnic Chinese respondents in Hong Kong, China, and Taiwan, it was translated into Chinese by the researcher. To allow for translation, some wordings have been changed. The translation was checked by a lecturer of Chinese studies from the University of Macau. For objectivity and consistency, the researcher requested another lecturer of English studies to perform a back-translation (Brislin, 1980). The result was

satisfactory as crucial meanings in the instrument could mostly be conveyed to the potential respondents. The English version of the TQM survey can be found in Appendix A.

As the TQM survey was to be administered to ISO 9000 certified companies, it is important to ensure that the instrument covers most of the important criteria contained in the ISO 9000 series. To allow for international standardization, the ISO 9001 standards were designed in a way that they are technically equivalent to the ANSI/ASQC Q90 series of quality system standards as adopted in the United States. On the other hand, these American standards form the foundation of the MBNQA criteria. In the United States, the MBNQA and the ISO 9000 certification are seen as mutually interconnected (Bureau of Business Practices, 1992: 115-120). The following comparisons depict the coverage of the TQM survey in the MBNQA and the ISO 9001 criteria.

Table 3.1. Coverage of the MBNQA examination criteria and the ISO 9001 by the TQM survey (Umeda, 1996: 47 & 54, adapted and expanded).

MBNQA Criteria	TQM Survey item no.
(1) Leadership	10, 11, 13, 15, 32, 33, 35, 62
(2) Information and analysis	28, 30, 36, 43, 52, 53, 54
(3) Strategic quality planning	38, 39, 40, 42, 44, 45, 46, 63
(4) Human resources development and management	1-9, 12, 16-21, 23, 29, 34, 41, 47, 48, 49, 51, 56, 57, 59, 61, 67
(5) Management of process quality	22-26, 31, 50, 55, 58, 60, 69
(6) Quality and operational results	64-66, 68, 70-72
(7) Customer focus and satisfaction	14, 27, 37, 73, 74
ISO 9001 Clauses	TQM Survey item no.
4.1.1. Management responsibility - quality policy	1, 2, 5, 6, 7, 8, 10, 13, 18, 33, 38, 42, 43, 44, 45
4.1.2. Management responsibility - organization	16, 17, 19, 21, 23, 25, 32, 34, 35, 41, 46
4.1.3. Management responsibility - management review	28, 29, 49, 56
4.2. Quality system	3, 4, 13, 22, 33, 35, 39, 40, 42, 43, 44, 45, 59,
4.3. Contract review	
4.4. Design control	70
4.5. Document and data control	36
4.6. Purchasing	20, 70
4.7. Control of customer supplied product	20, 70
4.8. Product identification and traceability	36
4.9. Process control	11, 12, 15, 31, 32, 41, 52, 53, 54, 55, 64
4.10. Inspection and testing	70, 71
4.11. Control of inspection, measuring, and test equipment	24, 66, 68
4.12. Inspection and test status	24, 66, 68
4.13. Control of non-conforming product	9, 15, 36, 71, 72, 73
4.14. Corrective action	9, 59, 71
4.15. Handling, storage, packaging, and delivery	65
4.16 Control of quality records	36
4.17 Internal quality audits	10, 11, 13, 14, 25, 31, 32, 36, 37, 39, 40, 41, 49, 52, 53, 54, 58, 59
4.18 Training	12, 26, 29, 30, 47, 48, 49, 50, 51, 56, 57, 61, 62, 63, 67, 69
4.19. Servicing	27, 72, 73
4.20 Statistical techniques	60

3.2.3. The CCV Survey - Introduction

The Chinese cultural values hypothesized to influence TQM in Chapter II were grounded on the dimensions derived form Yau's (1994) original findings. In his empirical research, he developed an inventory of Chinese cultural values to examine their relationships with consumer satisfaction in Hong Kong. 100 common Chinese sayings were collected from various sources. After careful consideration and screening based on expert review, the final version of the inventory consisted of 45 common sayings. Rigorous tests were performed to

ensure the reliability and validity of the instrument. Two fairly large samples of Chinese consumers in Hong Kong were administered the instrument. Factor analysis extracted 12 factors as underlying dimensions of Chinese cultural values from each of the two samples. The factor structures for the two samples were quite similar. They included (1) adaptiveness, (2) sincerity/suspicion, (3) continuity/respect for authority, (4) harmony with the universe, (5) harmony with people, (6) interdependence, (7) *pao* (reciprocity), (8) group-orientation, (9) respect for experience, (10) face, (11) abasement, (12) past-orientation, (13) conformity to activity, and (14) endurance.

The instrument of Yau (1994), addressed here as CCV for convenience, was adapted to be used in the present study. Some reasons as to its suitability are given here. Firstly, the instrument is not pseudo-etic. Secondly, the CCV used common Chinese sayings as instrument items instead of using adjectives (c.f. The Chinese Cultural Connection, 1987; Cheung *et al.*, 1996). Many of them are simply everyday life sayings which every Chinese person can understand easily. It was expected here that Chinese respondents should feel easier to express agreement or disagreement to a common saying rather than to a certain personal characteristic described by an adjective. Furthermore, many psychological studies were usually administered to university student samples for the sake of convenience. Yau (personal communications, 12th June 1997) strongly questioned the appropriateness of using student samples and any factor thus extracted should be dealt with care. The respondents of the present study had a closer resemblance to those who originally answered the CCV. Finally, the values contained in the CCV are parallel to those terminal values as described by Rokeach (1973).

3.2.4. The CCV Survey - Questionnaire Structure

The present study has directly adopted the original Chinese version of the CCV supplied by Yau. The version administered to the Hong Kong and Taiwanese respondents were essentially the same. The mainland Chinese version was written in simplified Chinese characters. The respondents were asked to express their level of agreement or disagreement towards the 45 Chinese sayings using a Likert scale covering (1) strongly disagree, (2) disagree, (3) somehow disagree, (4) somehow agree, (5) agree, and (6) strongly agree. Appendix B carries the English version of the instrument.

It should prove helpful here to report the reliability and validity of the instrument obtained in Yau's empirical study. Cronbach's alpha reliability coefficients for the two samples were 0.829 (N = 321) and 0.847 (N = 319). Split-half reliability coefficients were all above 0.72. Internal validity was assessed using the item-to-total correlation method (Cronbach & Meehl, 1955). All correlation coefficients were found to be significant at the 0.01 level. Furthermore, t-tests for each item of the scale across the two samples were not statistically significant showing that the instrument was internally consistent. In order to assess the external validity, the instrument was administered to two different groups, one Chinese and the other non-Chinese. A significant difference between the two groups existed at the 0.01 level, indicating that the instrument had reasonable external validity (Yau, 1994: 149-153).

3.2.5. Pilot Testing of the TQM Survey and the CCV Survey

According to Yau (1994: 116), a pilot study is a small-scale version of the main survey. Its purposes are to uncover possible problem areas; to evaluate findings in terms of how far the overall research objectives are achieved; and to assess the likely degree of error and the reliability and validity of the expected information.

A pilot test was conducted with the above objectives in mind. The two instruments were administered to a convenience sample of 40 participants of a part-time diploma program offered by the Macau Management Association. All the participants in that program held lower level management positions in different commercial entities in Macau and were over 25 years of age. They completed the questionnaires on their own and were asked to provide suggestions as to clarity and understandability. As a result, some wordings of the items in the TQM survey were slightly changed. Some participants even suggested that the six-point scale should be maintained so that no respondent would casually choose the median score. As to the CCV survey, it turned out as expected that no changes had to be made since it was already rigorously tested in Yau's empirical study.

Although the sample size of the pilot test was small and that the respondents were from companies not certified by ISO 9000 standards, the researcher assessed the Cronbach's alpha reliability coefficient of the TQM survey only to obtain a preliminary idea of the instrument's reliability. As shown in table 3.2., all coefficients were extremely high and positive but should in no way be treated as significant determinants. Concerning the CCV survey, an alpha coefficient of 0.7847 was obtained. Similar assessments of reliability were performed using actual samples in Chapter IV.

Table 3.2. Reliability coefficients of TQM survey items in pilot test.

TQM survey items	Cronbach's alpha
All (items no. 1-73)	0.9779
Dimension I - Assessment of organization climate (items no. 1-30)	0.9604
Dimension II - Assessment of processes (items no. 31-57)	0.9668
Dimension III - Assessment of management tools (items no. 58-63)	0.9203
Dimension IV - Assessment of outcomes (items no. 64-73)	0.8013

3.3. Reliability and Validity Testing of the Research Instruments

In this section, the methods used to assess the reliability and validity of the two research instruments are explained. Some basic concepts of reliability and validity testing are also briefly reviewed.

3.3.1. Reliability of Research Instruments

Reliability is the consistency or stability of an instrument. It refers to the degree to which a scale produces consistent and stable scores of a subject on a series of repeated tests (Cronbach, 1990). In fact, there is no such thing as a perfectly reliable research instrument or scale because random errors are always present in any measurement. Therefore, assessing reliability is to check the extent of contamination of the instrument by random errors. If an instrument is relatively free from random errors, it can be regarded as fairly reliable. Of the five approaches to assess reliability namely, test-retest reliability, parallel-form reliability, scorer reliability, internal-comparison reliability, and split-sample reliability as suggested by Tull and Hawkins (1980 in Yau, 1994: 136), the latter two were thought to be appropriate for the present study and were assessed. Results are carried in Chapter IV. Here, a brief review of the underlying concepts is given.

When a set of instrument items is designed to reflect an underlying construct, the items should be substantially correlated with one another. The

higher the correlation among them, the more likely they are measuring the same construct. Furthermore, for a given level of correlation among the measures, the greater the number of indicators, the more confidence we can have in the index constructed from them (Borhrnstedt & Knoke, 1988: 384). The Cronbach's alpha coefficient can be conceived as a measure of the inter-correlations among the various indicators used to capture the underlying construct (Ghauri *et al.*, 1995: 47). The coefficient ranges from zero, meaning no internal consistency, to one, meaning perfect consistency. The coefficient should also be positive, meaning that the indicators have positive inter-correlations. Usually, a Cronbach's alpha coefficient of 0.5 is regarded as reasonable in the social sciences. However, a stricter minimum value of 0.8 is usually preferred (Nunnally, 1978). It should be noted here that according to Bagozzi (1980 in Yau, 1994: 136), the Cronbach's alpha has the important property of being the lower bound for the reliability of a composite scale. Thus the actual reliability level could be somewhat higher than what is obtained from the coefficient. Split-sample reliability measures are obtained by dividing the sample into two or more randomly selected sub-samples and comparing results for each item of interest for each sub-sample.

3.3.2. Validity of Research Instruments

Validity refers to the degree to which an operation results in a measure that accurately reflects the concept it is intended to measure. A synonym for validity is accuracy. To the degree that an operation results in observable measures that are accurate representations of a theory's concepts, the resulting measures are said to be valid (Borhrnstedt & Knoke, 1988: 12-13).

According to Cook and Campbell (1979), four main validity concepts namely, internal validity, statistical conclusion validity, external validity, and construct validity are important to experimental research. However, the present study is not experimental in nature and therefore not all of these concepts are applicable. Construct validity is perhaps the most crucial type of validity among all others. It can be defined as the extent to which an operationalization measures the concept which it purports to measure.

Lundstrom and Lamont (1976 in Yau, 1994: 137) suggested that construct validity can be assessed using the item-to-total correlation analysis. It is said if construct validity exists, individual items in an instrument should adequately describe the constructs to be measured by them. Thus, the item-to-total analysis works by comparing each individual item and the remaining items in the instrument. In other words, the correlations of each individual item score and the total score of the remaining items are computed and should be positive and significant. This method was used in the present study to assess the validity of the TQM survey. Results of validity assessment are carried in Chapter IV.

3.4. Exploratory Factor Analysis

The main purposes of a factor analysis are data reduction and interpretation. For the present study, the main purpose was to define the fundamental constructs assumed to underlie the original variables in the two research instruments.

Two main types of factor analysis are commonly used. They are non-iterative methods such as principal component analysis or principal axis analysis, and iterative methods such as those based on maximum likelihood, unweighted least square, and generalized least square. The most commonly used principal

component method was selected for the present study. Initial factors obtained are usually difficult to interpret. Using orthogonal factor rotation has the advantage of eliminating multicolinearity among factors as well as improving the ease of interpretation of factors. Many rotation methods exist. In the present study, the most commonly used varimax orthogonal method was adopted.

A common question in factor analysis is how many factors should be extracted for rotation. This can be determined by examining the factor loadings as well as the eigenvalues of the factors. Factor loadings greater than +0.30 are regarded as significant, whereas loadings greater than +0.50 are considered very significant (Hair *et al.*, 1998: 111). Another commonly adopted method is the Kaiser's (1960 in Wood & Tataryn, 1996) "eigenvalues-greater-than-one" rule. It should be noted here that these are not absolute rules. Concerning factor loadings, they are actually influenced by various determinants such as sample size, number of variables, and number of factors. Furthermore, Wood & Tataryn (1996) have pointed out that the Kaiser's criterion was found to be unsatisfactory in a number of studies, for example, Hakstian *et al.*, (1982); H.B. Lee & Comrey, (1979); Revelle & Rocklin, (1979); and Zwick & Velicer (1986). Nevertheless, they have suggested that effective methods to estimate the number of factors avoiding under-extraction even at the risk of over-extraction should be followed. In any case, the researcher believed that it is important to look at how meaningful the extracted factors would be based on knowledge of existing literature and common sense. Results of factor analysis are carried in Chapter IV.

It should be noted that since in the present study, both exploratory as well as confirmatory factor analyses would be performed in building the theoretical

model, the entire sample of 385 observations was randomly divided into two sub-samples. The first sub-sample of 193 observations was used for exploratory factor analyses and other subsequent hypothesis testings. The other sub-sample of 192 observations was used for the model building process through structural equation modeling.

3.5. Development of Hypotheses

After the two research instruments were reduced to subsequent factors, a series of tests of difference were conducted. Grounded on the central argument of the present study and the supporting literature review, the existence of a culture-specific TQM model is mainly influenced by the particular social and cultural setting. Thus, it is reasonable to believe that "hard" factors such as industry size and industry type may not have a significant impact on the resulting culture-specific TQM model (Powell, 1995). That is to say, TQM as a transcendent philosophy (Garvin, 1988) can be successfully implemented irrespective of company size and type (T.Y. Lee, 1994, 1998). Rather than the hard factors, it was suspected that culture would have a significant bearing on the resulting culture-specific TQM model. To this end, a series of hypotheses and sub-hypotheses were raised.

It was mentioned earlier that the TQM survey was divided into four main dimensions namely, climate (items 1 to 30), processes (items 31 to 57), management tools (items 58 to 63), and outcome (items 64 to 73). The four dimensions denoted as variables in the model were renamed the following for convenience:

Variable 1 - QC (quality climate) analogous to climate;

Variable 2 - QP (quality processes) analogous to processes;

Variable 3 - QM (quality methods) analogous to management tools; and

Variable 4 - QR (quality results) analogous to outcome.

In section 3.1., it was mentioned that the sampled ISO 9000 companies were grouped according to several categories namely, (1) region (Hong Kong, China, and Taiwan), (2) industry size ("large" with over 200 employees and "small" with less than 200 employees), and (3) industry type (manufacturing and service). Each of these categorical effects was tested on each of the dimensions mentioned above by carrying out univariate and multivariate analysis of variance (ANOVA and MANOVA). The following hypotheses were set.

H1: There is no significant difference between the overall TQM survey scores of the two industry sizes.

H1a: There is no significant difference between the QC scores of the two industry sizes.

H1b: There is no significant difference between the QP scores of the two industry sizes.

H1c: There is no significant difference between the QM scores of the two industry sizes.

H1d: There is no significant difference between the QR scores of the two industry sizes.

H2: There is no significant difference between the overall TQM survey scores of the two industry types.

H2a: There is no significant difference between the QC scores of the two industry types.

H2b: There is no significant difference between the QP scores of the two industry types.

H2c: There is no significant difference between the QM scores of the two industry types.

H2d: There is no significant difference between the QR scores of the two industry types.

H3: There is no significant difference among the overall TQM survey scores of the three regions.

H3a: There is no significant difference among the QC scores of the three regions.

H3b: There is no significant difference among the QP scores of the three regions.

H3c: There is no significant difference among the QM scores of the three regions.

H3d: There is no significant difference among the QR scores of the three regions.

H4: There is no significant difference between the CCV survey scores of the two industry sizes.

H5: There is no significant difference between the CCV survey scores of the two industry types.

H6: There is no significant difference among the CCV survey scores of the three regions.

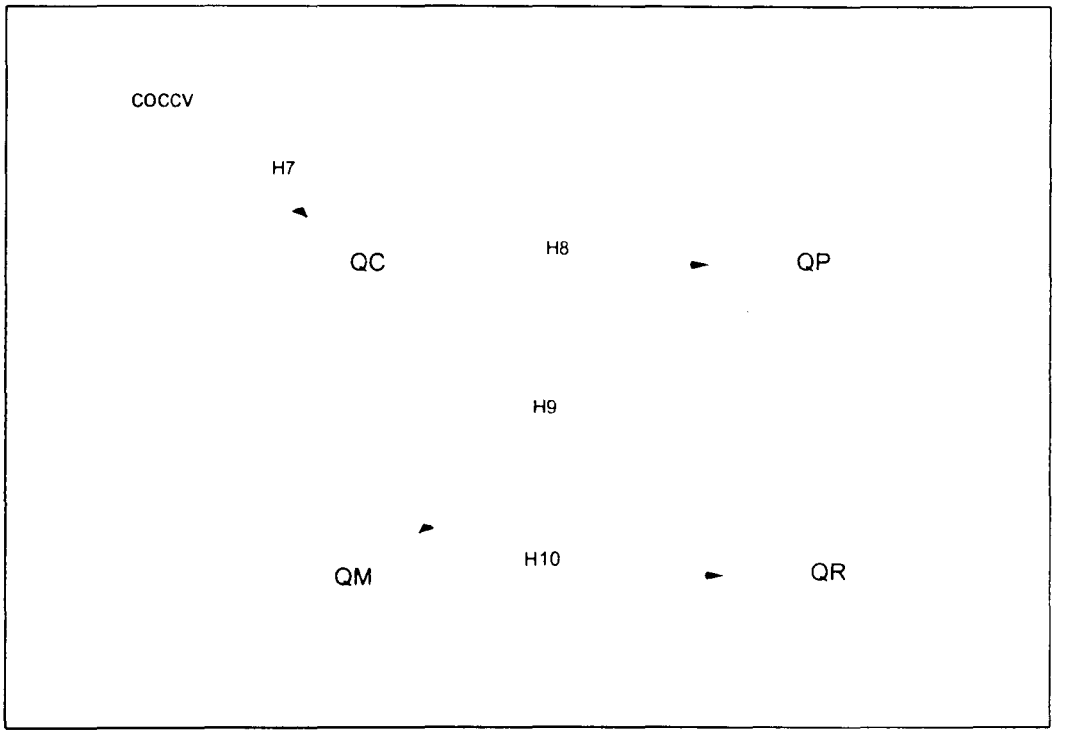
3.6. Structural Equation Modeling

Drawing from Jöreskog (1993: 295), structural equation modeling (SEM) can be employed under three different situations where the third one is the most common. (1) Strictly confirmatory: One single model has been formulated and is tested using empirical data so as to accept or reject it.

(2) Alternative models: Several alternative or competing models have been formulated and one of them selected given the best fit with a set of empirical data. (3) Model generating: A tentative initial model has been specified. A single set of data is used to test its fit. Driven by theory or data, the model is re-specified and tested again using the same data so that the model fits the data well from a statistical point of view. It is important also that every parameter of the model can be given a meaningful interpretation.

As the objectives of the present study are mainly to examine the inter-relationships among the four quality variables (QC, QP, QM, and QR), and to analyze the impact of Chinese cultural values on them, a tentative structural model was developed. The approach used in the present study has followed the third one described by Jöreskog. Based on prior review of current literature and theories, it possesses a confirmatory nature, but at the same time it serves also as a model generating process. The proposed model as shown in section 2.9.4. will be operationalized here. Each of the propositions would be formulated into some testable hypotheses. The model as a whole depicts the central argument of the influence of culture on the generation of a culture-specific TQM model. The theoretical model is shown in the following figure.

Figure 3.1. A structural model of Chinese cultural values and TQM.



In the above model, Chinese cultural value (COCCV) is an independent variable. QC, QP, QM, and QR are the dependent variables. The arrows represent influences or causal directions although causality must be carefully interpreted (see 3.7.). They can be represented by the following hypotheses.

H7: There is a positive association/relationship between COCCV and QC. That is, the higher the COCCV score, the higher the QC score.

H8: There is a positive association/relationship between QC and QP. That is, the higher the QC score, the higher the QP score.

H9: There is a positive association/relationship between QP and QM. That is, the higher the QP score, the higher the QM score.

H10: There is a positive association/relationship between QM and QR. That is, the higher the QM score, the higher the QR score.

In the present study, the SEM software AMOS 3.62 (Arbuckle, 1997) was used. The model was firstly formally specified in structural terms. COCCV, QC,

QP, QM, and QR were all treated as latent variables. Among which, COCCV was exogenous while all other latent variables were endogenous. Factors extracted from the factor analysis described earlier were treated as observed variables for them. After all necessary data input procedures, the identification status of the model was established. The model was then subject to model fit evaluation based on absolute as well as adjunct fit indexes. All parameters represented in the hypotheses mentioned above were also tested for significance. All of these procedures are discussed in detail in Chapter IV. The steps listed below linking sections 3.4. (factor analysis) and 3.6. (SEM) may be helpful in better understanding the methodology employed.

Figure 3.2. Explanations on the linkage of methodological steps 3.5. and 3.6.

1. We have 30 items in the climate section of the TQM survey. The climate section represents a quality variable known as QC. A factor analysis is performed to extract a number of factors (say, X) from this variable.

2. In devising the structural model, we treat QC as a latent variable. However, a latent variable must be explained by some observed variables. Here, the X number of factors will represent the observed variables.

3. Hence, we check the items contributing to each factor. For example, X1 may be contributed by items no. 1, 2, and 4. X2 may be contributed by items no. 9, 10, 12, and 14. Similarly, we check all the X number of factors.

4. We obtain the summated scores of items no. 1, 2, and 4 as the input score for observed variable no. 1. We obtain summated scores of all the X number of factors similarly and treat them as input scores for all the observed variables.

5. Therefore, we obtain the measurement model for QC.

6. We perform similar procedures for QP, QM, QR, and CCV.

7. All scores for all the observed variables are put into the AMOS software to evaluate the structural model.

3.7. A Brief Note on Causality

It is perhaps appropriate here to include a brief note on the ever-controversial subject of causality. Early structural models were often known also as "causal models" in the sense that SEM is able to demonstrate directional relationships or causalities among "cause variables" and "effect variables". Many saw SEM as an answer for establishing causality in non-experimental research. However, there appear always to be difficulties in translating this deep philosophical issue into methodologies of the social sciences. Mueller's very vivid quote from Muthén (1992) clearly demonstrates the very difficult controversy. "For example, while some contemporary methodologists suggest that causal explanation is the ultimate aim of science, others insisted that it would be very healthy if more researchers abandon thinking of and using terms such as cause and effect" (Mueller, 1996: xii-xiii).

A faceted definition of causality was suggested by Mulaik (1987). "Causality concerns the objective conception of the manner by which the variable properties of an object at a specified point in space and time determine unidirectionally by a functional relation the variable probabilistic, non-probabilistic properties of an object at a later point in space and time within a closed, self-contained system of interacting objects, defined in connection with a specific set of fixed background conditions". Translating such a philosophical definition of causality into methodology is clearly difficult for non-experimental researchers. In fact, this has long been challenged, for example, by the notion of a cause as a "producing agent" (e.g. If X is a cause of Y, then a change in X produces a change in Y. This is a concept similar to that of "forcing" known in

science) making it difficult to translate the concept into logical or mathematical languages. The difficulty with causality is also clearly pointed out by Blalock. He argued that causal inferences belong to the theoretical level, whereas actual research can only establish covariation and temporal sequences. As a result, one can never actually demonstrate causal laws empirically. This is true even where experimentation is possible (Blalock, 1961: 172).

SEM, although often thought of as a possible solution towards such difficulties, in fact provides no aid to such. Many difficulties still exist. Mulaik and James (1995) stated that it is possible to fit models with different directions of causality to the same correlational data, and even achieve comparable fit. Hoyle and Panter (1995: 175) pointed out that in many models, switching the direction of the association between two variables changes neither the overall fit of the model nor the parameter estimate of the association between the variables. In reality, SEM does nothing more than test the relationships among variables as they were assessed. In other words, SEM cannot overcome the limitations associated with non-experimental data gathered in a single session (Hoyle, 1995: 10).

Nevertheless, the SEM approach provides necessary but not sufficient conditions to establish causality. Blalock (1961: 14-15) stated that causal models should be thought of as containing desired simplifications. Although such models do not refer to reality, one can proceed by eliminating or modifying inadequate models that give predictions inconsistent with the data (pp. 20-22). Hoyle and Panter's advice seems most helpful and appropriate here. "If the research methods and design that generated the data favor a causal inference, then such an inference

can be made. Otherwise, the appropriate inference is that variables are reliably associated in the context of the model but the exact nature of the association cannot be demonstrated" (Hoyle & Panter, 1995: 175).

To conclude, establishing causality in structural models using non-experimental data is largely a matter of interpreting the research results with theoretical support and of course, common sense. Even if a directional causality cannot be justified, SEM can still demonstrate whether a strong or weak association exists. Therefore, like the advice given by Hoyle and Panter above, a causal inference can be suggested if the research design is highly favorable towards such inference. When it comes to more complex questions in the social sciences, like those to be answered in the present study, the same attitude should be held. Given the abundant theoretical support for culture to be an influence on social behaviors, it is probably not too unreasonable to conclude that culture is one of many causes of certain social behaviors like for example, management practices. This is a conservative stance because by looking at the square multiple correlation of an endogenous variable, one is aware that the exogenous variable is not the only cause of the endogenous variable. Other cause-elements must exist. The researcher was not trying to prove that Chinese cultural values "cause" certain styles or status of quality management practices. Rather, the researcher was attempting to prove a strong association between Chinese cultural values and quality management practices to support the fusion with the transcendent nature of TQM resulting in a Chinese culture-specific TQM model. If one prefers a more conservative perspective, one can interpret the result of the present study in terms of "associations" rather than "causes".

Chapter IV

Data Analysis

4.1. Characteristics of Sampled Companies

In this section, the characteristics of the sampled companies in terms of type and size as well as the respondent profiles in terms of age, sex, and company position are introduced in tabular form.

Table 4.1. Number of companies sampled and response rate.

Country	No. of companies sampled	%	No. of companies in sampling frame	Response rate in %
Hong Kong	79	20.5	613	12.9
Taiwan	189	49.1	1,200	15.8
China	117	30.4	473	24.7
Total	385	100	2,286	16.8

Table 4.2. Sampled companies by size, type, and type in detail.

Note: Types 1 and 3 were classified under "manufacturing".

Types 2, 4, 5, and 6 were under "service".

Company size	No. of companies	%
Over 200 employees	228	59.2
Less than 200 employees	144	37.4
Unknown	13	3.4
Total	385	100
Company type	No. of companies	%
Manufacturing	342	88.8
Service	42	10.9
Unknown	1	0.3
Total	385	100
Company type (detailed)	No. of companies	%
1. Manufacturing	288	74.8
2. Retail or wholesale	8	2.1
3. Construction	52	13.5
4. Transport and communication	12	3.1
5. Financial services	2	0.5
6. Professional services	20	5.2
7. Others	2	0.5
8. Unknown	1	0.3
Total	385	100

Table 4.3. Sampled companies by type and size (region specific)

Note: (H) denotes Hong Kong, (T) denotes Taiwan, and (C) denotes mainland China.

Company type (H)	No. of companies (H)	% (H)
Manufacturing	49	62.0
Service	29	36.7
Unknown	1	1.3
Total	79	100
Company size (H)	No. of companies (H)	% (H)
Over 200 employees	36	45.6
Less than 200 employees	41	51.9
Unknown	2	2.5
Total	79	100
Company type (T)	No. of companies (T)	% (T)
Manufacturing	186	98.4
Service	3	1.6
Total	189	100
Company size (T)	No. of companies (T)	% (T)
Over 200 employees	99	52.4
Less than 200 employees	88	46.6
Unknown	2	1.1
Total	189	100
Company type (C)	No. of companies (C)	% (C)
Manufacturing	107	91.5
Service	10	8.5
Total	117	100
Company size (C)	No. of companies (C)	% (C)
Over 200 employees	93	79.5
Less than 200 employees	15	12.8
Unknown	9	7.7
Total	117	100

Table 4.4. Respondents by sex, age brackets, and job positions.

Respondents' sex	No. of respondents	%
Male	278	72.2
Female	61	15.8
Unknown	44	11.9
Total	385	100
Age brackets	No. of respondents	%
Less than 20	1	0.3
20 to 30	67	17.4
31 to 40	130	33.8
41 to 50	98	25.5
51 to 60	26	6.8
Over 60	4	1.0
Unknown	59	15.3
Total	385	100
Job position	No. of respondents	%
Company director	58	15.1
Quality control engineer	102	26.5
ISO 9000 director	12	3.1
Plant manager	134	34.8
Unknown	79	20.5
Total	385	100

4.2. Reliability Testing of the TQM Survey

In this section, the reliability of the TQM survey was assessed based on the total sampled data. Two main methods were used, namely Cronbach's alpha coefficient and the split half method. The results are carried in the following table. All alpha coefficients were well above 0.8 indicating that the instrument was highly reliable.

Table 4.5. Reliability of TQM survey (all items and by each quality dimension).

TQM survey items	Cronbach's alpha coefficient
All 73 items (n = 385)	0.9825
Split half: part 1 (37 items)	0.9649
Split half: part 2 (36 items)	0.9711
Dimension 1: Quality climate items no. 1 to 30 (n = 385)	0.9557
Split half: part 1 (15 items)	0.9183
Split half: part 2 (15 items)	0.9285
Dimension 2: Quality processes items no. 31 to 57 (n = 385)	0.9699
Split half: part 1 (14 items)	0.9490
Split half: part 2 (13 items)	0.9418
Dimension 3: Quality methods items no. 58 to 63 (n = 385)	0.9016
Split half: part 1 (3 items)	0.8299
Split half: part 2 (3 items)	0.8469
Dimension 4: Quality results items no. 64 to 73 (n = 385)	0.8991
Split half: part 1 (5 items)	0.7868
Split half: part 2 (5 items)	0.8840

4.3. Validity Testing of the TQM Survey

The item-to-total correlation method was employed to test the validity of the TQM survey instrument. Again, if the instrument was valid, with all items measuring the same concept, the product-moment correlation of each item to the total of the remaining items should be positive and statistically significant. Based on the aggregate of all the three regional samples, the item-to-total correlations were separately calculated based on the four dimensions of the TQM survey and are depicted in tables 4.6., 4.7., 4.8., and 4.9. All the correlation coefficients were positive and statistically significant at $p = 0.000$.

Table 4.6. Item-to-total correlation of QC items (items no. 1-30).

Item no.	Quality climate (QC) dimension item description	Item-to-total correlation
1	People in this organization are aware of its overall mission	0.5493
2	People in this organization are aware of how the organization's mission contribute to higher-level missions and objectives	0.5806
3	People in this organization try to plan ahead for changes that might impact our mission performance.	0.5850
4	People in this organization regularly work together to plan for the future	0.5491
5	People in this organization see continuing improvement as essential	0.6341
6	Creativity is actively encouraged in this organization	0.6501
7	Every member of this organization is concerned with the need for quality	0.7217
8	Every member of this organization knows how to define the quality of what we do	0.6195
9	People in this organization emphasize doing things right the first time	0.6480
10	The leader(s) in this organization are committed to providing top quality services/products, work	0.6615
11	The leader(s) in this organization attempt to find out why the organization may not be meeting a particular goal/objective	0.6563
12	People in my work unit know how their supervisors will help them find answers to problems they may be having	0.4779
13	The supervisors in my work unit make the continuous improvement of our work top priority	0.6562
14	The supervisors in my work unit regularly ask our customers about the quality of work they receive	0.6245
15	The way we do things in this organization is consistent with quality	0.7271
16	People in my work unit understand how a quality emphasis leads to more productive use of resources	0.6992
17	People in my work unit believe that quality and productivity improvement is their responsibility	0.6926
18	People in my work unit believe that their work is important to the success of the overall organization	0.6757
19	A spirit of co-operation and teamwork exists in this organization	0.7439
20	We have good relationship with other organizations that we work with	0.6498
21	People in my work unit are involved in improving our services/products/work	0.6702
22	The supervisors in my work unit do a good job of setting work expectations	0.6468
23	People in my work unit enjoy their co-workers	0.5566
24	We have the right tools, equipment, and materials in my work unit to get the job done	0.5392
25	My work unit is structured properly to get the job done	0.6653
26	Attempts are made to promote the people in my work unit who do good work	0.5779
27	People in my work unit care about our customers	0.6666
28	There are effective communication channels between departments in this organization	0.7359
29	People in my work unit have ample opportunity to exchange information with their supervisors	0.5808
30	People in my work unit get the facts and the information they need to do a good job	0.6018

Table 4.7. Item-to-total correlation of QP items (items no. 31-57).

Item no.	Quality processes (QP) dimension item description	Item-to-total correlation
31	This organization has analyzed data concerning goal/objective accomplishments in order to determine whether improvements in quality are needed	0.7451
32	This organization is (or might become) committed to quality improvement because we want to improve an already acceptable quality record	0.7232
33	This organization has quality improvement policy that has specific goals and objectives	0.7832
34	Responsibility for quality performance improvement is accepted by almost all organizational members	0.7298
35	Managers at all levels have clearly defined roles in our quality improvement process	0.7173
36	The organization has a database or tracking system for relevant quality information	0.6630
37	In order to determine what our customers think about our products/services/work, we conduct surveys on a regular basis	0.6652
38	The leaders at the top level in this organization have set long-term goals concerning quality improvement	0.7722
39	The leaders at the top level in this organization have defined performance measures to monitor progress towards reaching objectives and goals	0.7625
40	All work units within this organization have defined performance measures to monitor progress towards reaching their objectives and goals	0.7372
41	All organizational members know how performance measures relate to monitoring their accomplishment of goals and objectives	0.7399
42	Long-range planning in this organization includes prioritizing quality improvement issues	0.8078
43	Long-range planning in this organization includes a means for monitoring quality improvement effectiveness over time	0.8158
44	In terms of setting organizational improvement priorities, we have considered or evaluated changing our business strategy	0.6318
45	In terms of setting organizational improvement priorities, we have considered or evaluated improving our work methods or procedures	0.6556
46	The structure of this organization supports its efforts to carry out its missions	0.7131
47	Organizational members have been adequately trained to use the equipment they have	0.6454
48	People in charge of similar work units frequently share information about their work methods and practices	0.7020
49	Organizational members with good ideas are likely to formally submit them through a suggestion system	0.7466
50	This organization has used teams to gather information or solve problems	0.7177
51	The future strength of this organization depends on the continuing growth of its members through appropriate training	0.7508
52	In order to tell how well we are doing as an organization, we monitor data about the quality of our services/products/work	0.7721
53	The performance data that this organization collects are compared with goals, standards, or objectives	0.7580
54	The performance data that this organization collects are used to identify opportunities for quality improvement	0.7437
55	Organizational members are informed about how this work unit stands in relation to goals, objectives or standards	0.7806
56	Top-performing managers at all levels in this organization can expect increased responsibility	0.6117
57	The performance appraisals of organizational members include quality improvement criteria	0.7524

Table 4.8. Item-to-total correlation of QM items (items no. 58-63).

Item no.	Quality methods (QM) dimension item description	Item-to-total correlation
58	This organization has used surveys to assess quality of its work	0.7491
59	This organization has called groups of individual together to define performance measures to track progress toward goal attainment	0.7426
60	This organization has used statistical process control charts or graphs to track data over time	0.6845
61	This organization has arranged workshops to promote quality awareness among its members	0.7158
62	This organization has attempted to inform and involve everyone in quality improvement	0.7777
63	This organization has established improvement teams (groups of individuals who come together to solve quality-related problems)	0.7329

Table 4.9. Item-to-total correlation of QR items (items no. 64-73).

Item no.	Quality results (QR) dimension item description	Item-to-total correlation
64	Once a job or project gets started, it is usually finished without undue delay	0.6094
65	People make effort to reuse or salvage excess materials and supplies whenever possible	0.5142
66	Tools and/or equipment are maintained and operated at peak efficiency	0.6834
67	The personnel turnover is low	0.5675
68	Working condition (noise, heat, light, dirt) in this organization are excellent	0.6141
69	Organizational members receive the guidance and assistance they need to accomplish their work	0.7251
70	This organization's materials and supplies meet quality specifications	0.6685
71	Organizational members rarely need to redo a job or task	0.6823
72	The organizational customers are satisfied with the quality of our work	0.7459
73	The organizational customers find minimal errors in our work	0.7381

4.4. Exploratory Factor Analysis for the TQM Survey

In this section, the 73 items in the TQM survey were subject to a series of factor analyses. The objectives of performing factor analyses are various. Firstly, a factor analysis can help to identify the structure of relationships among the variables so as to identify the dimensions which are not directly observable. For example, although the first section (30 questions) of the TQM survey is related to a dimension called "quality climate" (QC), QC itself can be further split into several other underlying sub-dimensions. Thus underlying factors can be identified and the variables made more manageable. Secondly, factor analysis helps to identify

representative variables from a much larger set of variables for use in subsequent multivariate analyses (Hair *et al.*, 1998: 95). This is particularly true in the present study as the reduced variables provide better data normality and homogeneity of variances and covariances which are important assumptions of the ANOVA and MANOVA techniques to be used in the next section.

Since in the latter part of the study, confirmatory factor analysis and structural equation modeling techniques would be used, it is unreasonable to conduct both exploratory as well as confirmatory factor analyses using the same data set of 385 observations. Thus, the entire sample was randomly split into two halves or sub-samples. Sub-sample 1 included 193 observations and was used for conducting exploratory factor analysis. Sub-sample 2 included 192 observations and was used only for conducting confirmatory factor analysis. The characteristics of the two sub-samples are carried in the following table.

Table 4.10. Characteristics of two randomly split sub-samples.

Sub-sample 1 (for exploratory factor analysis)	No. of observations	%
In terms of region:		
Hong Kong	40	20.7
Taiwan	94	48.7
China	59	30.6
Total	193	100
In terms of company size:		
Large (over 200 employees)	122	63.2
Small (less than 200 employees)	65	33.7
Unknown	6	3.1
Total	193	100
In terms of company type:		
Manufacturing	170	88.1
Service	22	11.4
Unknown	1	0.5
Total	193	100

Table 4.10. Characteristics of two randomly split sub-samples (continued).

Sub-sample 2 (for confirmatory factor analysis)	No. of observations	%
In terms of region:		
Hong Kong	39	20.3
Taiwan	95	49.5
China	58	30.2
Total	192	100
In terms of company size:		
Large (over 200 employees)	106	55.2
Small (less than 200 employees)	79	41.1
Unknown	7	3.6
Total	192	100
In terms of company type:		
Manufacturing	172	89.6
Service	20	10.4
Total	192	100

Before performing the factor analysis, it is vital that the assumptions underlying this statistical method be met. According to Hair *et al.* (1998: 98-99), a general rule is to have at least five times as many observations as there are variables to be analyzed. In the present research, the total sample size in sub-sample 1 was 193, number of items in the QC, QP, QM, and QR sections were 30, 27, 6, and 10 respectively. The sample size requirement was met. Furthermore, any departures from normality, homoscedasticity, and linearity apply only to the extent that they diminish the observed correlations and in fact some degree of multicolinearity is desirable (p. 99). Thus, although a normality check on the 73 individual items univariately showed skewness ranging from -0.2087 to -1.3216 and kurtosis from -0.0710 to 2.2987 represented by significant ($p = 0.000$) Kolmogorov-Smirnov Lilliefors adjusted statistics, this departure from normality did not create substantial problems for the factor analytic procedures. Nevertheless, the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and the Bartlett test of sphericity to be reported will indicate whether factor analysis is

suitable for the present data set or not. In the following sub-sections, four separate factor analyses were performed on the QC, QP, QM, and QR items.

Before looking at the result of the factor analysis, some issues such as factor extraction methods and rotation methods have to be noted. The popular method of principal component analysis is especially appropriate when the researcher is primarily concerned about predicting the minimum number of factors needed to account for the maximum portion of variances in the original variables (Hair *et al.*, 1998: 102). Also, this method works best when the original variables are very highly correlated (Manly, 1986: 60), which is the present case. A second issue is related to the number of factors to be extracted. The Kaiser's eigenvalue-greater-than-one criterion and physical inspection of the scree plot methods are popular and were used in the present study. Although popular, these methods may not always provide the appropriate number of factors to be extracted. Prior understanding of the survey instrument and theoretical considerations are of great importance for effective factor extraction. A last issue to be noted is the type of rotation method to be used. Factors are usually rotated for easier interpretations and two main methods namely orthogonal and oblique rotations are available. The former assumes that the factors are not inter-correlated while the latter allows the opposite to be assumed. Although most published works employ orthogonal rotation while the factors are in fact correlated, the present research has employed both methods and any significant discrepancies observed were taken into account. The most commonly used orthogonal rotation method varimax and oblique rotation method direct oblimin were chosen.

Table 4.10. shows the result of four principal component factor analyses each performed on the QC, QP, QM, and QR items respectively. The number of factors extracted was based on Kaiser's eigenvalue criterion, careful observation of the scree plots, as well as theoretical considerations. The percentages of variances of the original variables accounted for by the extracted factors are also shown in the table. A higher value (maximum 1) for the KMO test indicates a higher suitability of using factor analysis. A significant Bartlett statistic for test of sphericity indicates that the original variables are correlated.

Table 4.11. Eigenvalues of extracted factors of QC, QP, QM, and QR items.

QC Factors	Eigenvalue	% variance explained	Cumulative % of variance explained
Factor 1	14.84127	49.5%	49.5%
Factor 2	1.53887	5.1%	54.6%
Factor 3	1.45490	4.8%	59.5%
Factor 4	1.07372	3.6%	63.0%
			KMO = 0.95419; Bartlett = 3,956.5532 (p = 0.000)
QP Factors	Eigenvalue	% variance explained	Cumulative % of variance explained
Factor 5	15.98979	59.2%	59.2%
Factor 6	1.13840	4.2%	63.4%
			KMO = 0.95934; Bartlett = 4,546.0426 (p = 0.000)
QM Factors	Eigenvalue	% variance explained	Cumulative % of variance explained
Factor 7	4.31674	71.9%	71.9%
Factor 8	0.50971	8.5%	80.4%
			KMO = 0.89504; Bartlett = 807.86332 (p = 0.000)
QR Factors	Eigenvalue	% variance explained	Cumulative % of variance explained
Factor 9	5.34599	53.5%	53.5%
Factor 10	0.95000	9.5%	63.0%
			KMO = 0.90869; Bartlett = 955.01802 (p = 0.000)

The extracted factors were then subject to varimax as well as direct oblimin oblique rotations to derive the final factor structures and were compared. As the oblique rotated factor structures resembled very closely to those rotated using varimax, only the latter were reported here. Table 4.12. summarizes the ten factors obtained from the four factor analyses. By examining the items and

considering their loadings, the factors were given appropriate names. The ten factors obtained were quite consistent with those common TQM elements surveyed from the various writers as discussed in Chapter II. Tables 4.13., 4.14., 4.15., and 4.16. show which items load on the factors and their loadings. Usually a loading of higher than 0.3 indicates reasonable correlation of the item with the factor.

Table 4.12. Ten factors extracted from the TQM survey.

Instrument items	Factors extracted
Quality Climate (QC) items	
	Factor 1: Employee commitment
	Factor 2: Communication
	Factor 3: Unity of purpose
	Factor 4: Leader commitment
Quality Processes (QP) items	
	Factor 5: Organizational planning and evaluation
	Factor 6: Employee training and evaluation
Quality Methods (QM) items	
	Factor 7: Scientific approach
	Factor 8: Teamwork and involvement
Quality Results (QR) items	
	Factor 9: Customer satisfaction
	Factor 10: Workplace kaizen

Table 4.13. Four factors and item loadings of QC.

Item	Factor 1: Employee Commitment	Loading
7	Every member of this organization is concerned with the need for quality	0.79808
14	The supervisors in my work unit regularly ask our customers about the quality of work they receive	0.70744
15	The way we do things in this organization is consistent with quality	0.69915
17	People in my work unit believe that quality and productivity improvement is their responsibility	0.68911
16	People in my work unit understand how a quality emphasis leads to more productive use of resources	0.67637
19	A spirit of co-operation and teamwork exists in this organization	0.63982
8	Every member of this organization knows how to define the quality of what we do	0.62539
6	Creativity is actively encouraged in this organization	0.61336
9	People in this organization emphasize doing things right the first time	0.60406
5	People in this organization see continuing improvement as essential	0.54778
20	We have good relationship with other organizations that we work with	0.51391
21	People in my work unit are involved in improving our services/products/work	0.44679
Item	Factor 2: Communication	Loading
29	People in my work unit have ample opportunity to exchange information with their supervisors	0.75099
30	People in my work unit get the facts and the information they need to do a good job	0.72449
23	People in my work unit enjoy their co-workers	0.58715
28	There are effective communication channels between departments in this organization	0.58036
18	People in my work unit believe that their work is important to the success of the overall organization	0.52418
27	People in my work unit care about our customers	0.51567
26	Attempts are made to promote the people in my work unit who do good work	0.51642
Item	Factor 3: Unity of Purpose	Loading
1	People in this organization are aware of its overall mission	0.79516
2	People in this organization are aware of how the organization's mission contribute to higher-level missions and objectives	0.73551
3	People in this organization try to plan ahead for changes that might impact our mission performance.	0.70706
4	People in this organization regularly work together to plan for the future	0.63931
Item	Factor 4: Leader Commitment	Loading
12	People in my work unit know how their supervisors will help them find answers to problems they may be having	0.72771
24	We have the right tools, equipment, and materials in my work unit to get the job done	0.60502
22	The supervisors in my work unit do a good job of setting work expectations	0.58785
13	The supervisors in my work unit make the continuous improvement of our work top priority	0.57860
11	The leader(s) in this organization attempt to find out why the organization may not be meeting a particular goal/objective	0.56114
10	The leader(s) in this organization are committed to providing top quality services/products, work	0.54249
25	My work unit is structured properly to get the job done	0.51605

Table 4.14. Two factors and item loadings of QP.

Item	Factor 5: Organizational Planning and Evaluation	Loading
42	Long-range planning in this organization includes prioritizing quality improvement issues	0.76244
38	The leaders at the top level in this organization have set long-term goals concerning quality improvement	0.75534
43	Long-range planning in this organization includes a means for monitoring quality improvement effectiveness over time	0.75174
57	The performance appraisals of organizational members include quality improvement criteria	0.72984
44	In terms of setting organizational improvement priorities, we have considered or evaluated changing our business strategy	0.71159
37	In order to determine what our customers think about our products/services/work, we conduct surveys on a regular basis	0.71054
54	The performance data that this organization collects are used to identify opportunities for quality improvement	0.67641
45	In terms of setting organizational improvement priorities, we have considered or evaluated improving our work methods or procedures	0.66589
55	Organizational members are informed about how this work unit stands in relation to goals, objectives or standards	0.63471
52	In order to tell how well we are doing as an organization, we monitor data about the quality of our services/products/work	0.62816
33	This organization has quality improvement policy that has specific goals and objectives	0.61388
56	Top-performing managers at all levels in this organization can expect increased responsibility	0.60972
53	The performance data that this organization collects are compared with goals, standards, or objectives	0.60531
32	This organization is (or might become) committed to quality improvement because we want to improve an already acceptable quality record	0.59735
31	This organization has analyzed data concerning goal/objective accomplishments in order to determine whether improvements in quality are needed	0.59042
Item	Factor 6: Employee Training and Evaluation	Loading
47	Organizational members have been adequately trained to use the equipment they have	0.83178
48	People in charge of similar work units frequently share information about their work methods and practices	0.75111
41	All organizational members know how performance measures relate to monitoring their accomplishment of goals and objectives	0.69764
40	All work units within this organization have defined performance measures to monitor progress towards reaching their objectives and goals	0.69373
46	The structure of this organization supports its efforts to carry out its missions	0.68671
51	The future strength of this organization depends on the continuing growth of its members through appropriate training	0.67273
49	Organizational members with good ideas are likely to formally submit them through a suggestion system	0.63008
35	Managers at all levels have clearly defined roles in our quality improvement process	0.62098
34	Responsibility for quality performance improvement is accepted by almost all organizational members	0.61994
39	The leaders at the top level in this organization have defined performance measures to monitor progress towards reaching objectives and goals	0.59107
36	The organization has a database or tracking system for relevant quality information	0.58328
50	This organization has used teams to gather information or solve problems	0.57645

Table 4.15. Two factors and item loadings of QM.

Item	Factor 7: Scientific Approach	Loading
61	This organization has arranged workshops to promote quality awareness among its members	0.83658
60	This organization has used statistical process control charts or graphs to track data over time	0.81727
62	This organization has attempted to inform and involve everyone in quality improvement	0.77890
63	This organization has established improvement teams (groups of individuals who come together to solve quality-related problems)	0.65754
Item	Factor 8: Teamwork and Involvement	Loading
59	This organization has called groups of individual together to define performance measures to track progress toward goal attainment	0.88202
58	This organization has used surveys to assess quality of its work	0.78857

Table 4.16. Two factors and item loadings of QR.

Item	Factor 9: Customer Satisfaction	Loading
73	The organizational customers find minimal errors in our work	0.82601
72	The organizational customers are satisfied with the quality of our work	0.82211
71	Organizational members rarely need to redo a job or task	0.82195
70	This organization's materials and supplies meet quality specifications	0.64836
68	Working conditions (noise, heat, light, dirt) in this organization are excellent	0.63656
69	Organizational members receive the guidance and assistance they need to accomplish their work	0.61655
Item	Factor 10: Workplace Kaizen	Loading
65	People make effort to reuse or salvage excess materials and supplies whenever possible	0.81565
66	Tools and/or equipment are maintained and operated at peak efficiency	0.74316
64	Once a job or project gets started, it is usually finished without undue delay	0.61052
67	The personnel turnover is low	0.57302

In the next section, a series of hypothesis testings were performed. The ten factors were treated as dependent variables for the various univariate and multivariate tests of differences. According to Hair *et al.* (1998: 115-120), when factors obtained from an exploratory attempt are to be subject to further statistical testing, three approaches are usually available. The first is to select surrogate items for subsequent analyses. Using surrogate items implies ignoring other items which load high on a factor. This is not suitable for the present situation as the interpretation of factors was performed by looking at all the items which load on a factor but not only the one which loads highest. A second alternative is to

compute factor scores. This approach is much favored because a factor score takes into account all the items contained in the instrument but not only those which load high. However, a factor score for a factor takes into account also those items which do not load on a factor. Furthermore, factor scores are not easily replicable because they are calculated based on a particular factor matrix. The third choice is to use summated scales. Generally speaking, items which load on a factor with a loading of 0.3 or above are taken into account for factor interpretation purpose. A summated scale is thus the summation of such items. The logic behind the summing of items is that each item contains some true values of the variable in question, as well as some random measurement errors. Therefore, by summing up the items, the measurement errors will be minimized across all measurements and the summated score will become more and more reliable (StatSoft Inc., 1997). This method also has the advantage of being able to represent the multiple aspects of a concept in a single measure. Also, the use of summated scores for the ten factors can usually provide better data normality and homogeneity. The high Cronbach's alpha coefficients as well as the significant ($p = 0.000$) inter-factor correlations presented in the subsequent tables have shown that the ten factors using summated scores were reliable and closely related to one another.

Table 4.17. Reliability of ten factors from the TQM survey.

Factors	Cronbach's alpha coefficient (N = 193)
All 10 factors	0.9264
QC 4 factors	0.8695
QP 2 factors	0.9290
QM 2 factors	0.7744
QR 2 factors	0.7876

Table 4.18. Correlation matrix of four sets of factors

Note: All correlation coefficients are significant at p = 0.000. f denotes factor.

	f1	f2	f3	f4	f5	f6	f7	f8	f9	f10
f1	1.0000									
f2	0.7916	1.0000								
f3	0.7872	0.7843	1.0000							
f4	0.6651	0.6257	0.6112	1.0000						
f5					1.0000					
f6					0.8846	1.0000				
f7							1.0000			
f8							0.7791	1.0000		
f9									1.0000	
f10									0.6943	1.0000

4.5. Hypothesis Testing (TQM Survey)

In this section, some hypotheses related to the TQM survey concerning industry size, industry type, and region as raised in Chapter III were tested.

4.5.1. The Effect of "Industry Size" on the TQM Survey

In order to test the stated hypotheses, MANOVA as well as ANOVA techniques were employed. Before proceeding, some fundamental assumptions such as data normality and homogeneity of variances were noted. Univariate normality can be checked by assessing the Kolmogorov-Smrinov (KS) Lilliefors adjusted statistic. As to multivariate normality, no exact test is available. The nearest would be the Mahalanobis distance and the Mardia's test for multivariate kurtosis. A minimum requirement states that if all the individual variables appear to be univariate normally distributed, then it can be assumed that the joint distribution is multivariate normal (Manly, 1986: 15). It should be noted that this is only a minimum requirement since variables which are univariate non-normal cannot be multivariate normal but univariate normal variables do not guarantee multivariate normality. Nevertheless, the F test is known to be fairly robust against the violation of the normality assumption (Ferguson & Takane, 1989: 261). Univariate homogeneity (equality of variances) can be assessed by testing the

Cochran's C or the Bartlett-Box F. The Box's M test is used to assess multivariate homogeneity (equality or homogeneity of the covariance matrices). Again, univariate homogeneity does not guarantee multivariate homogeneity. Although, it is not always that the homogeneity of covariance matrices is satisfied, violation of this assumption may induce some statistical problems. Nevertheless, Stevens (1986) has provided some alternatives related to the homogeneity violation.

The following table shows the assessment of normality as well as some descriptive statistics of the ten variables. They are the ten factors obtained from the exploratory factor analyses performed previously and were named f1 to f10 for convenience. Normality was checked by dimension (QC, QP, QM, and QR) as well as by size (L for large companies with over 200 employees, and S for small companies with less than 200 employees).

Table 4.19. Descriptive statistics of ten variables by size.

QC variables	L or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f1	L	-0.2516	-0.2864	54.3197	9.0893	0.0427	122	> 0.2000
	S	-0.5246	0.2125	54.9077	10.0867	0.0483	65	> 0.2000
f2	L	-0.4752	1.4473	31.1721	5.2644	0.0868	122	0.0247
	S	-0.6349	0.8593	31.8462	5.8583	0.0557	65	> 0.2000
f3	L	-0.3942	-0.0150	32.0656	5.0317	0.0504	122	> 0.2000
	S	-0.9547	0.9043	32.3692	6.2938	0.0766	65	> 0.2000
f4	L	-0.6397	0.7065	16.9180	3.4916	0.0720	122	0.1877
	S	-0.0819	-0.9396	17.4308	3.7665	0.1095	65	0.0510
QP variables	L or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f5	L	-0.4750	1.5475	67.5984	11.5670	0.0517	122	> 0.2000
	S	-0.5666	0.5339	66.4615	13.8158	0.0701	65	> 0.2000
f6	L	-0.2506	0.2481	52.6066	9.9566	0.0567	122	> 0.2000
	S	-0.9040	1.7853	53.5385	10.6508	0.0735	65	> 0.2000
QM variables	L or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f7	L	-0.8450	0.9499	17.6230	4.1507	0.0867	122	0.0250
	S	-0.4017	-0.3304	16.7385	4.3706	0.0748	65	> 0.2000
f8	L	-0.5900	0.6759	8.3361	2.0271	0.0993	122	0.0049
	S	-0.4368	-0.2986	7.9385	2.4101	0.0885	65	> 0.2000
QR variables	L or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f9	L	0.0129	-0.4281	26.0246	4.4656	0.0683	122	> 0.2000
	S	-0.5202	0.5531	26.9692	5.2914	0.0526	65	> 0.2000
f10	L	-0.1730	-0.3125	16.4918	3.2632	0.0681	122	> 0.2000
	S	0.0588	-0.6005	16.9692	3.4094	0.0888	65	> 0.2000

As seen in the table, almost all of the 20 data sets possessed satisfactory normality. This is reflected in the non-significant ($p > 0.20$) KS test statistics. f2L, f4L, f4S, and f7L were normally distributed at the 0.01 level while departure from normality was found in f8L. Since the F test is fairly robust against moderate non-normality, this situation is not likely to cause great statistical problems. Now the hypotheses raised can be tested. The tests for homogeneity are reported alongside the MANOVA results.

H1: There is no significant difference between the overall TQM survey scores of the two industry sizes.

To test this hypothesis, a MANOVA design was employed. There were ten dependent variables (the ten factors) and two groups (L and S). A significant ($p < 0.05$) Wilks' Lambda F ratio indicates significant differences between the two

groups. Univariate test of homogeneity is reflected by the Bartlett-Box F which is usually used when group sizes are unequal (Bryman & Duncan, 1990). Multivariate homogeneity is assessed by the Box's M Chi-square, which is usually used when the group sizes are over 20, the number of dependent variables less than six, and the number of groups also less than six (Stevens, 1986). Non-significant p-values ($p > 0.05$) indicate homogeneity of variances and covariances. The results are carried in the following table.

Table 4.20. Homogeneity and MANOVA results of H1.

Item	Bartlett-Box F (1, 79,026) /Univariate F (1, 185)	p-value	Box's M	Box's M χ^2 (55)	p-value	Wilks' λ	Wilks' λ F (10, 176)	p-value
f1	0.92001 /0.16432	0.338 /0.686						
f2	0.97021 /0.64220	0.325 /0.424						
f3	0.43142 /0.12921	0.038 /0.720						
f4	0.48484 /0.86546	0.486 /0.353						
f5	2.71120 /0.35693	0.100 /0.551						
f6	0.38305 /1.85578	0.536 /0.553						
f7	0.22401 /1.42724	0.636 /0.175						
f8	2.57064 /1.42724	0.109 /0.234						
f9	2.47023 /1.66489	0.116 /0.199						
f10	0.16116 /0.87984	0.688 /0.349						
			89.54233	83.79961	0.007	0.91593	1.61534	0.105

Results in table 4.20 showed that the univariate homogeneity of assumption was well met at the 0.05 level except f3. However, the multivariate homogeneity of covariance matrices was violated as the Box's M test showed a significant p-value ($p = 0.007$). According to Stevens (1986), homogeneity of the covariance matrices is not always met and some alternatives are provided in case of such a violation. If the Box's M test is significant with unequal N for groups,

which is the present case, compare the determinants. If the largest determinant is with the smallest group size, the test will be liberal (inflating type I error). If the largest determinant is with the largest group size, the test will be conservative (inflating type II error). The determinants were therefore checked to see if the violation has led to serious statistical problems. The logarithm of the largest determinant (24.25865) was found to be associated with the small company group (N = 65). As a result, type I error was inflated and it was necessary to use a higher alpha level (say, 0.1 instead of the usual 0.05) when evaluating the significance of the Wilks' Lambda. Even so, at the 0.1 level, the hypothesis was not rejected. Next, the four sub-hypotheses H1a, H1b, H1c, and H1d were tested using a similar approach.

H1a: There is no significant difference between the QC scores of the two industry sizes.

H1b: There is no significant difference between the QP scores of the two industry sizes.

H1c: There is no significant difference between the QM scores of the two industry sizes.

H1d: There is no significant difference between the QR scores of the two industry sizes.

To test the above four sub-hypotheses, a MANOVA design was employed in each instance. Homogeneity was well met in H1a, H1b, and H1c, but not in H1d. Again the determinants were checked. The larger logarithm of the determinant (5.33377) was found to be with the small company group and thus a higher alpha level had to be used when evaluating H1d. The results showed that H1a, H1c, and H1d were all not rejected at the 0.1 level. Although the p-value of the Wilks' Lamda for H1b showed 0.041, univariately the two items demonstrated no significant difference between the two size groups (F ratio for f5 = 0.35693, p = 0.551; F ratio for f6 = 0.35383, p = 0.553). Thus it could be reasonably said that H1b was not rejected at the 0.01 level. Therefore, the quality climate, processes,

methods, and results in the companies of the two industry sizes did not differ significantly. The results are shown in table 4.21. In conclusion, industry size did not affect the implementation of TQM. This is in line with the current literature stating that ISO 9000 and TQM can be adopted by companies of any size.

Table 4.21. Homogeneity and MANOVA results of H1a, H1b, H1c, and H1d.

Items for H1a	Bartlett-Box F (1, 79,026)	p-value	Box's M	Box's M χ^2 (10)	p-value	Wilks' λ	Wilks' λ F (4, 182)	p-value
f1	0.92001	0.338						
f2	0.97021	0.325						
f3	4.33142	0.038						
f4	0.48484	0.486						
			17.08611	16.63344	0.083	0.99202	0.36579	0.833
Items for H1b	Bartlett-Box F (1, 79,026)	p-value	Box's M	Box's M χ^2 (6)	p-value	Wilks' λ	Wilks' λ F (3, 321)	p-value
f5	2.71120	0.100						
f6	0.38305	0.536						
			7.22393	7.12749	0.068	0.96585	3.25256	0.041
Items for H1c	Bartlett-Box F (1, 79,026)	p-value	Box's M	Box's M χ^2 (3)	p-value	Wilks' λ	Wilks' λ F (2, 339)	p-value
f7	0.22401	0.636						
f8	2.57064	0.109						
			7.32113	7.22340	0.065	0.98983	0.94479	0.391
Items for H1d	Bartlett-Box F (1, 79,026)	p-value	Box's M	Box's M χ^2 (3)	p-value	Wilks' λ	Wilks' λ F (2, 323)	p-value
f9	1.66489	0.116						
f10	0.87984	0.688						
			12.12100	11.95919	0.008	0.99106	0.82987	0.438

4.5.2. The Effect of "Industry Type" on the TQM Survey

Procedures similar to those in 4.5.1. were followed in order to test the effect of industry type. Table 4.23. illustrates the various descriptive statistics and normality check on the ten variables based on industry type. M denotes manufacturing companies (comprising of manufacturing companies and construction companies), while S denotes service companies (comprising of retail and wholesale companies, transport and communication companies, and companies providing financial services and professional services).

Table 4.22. Descriptive statistics of ten variables by type.

QC variables	M or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f1	M	-0.3992	-0.0591	54.7235	9.5670	0.0355	170	> 0.2000
	S	0.1449	-0.6698	52.9545	7.7489	0.1042	22	> 0.2000
f2	M	-0.5764	1.2046	31.5059	5.5462	0.0540	170	> 0.2000
	S	0.0458	-0.2822	30.6364	4.5830	0.1395	22	> 0.2000
f3	M	-0.6833	0.7794	32.2471	5.3932	0.0491	170	> 0.2000
	S	-0.6747	-0.0966	31.7273	5.7668	0.0894	22	> 0.2000
f4	M	-0.3476	0.1699	17.100	3.6385	0.0539	170	> 0.2000
	S	-0.4372	-1.2485	17.3636	2.8208	0.1209	22	> 0.2000
QP variables	M or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f5	M	-0.5663	1.0448	67.2353	12.6866	0.0511	170	> 0.2000
	S	-0.0589	0.0885	66.4545	9.2310	0.1376	22	> 0.2000
f6	M	-0.4885	0.7417	52.9000	10.3596	0.0523	170	> 0.2000
	S	-0.4110	0.0923	53.1364	7.9540	0.0941	22	> 0.2000
QM variables	M or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f7	M	-0.6710	0.3498	17.2647	4.3043	0.0626	170	> 0.2000
	S	-0.5690	-0.7989	17.5455	3.5420	0.1043	22	> 0.2000
f8	M	-0.4964	0.0157	8.1529	2.1290	0.0928	170	0.0011
	S	-0.9554	0.3017	8.4545	2.4049	0.1239	22	> 0.2000
QR variables	M or S	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f9	M	-0.1725	0.0056	26.2059	4.7840	0.0701	170	0.0406
	S	-0.1609	-0.0822	27.3182	4.4335	0.1249	22	> 0.2000
f10	M	-0.0969	-0.3121	16.7059	3.2882	0.0673	170	0.0577
	S	0.1625	-0.6085	16.1818	3.2753	0.1585	22	0.1579

The results indicated that all data sets were normally distributed as reflected by the non-significant p-values ($p > 0.20$ except f10M and f10S where $p > 0.05$ and f9M where $p > 0.01$) of the KS tests except one item, f8M. Again, the analysis proceeded given that the F test is quite robust against moderate non-normality.

H2: There is no significant difference between the overall TQM survey scores of the two industry types.

To test this hypothesis, a MANOVA design was employed. There were ten dependent variables (the ten factors) and two groups (M and S). The results of homogeneity tests and MANOVA are carried in the following table.

Table 4.23. Homogeneity and MANOVA results of H2.

Item	Bartlett-Box F (1, 11,587) /Univariate F (1, 190)	p-value	Box's M	Box's M χ^2 (55)	p-value	Wilks' λ	Wilks' λ F (10, 181)	p-value
f1	1.46462 /0.69231	0.226 /0.406						
f2	1.21203 /0.49617	0.271 /0.482						
f3	0.17073 /0.17812	0.680 /0.673						
f4	2.08919 /0.10699	0.149 /0.744						
f5	3.15660 /0.07782	0.076 /0.781						
f6	2.24007 /0.01062	0.135 /0.918						
f7	1.26315 /0.08594	0.261 /0.770						
f8	0.58151 /0.37935	0.446 /0.539						
f9	0.20457 /1.06971	0.651 /0.302						
f10	0.00057 /0.49522	0.981 /0.482						
			63.50258	54.53137	0.492	0.93227	1.31497	0.225

Results revealed that homogeneity of variances and covariance matrices were well satisfied. The non-significant ($p > 0.05$) Wilks' Lambda F ratio suggested that H2 was not rejected. The sub-hypotheses H2a, H2b, H2c, and H2d were then tested in turn.

H2a: There is no significant difference between the QC scores of the two industry types.

H2b: There is no significant difference between the QP scores of the two industry types.

H2c: There is no significant difference between the QM scores of the two industry types.

H2d: There is no significant difference between the QR scores of the two industry types.

To test the above four sub-hypotheses, a MANOVA design was employed in each instance. The results showed that homogeneity was well met in all the four tests. None of the four sub-hypotheses H2a, H2b, H2c, H2d was rejected at the 0.05 level. The results are shown in table 4.24. As H2 and its sub-hypotheses H2a, H2b, H2c, and H2d were all not rejected, it could be concluded here that the TQM

practices of manufacturing and service companies did not differ significantly. This result has supported that ISO 9000 and TQM are applicable to all kinds of industry, no matter manufacturing or service.

Table 4.24. Homogeneity and MANOVA results of H2a, H2b, H2c, and H2d.

Items for H2a	Bartlett-Box F (1, 11,587)	p-value	Box's M	Box's M χ^2 (10)	p-value	Wilks' λ	Wilks' λ F (4, 187)	p-value
f1	1.46462	0.226						
f2	1.21203	0.271						
f3	0.17073	0.680						
f4	2.08919	0.149						
			15.07657	14.03340	0.171	0.98793	0.57119	0.684
Items for H2b	Bartlett-Box F (1, 11,587)	p-value	Box's M	Box's M χ^2 (6)	p-value	Wilks' λ	Wilks' λ F (2, 189)	p-value
f5	3.15660	0.076						
f6	2.24007	0.135						
			3.78917	3.65706	0.301	0.99660	0.32226	0.725
Items for H2c	Bartlett-Box F (1, 11,587)	p-value	Box's M	Box's M χ^2 (3)	p-value	Wilks' λ	Wilks' λ F (2, 189)	p-value
f7	1.26315	0.261						
f8	0.58151	0.446						
			4.63236	4.47086	0.215	0.99754	0.23263	0.793
Items for H2d	Bartlett-Box F (1, 11,587)	p-value	Box's M	Box's M χ^2 (3)	p-value	Wilks' λ	Wilks' λ F (2, 189)	p-value
f9	0.20457	0.651						
f10	0.00057	0.981						
			4.94830	4.77579	0.189	0.97411	2.51182	0.084

4.5.3. The Effect of "Region" on the TQM Survey

Procedures similar to those in 4.5.1. and 4.5.2. were followed in order to test the effect of region. The following table illustrates the various descriptive statistics and normality check on the ten variables based on three different regions. H denotes Hong Kong, T denotes Taiwan, and C denotes China.

Table 4.25. Descriptive statistics of ten variables by region.

QC variables	H/T/C	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f1	H	-0.2604	-0.3603	50.6250	9.9555	0.0640	40	> 0.2000
	T	-0.1138	-0.2839	54.8617	9.4432	0.0591	94	> 0.2000
	C	-0.7015	0.8861	56.6102	8.0473	0.0786	59	> 0.2000
f2	H	-1.2197	2.3625	30.2250	5.7712	0.0749	40	> 0.2000
	T	-0.1282	-0.5574	32.1064	5.7220	0.0798	94	0.1738
	C	-1.0342	4.2028	31.0678	4.5556	0.0923	59	0.0761
f3	H	-1.0048	0.9232	31.6250	6.3030	0.0809	40	> 0.2000
	T	-0.3460	-0.3038	32.7447	5.3880	0.0505	94	> 0.2000
	C	-1.0116	1.7430	31.6780	4.7577	0.0808	59	> 0.2000
f4	H	-1.0801	1.3643	16.6000	3.9406	0.1071	40	> 0.2000
	T	-0.0170	-0.6672	17.0851	3.6593	0.0837	94	0.1017
	C	-0.0622	-0.2679	17.5593	3.0301	0.0799	59	> 0.2000
QP variables	H/T/C	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f5	H	-0.7764	1.1287	63.0250	14.3428	0.0657	40	> 0.2000
	T	-0.0408	-0.6273	67.9362	12.5927	0.1121	94	0.0054
	C	-1.1325	5.9746	68.6949	9.6065	0.1001	59	> 0.2000
f6	H	-0.8073	0.5518	50.3000	11.0806	0.0678	40	> 0.2000
	T	0.0026	-0.5685	53.8936	9.9779	0.1072	94	0.0097
	C	-0.9911	3.3137	53.0678	9.3677	0.1138	59	0.0551
QM variables	H/T/C	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f7	H	-0.6036	-0.3028	15.7000	4.7512	0.0674	40	> 0.2000
	T	-0.1628	-0.4122	17.3298	4.0967	0.0640	94	> 0.2000
	C	-1.5082	3.4082	18.2881	3.7141	0.1190	59	0.0368
f8	H	-0.6407	-0.4850	7.7000	2.7194	0.0882	40	> 0.2000
	T	0.0815	-0.2238	8.0851	2.0196	0.1338	94	0.0003
	C	-1.0292	1.7816	8.6610	1.8533	0.1503	59	0.0020
QR variables	H/T/C	Skewness	Kurtosis	Mean	Standard deviation	KS (Lilliefors)	df and N	P-value of KS test
f9	H	0.1252	0.2604	25.4500	5.3491	0.0918	40	> 0.2000
	T	0.0243	-0.6088	26.0106	4.7349	0.0647	94	> 0.2000
	C	-0.7090	1.8782	27.3559	4.2131	0.0618	59	> 0.2000
f11	H	-0.0800	-0.3281	16.0250	3.7859	0.0811	40	> 0.2000
	T	0.2004	-0.8701	16.8191	3.3791	0.1048	94	0.0126
	C	-0.5745	0.3278	16.7288	2.7281	0.0968	59	> 0.2000

The results in table 4.25. showed that all data sets were normally distributed as indicated by the non-significant p-values ($p > 0.20$ except f2T, f2C, f4T, and f6C where $p > 0.05$, f7C and f11T where $p > 0.01$) of the KS tests except four items, f5T, f6T, f8T and f8C which were not normally distributed. Again, the analysis proceeded given that the F test is quite robust against moderate non-normality.

H3: There is no significant difference among the overall TQM survey scores of the three regions.

To test this hypothesis, a MANOVA design was employed. There were ten dependent variables (the ten factors) and three groups (H, T, and C). The results of homogeneity tests and MANOVA were carried in the following table.

Table 4.26. Homogeneity and MANOVA results of H3.

Item	Bartlett-Box F (2, 61,543) /Univariate F (2, 190)	p-value	Box's M	Box's M χ^2 (110)	p-value	Wilks' λ	Wilks' λ F (20, 360)	p-value
f1	1.25786 /5.22662	0.284 /0.006						
f2	1.99047 /1.86039	0.137 /0.158						
f3	1.87737 /0.97622	0.153 /0.379						
f4	1.83964 /0.88884	0.159 /0.413						
f5	4.04514 /2.97110	0.018 /0.054						
f6	0.66981 /1.81125	0.512 /0.166						
f7	1.44652 /4.69092	0.236 /0.010						
f8	4.00378 /2.59853	0.018 /0.077						
f9	1.34978 /2.30288	0.260 /0.103						
f10	2.69434 /0.85987	0.068 /0.425						
			187.0120	171.76648	0.000	0.70302	3.48716	0.000

Results in table 4.26 showed that the univariate homogeneity assumption was well met at the 0.05 level except f5 and f8 at the 0.01 level. However, multivariate homogeneity was violated as the Box's M test showed a significant p-value ($p = 0.000$). The determinants were therefore checked. The logarithm of the largest determinant (22.86985) was found to be with group C (China), which was neither the largest nor the smallest group. Therefore, the violation did not cause a serious statistical problem. The Wilks' Lambda showed a significant p-

value of 0.000. This indicated that H3 cannot be accepted. To follow, the four sub-hypotheses were tested using a MANOVA design in each instance.

H3a: There is no significant difference among the QC scores of the three regions.

H3b: There is no significant difference among the QP scores of the three regions.

H3c: There is no significant difference among the QM scores of the three regions.

H3d: There is no significant difference among the QR scores of the three regions.

Table 4.27. Homogeneity and MANOVA results of H3a, H3b, H3c, and H3d.

Items for H3a	Bartlett-Box F (1, 61,543)	p-value	Box's M	Box's M χ^2 (20)	p-value	Wilks' λ	Wilks' λ F (8, 374)	p-value
f1	1.25786	0.284						
f2	1.99047	0.137						
f3	1.87737	0.153						
f4	1.83964	0.159						
			28.79666	27.79838	0.114	0.82649	4.67364	0.000
Items for H3b	Bartlett-Box F (1, 61,543)	p-value	Box's M	Box's M χ^2 (6)	p-value	Wilks' λ	Wilks' λ F (4, 378)	p-value
f5	4.04514	0.018						
f6	0.66981	0.512						
			13.64178	13.40349	0.037	0.95206	2.35003	0.054
Items for H3c	Bartlett-Box F (1, 61,543)	p-value	Box's M	Box's M χ^2 (6)	p-value	Wilks' λ	Wilks' λ F (4, 378)	p-value
f7	1.44652	0.236						
f8	4.00378	0.018						
			16.53836	16.24947	0.012	0.94610	2.65455	0.033
Items for H3d	Bartlett-Box F (1, 61,543)	p-value	Box's M	Box's M χ^2 (6)	p-value	Wilks' λ	Wilks' λ F (4, 378)	p-value
f9	1.34978	0.260						
f10	2.69434	0.068						
			11.22726	11.03115	0.087	0.95661	2.11936	0.078

Multivariate homogeneity was well met at the 0.05 level for H3a and H3d but not for H3b and H3c. To be conservative, the determinants were checked. For H3b, the largest logarithm of the determinant (8.30248) was found to be associated with group H (Hong Kong), which was the smallest of the three groups. Thus type I error was inflated and a higher alpha level (say 0.1 instead of 0.05) had to be used when evaluating the significance of the test. For H3c, the largest logarithm of the determinant (3.55007) was found to be associated with group T

(Taiwan), which was the largest of the three groups. Thus type II error was inflated and a lower alpha level (say 0.01 instead of 0.05) had to be set. Given such considerations, H3a and H3b were not accepted while H3c and H3d were not rejected.

Results of the five hypotheses tested indicated that overall speaking, the TQM practices of the companies in the three regions were different. To be more specific, differences were found in terms of quality climate and processes, but not in terms of methods and results. This finding was thought to be particularly interesting because the following propositions could be inferred to.

(1) The results obtained from hypothesis testing looking into the effect of industry size and type indicated no significant differences. This is consistent with the already accepted fact that ISO 9000 and TQM can be implemented in companies of any size and any business nature. However, when it came to the effect of "region" which carries some kind of cultural element, the results showed significant differences. Thus it is not unreasonable to suspect that there is indeed a relationship between culture and TQM, which is the central theme of the present study.

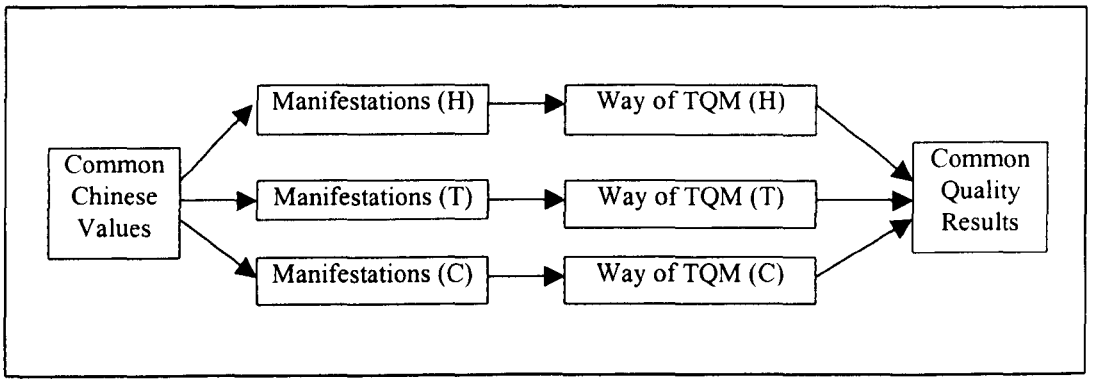
(2) Since the four parts of the TQM survey can be naturally viewed as a simple "input-process-output" picture with climate (QC) as the "input", processes (QP) and methods (QM) as the "process", and results (QR) as the "output", the results of the hypothesis testing revealed that hard factors such as scientific approaches for managing quality (use of statistical process control, quality circles, and so on) and the final end results of the companies (certification under ISO 9000 and customer satisfaction) in the three regions were the same. This is supported by

H3a and H3b being not accepted but H3c and H3d not rejected. What is different is thus the "way" the companies do things according to their own culture-specific TQM which is shaped by the core national culture.

(3) Hong Kong, Taiwan, and China, though Chinese dominated regions, do possess differences in cultural manifestations. It was believed that it is the manifestations which drive people to work things out in different fashions, but ending up with the same results. However, the core cultural values of the Chinese in the three regions are the same. The following figure depicts the proposition. The "manifestations → way of TQM" parts were already supported by the hypothesis testing performed. Still to be uncovered are the Chinese cultural values common to the three regions and how do they relate to the TQM practices. These are to be explored later in this chapter through the use of structural equation modeling techniques.

Figure 4.1. Proposition arising from hypothesis testing.

Note: H denotes Hong Kong, T denotes Taiwan, and C denotes China.



4.6. Item Bias Detection for the CCV Survey

Due to the nature of the CCV survey, a more stringent psychometric approach to the methodology is warranted. Instruments measuring people's underlying beliefs, values, or personality are less stable when compared to other instruments such as the TQM survey which measures concrete concepts.

Of major concern to the present study is the problem associated with item bias which is frequently encountered in psychological studies. As defined by Mellenbergh (1982), there exist two main types of item biases namely, uniform bias and non-uniform bias. The former refers to the case when individuals from one cultural group may have higher scores on an item than individuals from another cultural group even when they have the same total test score. This is possible in the present case because the CCV instrument was developed in Hong Kong based on a Hong Kong sample. Although all the instrument items are traditional Chinese sayings, certain items could be more easily understood by the Hong Kong respondents than the Taiwanese and mainland Chinese respondents. Non-uniform bias refers to the case when an item discriminates better in one group than in the other. For example, some items in the CCV survey may be more related to "Chinese-ness" for the Hong Kong respondents than the Taiwanese or mainland Chinese respondents. To paraphrase from van de Vijver and Leung's (1997: 62) discussion on item bias, an item is an unbiased measure of a theoretical construct, say, Chinese-ness, if persons from different cultural groups (Hong Kong, Taiwan, and China) who are equally Chinese have the same average score on the item. As it was argued that the core Chinese values of the people in the three regions should be the same but their manifestations could be different, the

main objective here is to identify the common core values. A common way is to treat biased items as disturbances and are removed from the instrument. Therefore, only the unbiased items are used for solid comparison.

A conditional procedure (when the sample is split into score level groups) ANOVA as described by van de Vijver and Leung (1997) was employed for item bias detection. Using SPSS syntax instructions, the total scores of the respondents from the three regions were divided into five score levels, each having an approximately similar size of at least 30 observations. The number of respondents contained in the five groups were 38, 39, 43, 38, and 33 respectively. The conditional ANOVA was then performed univariately on each of the 45 instrument items. The results are carried in table 4.28. When the effect of culture groups (in this case the three regions) is non-significant, the item is free from uniform bias. On the other hand, when the interaction of culture groups and score level groups (the five score level groups) are non-significant, the item is free from non-uniform bias. In other words, items which show both uniform as well as non-uniform biases were discarded from the instrument. A lower significance level of 0.01 was chosen in order to reduce the chance of committing type I error for the overall test.

Table 4.28. Item bias detection of 45 CCV items.

Item	Effect of region F (2, 176)	p-value	Interaction effect of region and score level F (8,176)	p-value	Cochrans C (12,15)	p-value
1. A family will be prosperous if it is in harmony.	3.551	0.031	0.285	0.970	0.11918	0.572
2. Haughtiness invites ruin; humility receives benefits.	1.480	0.230	1.145	0.336	0.13452	0.224
3. The best strategy to deal with changes is not to change at all.	0.733	0.482	0.366	0.937	0.10961	0.985
4. Children should report everything to their parents.	10.568	0.000	0.363	0.939	0.11169	0.878
5. Reflect on our faults when we take a rest.	1.583	0.208	0.854	0.557	0.20673	0.001
6. The new generation is worse than the old.	10.704	0.000	1.164	0.324	0.12630	0.374
7. I will treat my teacher as my father even though he has taught me for one day.	4.063	0.019	0.619	0.761	0.11152	0.886
8. Reject an old man's advice and you'll soon pay for it.	2.513	0.084	1.666	0.110	0.15297	0.065
9. An eye for an eye.	3.739	0.026	0.910	0.510	1.27547	0.214
10. Live as it is predestined.	0.323	0.724	1.535	0.148	0.11908	0.576
11. He who submits to Heaven shall live; he who rebels against Heaven shall perish.	0.242	0.786	2.131	0.035	0.12360	0.440
12. Do all that is humanly possible and leave the rest to the will of providence.	6.742	0.002	0.675	0.713	0.14101	0.147
13. When in Rome, do as the Romans do.	1.234	0.294	3.555	0.001	0.11630	0.677
14. Blessing abound in a family that preserves in good deeds.	2.010	0.137	0.550	0.817	0.20080	0.002
15. Life and death are fated; wealth and honors hinge on the will of providence.	30.302	0.000	1.628	0.120	0.19801	0.002
16. A family has its rules as a state has its laws.	3.999	0.020	0.449	0.890	0.23751	0.000
17. Forgive others whenever you can.	2.464	0.088	1.257	0.269	0.13170	0.268

Table 4.28. Item bias detection of 45 CCV items (continued).

Note: * denotes Bartlett-Box F (14, 10,073)

Item	Effect of region F (2, 176)	p-value	Interaction effect of region and score level F (8.176)	p-value	Cochrans C (12,15)	p-value
18. At a different time and in a different place we will meet again.	8.143	0.000	0.809	0.595	0.13330	0.242
19. To have a son for old age is to stock provision for a rainy day.	5.144	0.007	2.787	0.006	0.13939	0.163
20. Children have to respect the decisions of their parents.	0.958	0.386	1.452	0.178	0.20281	0.001
21. Talk to people in their own language.	4.988	0.008	2.344	0.020	0.69818*	0.778
22. Fate is predestined.	7.409	0.001	3.002	0.004	0.18640	0.006
23. Those against the laws should be punished.	6.329	0.002	1.685	0.105	0.13475	0.221
24. Live with your parents after marriage.	5.776	0.004	0.565	0.805	0.13306	0.245
25. Endure and you will find everything all right; retreat and you will find yourself happy.	1.077	0.343	0.849	0.561	0.12505	0.403
26. A man depends on his parents at home.	3.112	0.047	0.256	0.979	0.12970	0.303
27. Beyond a mountain, yet a higher one.	4.032	0.019	0.790	0.612	0.13057	0.287
28. Man can communicate with Nature and exist in harmony.	2.645	0.074	0.901	0.517	0.15416	0.060
29. If you honor me a linear foot, I should in return honor you ten feet.	0.834	0.436	0.954	0.473	0.47562*	0.947
30. There is deceit in excessive courtesy.	2.927	0.056	0. 964	0.465	0.11611	0.684
31. Shameful affairs of the family should not be spoken outside.	0.680	0.508	1.040	0.408	0.15556	0.055
32. Unmarried children should make their parents well and strong.	7.176	0.001	0.575	0.797	0.15002	0.080
33. I won't offend others unless I am offended.	2.215	0.112	0.639	0.744	0.12855	0.326
34. If we want to criticize others, criticize ourselves first.	3.966	0.021	1.200	0.301	0.11880	0.585

Table 4.28. Item bias detection of 45 CCV items (continued).

Item	Effect of region F (2, 176)	p-value	Interaction effect of region and score level F (8.176)	p-value	Cochrans C (12,15)	p-value
35. Of the three practices of unfilial piety, having no son is the greatest.	8.341	0.000	1.436	0.184	0.11654	0.667
36. Old parents are just like treasure in your house when living with.	3.174	0.044	1.135	0.342	0.14643	0.102
37. A man who can survive in hardship is the man of men.	3.096	0.048	1.311	0.241	0.18844	0.005
38. Better bend than break.	0.830	0.438	0.473	0.874	0.19031	0.004
39. To please someone without a cause is either adulterous or greedy.	4.511	0.012	0.792	0.610	0.11937	0.566
40. Never forget what others have done for you.	0.485	0.616	1.102	0.364	0.17507	0.013
41. Face is honored by others; shame is sought by ourselves.	7.309	0.001	0.797	0.606	0.15867	0.044
42. No matter what you are doing, don't go too far.	2.031	0.134	0.437	0.898	0.20390	0.001
43. It is more urgent to pay back favors than debts.	2.503	0.085	0.697	0.694	0.12068	0.524
44. Help each other whenever in need.	0.122	0.885	1.158	0.327	0.14153	0.142
45. I will return favors and take revenge as well.	9.112	0.000	1.007	0.433	0.12538	0.395

In table 4.28., the homogeneity of variance assumption was assessed by the Cochran's C test. Results showed that homogeneity was well met at the 0.01 level except items 5, 14, 15, 16, 20, 22, 38, and 42. Since ANOVA is quite robust against the violation of homogeneity in a small number of items, the analysis proceeded. At the 0.01 level, item bias was detected to be present in items 4, 6, 12, 13, 15, 18, 19, 21, 22, 23, 24, 32, 35, 41, and 45. In fact, these items might contain a mixture of item biases as well as genuine cultural differences. However, as the objective of performing the item bias detection was to determine the common Chinese cultural values across the respondents in the three regions, these 15 items

were discarded from the instrument for the sake of conservatism and can be further analyzed in subsequent research. To check whether the power of the instrument has drastically decreased or not, the Cronbach's alpha reliability coefficients before and after discarding the items were compared. Based on the original 45-item instrument, alpha was 0.8650 (N = 193). After discarding 15 items, the alpha did not drop drastically but remained at an acceptable level of 0.8399 (N = 193). Although at the 0.05 level, the first alpha was more reliable than the second one, the absolute value of the alpha warranted the maintenance of satisfactory reliability in the reduced instrument.

4.7. Factor Analysis on the CCV Survey Items

The CCV survey with the 30 unbiased items was then subject to factor analysis in order to identify the underlying common Chinese cultural values. Whether an exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) should be performed is an important question to answer here. An EFA is usually performed when there is no sound theoretical background underlying the factor structures and the objective is to identify them. A CFA, on the other hand, is performed when there is established theory or empirical findings already and the objective is to use new data to confirm the defined factor structures. Since the dimensions or factors which the items relate to were already identified in Yau's (1994) empirical research, a CFA should be employed in this instance to confirm the factor structures.

4.7.1. Identification of Underlying CCV Dimensions

Administered to two fairly large samples in Hong Kong denoted as the ball pen sample and the mini cassette player sample, Yau (1994) has identified 12 similar factors underlying the CCV survey as shown in the following table.

Table 4.29. Dimensions of Chinese cultural values according to Yau's samples (Yau ,1994: 156).

Ball pen sample factors	Mini cassette player sample factors
1. Adaptiveness	1. Interdependence
2. Sincerity/Suspicion	2. Continuity/Respect for authority
3. Continuity/Respect for authority	3. Conformity to activity
4. Harmony with the universe	4. Abasement
5. Harmony with people	5. Harmony with the universe
6. Interdependence	6. Reciprocity
7. Reciprocity	7. Harmony with people
8. Group-orientation	8. Sincerity/Suspicion
9. Respect for experience	9. Face
10. Face	10. Endurance
11. Abasement	11. Group-orientation
12. Past-orientation	12. Past-orientation

If one studies carefully the above dimensions, some of them are inter-related with very close meanings. For example, "continuity/respect for authority" and "respect for experience" both relate to a single dimension of authority or power distance. "Harmony with the universe" and "conformity to activity" relate to a dimension of harmony. "Sincerity/suspicion" and "abasement" have also close meanings. "Harmony with people", "group-orientation", and "interdependence" all relate to a dimension of collectivism. Therefore, to further aggregate these values is only a matter of interpretation.

The 30 unbiased items were classified under the dimensions according to Yau's interpretation. Three classifications were included here for comparison. The first was taken from his ball pen sample, the second from his mini cassette player sample, and the third from a stepwise regression analysis which he performed based on the two samples. Several items which had low factor loadings and were

not classified by Yau were also classified here according to their best meanings. They are carried in table 4.30.

Table 4.30. Dimensions underlying 30 CCV items.

Item	Classification (ball pen sample)	Classification (mini cassette sample)	Classification (stepwise regression)	Classification (best literal meaning)
1. A family will be prosperous if it is in harmony.	Harmony with people	Group-orientation		
2. Haughtiness invites ruin; humility receives benefits.	Sincerity/Suspicion	Abasement		
3. The best strategy to deal with changes is not to change at all.				Adaptiveness
5. Reflect on our faults when we take a rest.	Abasement	Abasement	Abasement	
7. I will treat my teacher as my father even though he has taught me for one day.				Continuity/ Respect for authority
8. Reject an old man's advice and you'll soon pay for it.	Respect for experience	Continuity	Continuity	
9. An eye for an eye.	Reciprocity	Reciprocity	Reciprocity	
10. Live as it is predestined.	Sincerity/Suspicion	Group-orientation	Harmony with the universe	
11. He who submits to Heaven shall live; he who rebels against Heaven shall perish.	Harmony with the universe	Harmony with the universe	Harmony with the universe	
14. Blessing abound in a family that preserves in good deeds.	Adaptiveness	Conformity to activity		
16. A family has its rules as a state has its laws.	Adaptiveness		Adaptiveness	
17. Forgive others whenever you can.	Sincerity/Suspicion	Harmony with people	Harmony with people	
20. Children have to respect the decisions of their parents.	Continuity/Respect for authority	Continuity/Respect for authority		
25. Endure and you will find everything all right; retreat and you will find yourself happy.	Abasement	Endurance		
26. A man depends on his parents at home.	Interdependence	Interdependence	Interdependence	
27. Beyond a mountain, yet a higher one.	Interdependence	Interdependence		

Table 4.30. Dimensions underlying 30 CCV items (continued).

Item	Classification (ball pen sample)	Classification (mini cassette sample)	Classification (stepwise regression)	Classification (best literal meaning)
28. Man can communicate with Nature and exist in harmony.				Harmony with the universe
29. If you honor me a linear foot, I should in return honor you ten feet.		Interdependence	Interdependence	
30. There is deceit in excessive courtesy.	Sincerity/Suspicion	Sincerity/Suspicion		
31. Shameful affairs of the family should not be spoken outside.	Harmony with people	Group-orientation	Face	
33. I won't offend others unless I am offended.	Harmony with people		Harmony with people	
34. If we want to criticize others, criticize ourselves first.				Abasement
36. Old parents are just like treasure in your house when living with.	Continuity/Respect for authority	Continuity/Respect for authority	Continuity/ Respect for authority	
37. A man who can survive in hardship is the man of men.	Adaptiveness	Conformity to activity	Adaptiveness	
38. Better bend than break.				Adaptiveness
39. To please someone without a cause is either adulterous or greedy.	Sincerity/Suspicion	Sincerity/Suspicion	Sincerity/ Suspicion	
40. Never forget what others have done for you.	Sincerity/Suspicion	Abasement	Abasement	
42. No matter what you are doing, don't go too far.	Harmony with people	Harmony with people	Harmony with people	
43. It is more urgent to pay back favors than debts.	Face		Face	
44. Help each other whenever in need.	Face	Conformity to activity	Harmony with people	

As can be seem from table 4.30., most items associated with one dimension or two similar dimensions, while some items had multiple dimensions. By carefully scrutinizing the literal meaning of each item while preserving the original interpretations of Yau, the final factor structures were proposed in table 4.31.

Table 4.31. Factor structures of seven Chinese cultural values.

Factor 1. Abasement
2. Haughtiness invites ruin; humility receives benefits.
5. Reflect on our faults when we take a rest.
25. Endure and you will find everything all right; retreat and you will find yourself happy.
34. If we want to criticize others, criticize ourselves first.
40. Never forget what others have done for you.
Factor 2. Adaptiveness
3. The best strategy to deal with changes is not to change at all.
14. Blessing abound in a family that preserves in good deeds.
16. A family has its rules as a state has its laws.
37. A man who can survive in hardship is the man of men.
38. Better bend than break.
Factor 3. Harmony with people
1. A family will be prosperous if it is in harmony.
17. Forgive others whenever you can.
31. Shameful affairs of the family should not be spoken outside.
33. I won't offend others unless I am offended.
42. No matter what you are doing, don't go too far.
44. Help each other whenever in need.
Factor 4. Harmony with the universe
10. Live as it is predestined.
11. He who submits to Heaven shall live; he who rebels against Heaven shall perish.
28. Man can communicate with Nature and exist in harmony.
Factor 5. Interdependence
9. An eye for an eye.
26. A man depends on his parents at home.
27. Beyond a mountain, yet a higher one.
29. If you honor me a linear foot, I should in return honor you ten feet.
43. It is more urgent to pay back favors than debts.
Factor 6. Continuity/Respect for authority
7. I will treat my teacher as my father even though he has taught me for one day.
8. Reject an old man's advice and you'll soon pay for it.
20. Children have to respect the decisions of their parents.
36. Old parents are just like treasure in your house when living with.
Factor 7. Sincerity/Suspicion
30. There is deceit in excessive courtesy.
39. To please someone without a cause is either adulterous or greedy.

The final result consisted of seven major Chinese cultural values. Since it was stated that some of the original 12 values identified by Yau may overlap, having only seven values to represent the latent variable "Chinese cultural values" is conservative. The only drawback here is that no value parallel to F. Kluckhohn and Strodtbeck's (1961) "time orientation" is present. Nevertheless, even in Yau's

original findings, "past time orientation" was only measured by one surrogate measure, which is relatively unstable.

Summated scores were calculated to provide the input score for the seven respective factors. For convenience, the seven variables abasement, adaptiveness, harmony with people, harmony with the universe, interdependence, continuity/respect for authority, and sincerity/suspicion were renamed ABASE, ADAPT, HARPE, HARUN, INTDP, RESPC, and SINCE. A normality check as seen in table 4.32. on the seven variables found that none of them were normally distributed. Since the CCV survey measures underlying psychological constructs of people rather than very solid facts like what the TQM survey does, responses were expected to be less stable.

Table 4.32. Descriptive statistics of seven Chinese cultural values.

Variable	Mean	Standard deviation	Skewness	Kurtosis	KS (Lilliefors) with 193 df	p-value
ABASE	24.3523	2.8063	-0.2250	0.2754	0.0875	0.0011
ADAPT	26.6528	3.0257	-0.00476	0.3581	0.0932	0.0003
HARPE	29.0933	2.9122	-0.1125	0.4690	0.1282	0.0000
HARUN	12.1813	2.4671	-0.0911	-0.0269	0.0889	0.0008
INTDP	21.9585	2.6117	-0.0163	-0.0757	0.0843	0.0020
RESPC	15.3679	3.0215	-2.0130	-0.0952	0.1029	0.0000
SINCE	7.3731	1.9910	-0.3106	0.4826	0.1122	0.0000

In order to improve data normality, the four most common data transformation methods namely, taking the inverse, the square root, logarithms, and the arcsine (Hair *et al.*, 1998: 77) were attempted. It was found that by taking the natural logarithm, data normality improved substantially except HARPE and SINCE which did not improve upon applying any of the four methods. HARUN, INTDP, and RESPC were normally distributed at the 0.05 level, while ABASE and ADAPT could be considered normal at the 0.01 level. Although it was unsuccessful to transform HARPE into an acceptable distribution, its absolute

values of skewness and kurtosis could be considered mild. However, SINCE showed a serious kurtosis problem. The descriptive statistics of the seven transformed variables are depicted in table 4.33.

Table 4.33. Descriptive statistics of seven Chinese cultural values after data transformation.

Variable	Mean	Standard deviation	Skewness	Kurtosis	KS (Lilliefors) with 193 df	p-value
ABASE	1.3836	0.0517	-0.6584	1.1161	0.0697	0.0235
ADAPT	1.3511	0.0598	-0.5627	1.0243	0.0717	0.0172
HARPE	1.4616	0.0445	-0.5671	1.7923	0.1090	0.0000
HARUN	1.0761	0.0841	-0.7953	1.1451	0.0626	0.0630
INTDP	1.3385	0.0526	-0.3686	0.1452	0.0636	0.0553
RESPC	1.1780	0.0877	-0.3622	0.0919	0.0631	0.0588
SINCE	0.8477	0.1432	-1.6772	4.1786	0.0972	0.0001

The inter-correlations of the seven variables were then assessed. It was found that all of them were highly inter-correlated except SINCE, which only correlated with INTDP (controlling overall type I error at 0.05, the significance level for a correlation coefficient to be significantly different from zero is around 0.0017). Theoretically speaking, the value of sincerity should be highly correlated with the other values. A possible reason for the opposite to occur here is that SINCE itself contains two opposite connotations namely sincerity and suspicion. That is to say, some respondents might agree with the former but not the latter or vice versa. This can create substantial distortions to the meaning of the data set. To support discarding SINCE, the Cronbach's alpha reliability coefficients were calculated. With seven variables including SINCE, alpha was 0.6644 (0.8001 before transformation). With only six items, the alpha increased to 0.7753 (0.8144 before transformation). At the 0.05 level, the second alpha was significantly higher than the first one. For the sake of conservatism and to retain a usable data set for subsequent analysis, it was decided that the variable SINCE be dropped from the analysis. The inter-variable correlation matrix is carried in table 4.34.

Table 4.34. Correlation matrix of seven Chinese cultural values.

	ABASE	ADAPT	HARPE	HARUN	INTDP	RESPC	SINCE
ABASE	1.0000						
ADAPT	0.4200 (p = 0.000)	1.0000					
HARPE	0.6176 (p = 0.000)	0.4723 (p = 0.000)	1.0000				
HARUN	0.4004 (p = 0.000)	0.3695 (p = 0.000)	0.3436 (p = 0.000)	1.0000			
INTDP	0.3746 (p = 0.000)	0.3473 (p = 0.000)	0.4686 (p = 0.000)	0.3149 (p = 0.000)	1.0000		
RESPC	0.4765 (p = 0.000)	0.4685 (p = 0.000)	0.4302 (p = 0.000)	0.3786 (p = 0.000)	0.3292 (p = 0.000)	1.0000	
SINCE	-0.0157 (p = 0.828)	0.1481 (p = 0.400)	0.1959 (p = 0.006)	0.0334 (p = 0.645)	0.3100 (p = 0.000)	0.1160 (p = 0.108)	1.0000

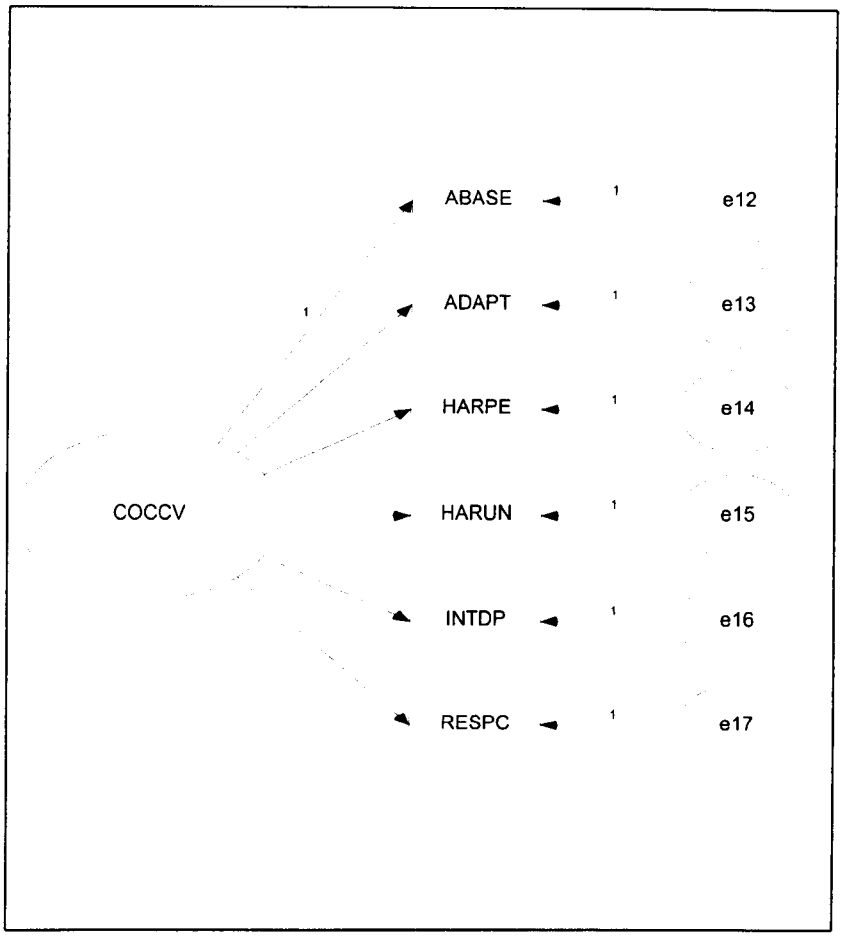
The variables, especially HARPE, were still not completely normally distributed after a series of attempts in data transformation. For the purpose of confirmatory factor analysis and structural equation modeling, some statistical problems may arise when normality is violated although some researchers have reckoned that normal theory estimation methods such as generalized least square (GLS) is often found to be less sensitive to non-normality (Schumacker & Lomax, 1996: 27, 105). Generally speaking, when the normality assumption is violated, normal theory maximum likelihood (ML) and GLS produce χ^2 values which are too large especially when sample size is small. Also, standard errors as well as some fit indices such as the Tucker-Lewis index (TLI) and the comparative fit index (CFI) are also underestimated (West *et al.*, 1995: 62-63). In order to deal with the problem, Browne's (1984) asymptotic distribution free (ADF) method which does not rest on the normality assumption is frequently used. However, this estimation method usually requires a sample size of at least 1,000 for simple models and around 5,000 for complex models in order to provide unbiased estimates (West *et al.*, 1995: 68). Fortunately, with the availability of modern

computing facilities, bootstrapping (Efron & Tibshirani, 1986) serves as an effective remedy. Empirical sampling distributions taken from bootstrap samples can often be reasonably approximated based on a single sample. Thus, by taking a large number of bootstrap samples from the original sample, the mean and variance of the empirical bootstrap sampling distribution can be determined (West *et al.*, 1995: 66). Furthermore, according to West *et al.* (1995) and Hu and Bentler (1995) quoting from Amemiya and Anderson (1990), Browne and Shapiro (1988), and Satorra and Bentler (1990, 1991), normal theory maximum likelihood (ML) or GLS can possibly correctly describe and evaluate a model with non-normally distributed variables. Therefore, in the following and subsequent sections where CFA or SEM was conducted, models would be estimated using ML and bootstrap parameter estimates were provided for comparisons.

4.7.2. Confirmatory factor analysis of a 6-factor CCV Model

To perform a CFA on the six variables as measures of Chinese cultural values common to the respondents in the three regions, the measurement model as presented in figure 4.2. was used. Common Chinese cultural values (COCCV) is the latent variable which can be explained by the six manifest variables namely, abasement (ABASE), adpativeness (ADAPT), harmony with people (HARPE), harmony with the universe (HARUN), interdependence (INTDP), and continuity/respect for authority (RESPC). Each manifest variable is associated with a measurement error (e12 to e17). Conventionally, certain parameters are fixed at unity to allow for model identification.

Figure 4.2. Measurement model of six-factor Chinese cultural value model.



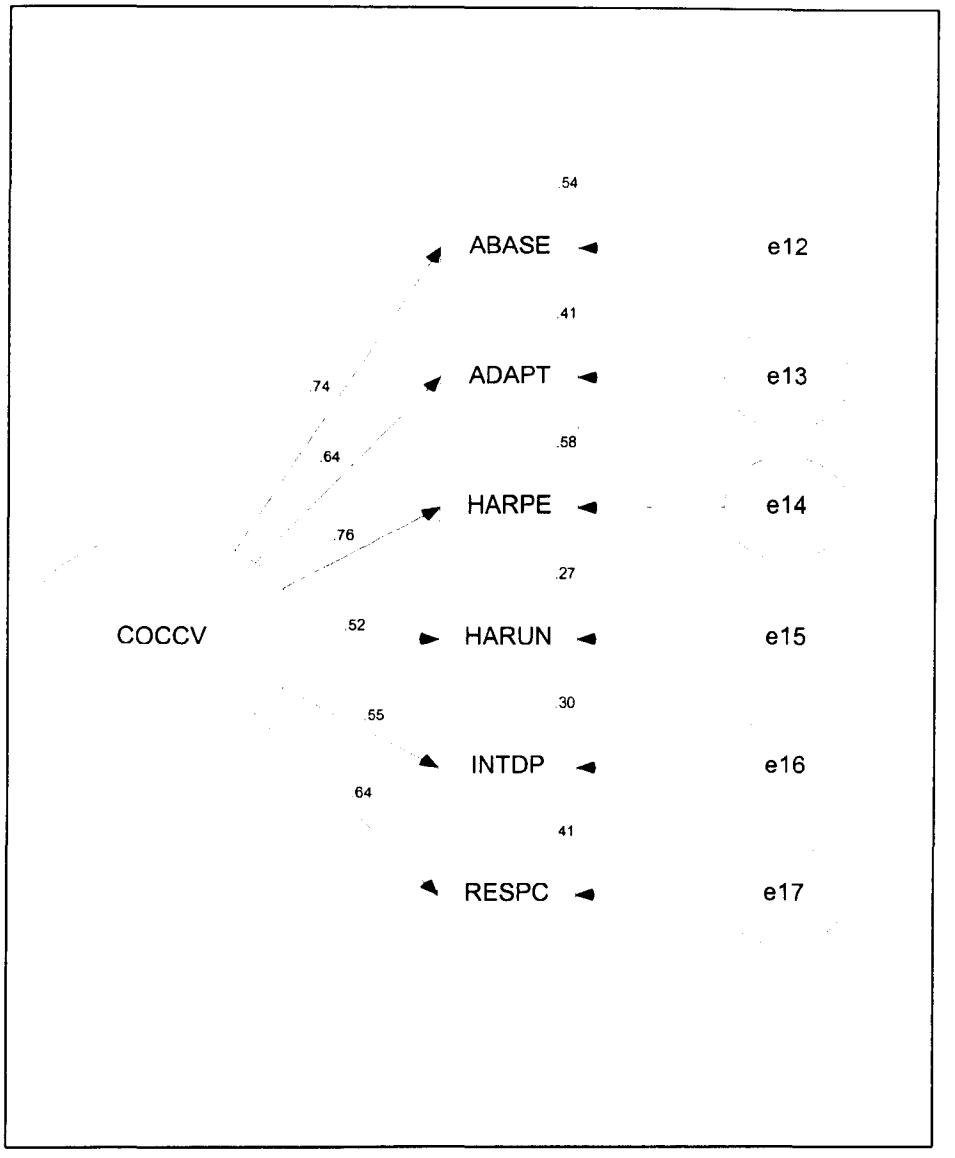
Using ML in minimizing the discrepancy function, the model was not rejected at the 0.05 level [$\chi^2(9, N = 193) = 16.319$, $p = 0.061$]. Also, all regression weights were significant at 0.05 (critical ratios larger than 1.96). Model fit was represented by a goodness-of-fit index (GFI) of 0.973, an adjusted goodness-of-fit index of (AGFI) 0.938, and root mean residual (RMR) of 0.000. Other fit indices such as comparative fit index (CFI) and root mean square error of approximation (RMSEA) showed 0.977 and 0.065 respectively. Overall speaking, the model had an excellent fit. All square multiple correlations were reasonably indicating high construct validity (ABASE: 0.542, ADAPT: 0.410, HARPE: 0.577, HARUN: 0.272, INTDP: 0.304, RESPC: 0.409). The standardized regression weights (figures near arrows from latent to manifest variables) and square multiple

correlations (figures near manifest variables) are depicted in the output model in figure 4.3. The unstandardized regression weights and variances as well as those obtained from 1,000 bootstrap samples are carried in table 4.35.

Table 4.35. Unstandardized output of six-factor Chinese cultural value model.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
ABASE ← COCCV	1.000			1.000		
ADAPT ← COCCV	1.005	0.127	7.921	1.011	0.143	7.069
HARPE ← COCCV	0.888	0.097	9.149	0.886	0.090	9.844
HARUN ← COCCV	1.287	0.198	6.508	1.290	0.214	6.028
INTDP ← COCCV	0.762	0.111	6.864	0.764	0.126	6.063
RESPC ← COCCV	1.468	0.185	7.912	1.477	0.197	7.497
COCCV	0.001	0.000	5.415	0.001	0.000	5.415
e12	0.001	0.000	7.268	0.001	0.000	7.268
e13	0.002	0.000	8.329	0.002	0.000	8.329
e14	0.001	0.000	6.884	0.001	0.000	6.884
e15	0.006	0.001	9.017	0.006	0.001	9.017
e16	0.002	0.000	8.885	0.002	0.000	8.885
e17	0.005	0.001	8.335	0.004	0.001	4.000

Figure 4.3. Standardized output of six-factor Chinese cultural value model.



4.8. Hypotheses Testing (Chinese Cultural Values)

In this section, some hypotheses regarding the effect of region, industry size, and industry type on the Chinese cultural value survey as raised earlier were tested. First of all, the descriptive statistics of the six variables after transformation by region, industry size, and industry type are provided in table 4.36.

Table 4.36. Descriptive statistics of six Chinese cultural values by different categories.

Chinese cultural values	Category	Mean	Standard deviation	Skewness	Kurtosis	KS (Lilliefors)	df and N	p-value
ABASE	Hong Kong	1.3899	0.0572	-1.5574	6.2973	0.1258	38	0.1344
	Taiwan	1.3891	0.0506	-0.4989	0.6276	0.0970	43	0.0309
	China	1.3718	0.0539	-0.4263	-0.5836	0.0710	56	>0.2000
	Large	1.3827	0.0529	-0.9935	1.7283	0.0745	122	0.0928
	Small	1.3866	0.0516	-0.0433	-0.4088	0.1028	65	0.0850
	Manufac -turing	1.3852	0.0532	-0.7647	1.1743	0.0697	165	0.0485
	Service	1.3754	0.0460	0.1116	0.6972	0.1757	22	0.0755
ADAPT	Hong Kong	1.3359	0.0683	-0.9430	1.7112	0.1003	38	>0.2000
	Taiwan	1.3624	0.0580	-0.2323	0.1335	0.0763	43	>0.2000
	China	1.3451	0.0548	-0.7596	1.0448	0.0729	56	>0.2000
	Large	1.3546	0.0569	-0.6533	1.3987	0.0800	122	0.0530
	Small	1.3466	0.0657	-0.4432	0.7132	0.0948	65	>0.2000
	Manufac -turing	1.3557	0.0571	-0.5063	1.0147	0.0720	165	0.0363
	Service	1.3229	0.0738	-0.4688	0.7475	0.1278	22	>0.2000
HARPE	Hong Kong	1.4585	0.0509	-1.6674	5.7861	0.0928	38	>0.2000
	Taiwan	1.4662	0.0444	-0.2811	0.3036	0.1017	43	0.0104
	China	1.4583	0.0411	-0.0007	-0.5964	0.1072	56	0.1648
	Large	1.4644	0.0438	-0.9645	3.8759	0.0879	122	0.0218
	Small	1.4583	0.0468	-0.0254	-0.7896	0.1326	65	0.0063
	Manufac -turing	1.4646	0.0442	-0.7017	2.5046	0.1082	165	0.0001
	Service	1.4448	0.0463	0.0435	-1.0638	0.1167	22	>0.2000
HARUN	Hong Kong	1.0698	0.0975	-0.3894	-0.2918	0.0925	38	>0.2000
	Taiwan	1.0923	0.0890	-0.8160	0.7057	0.0683	43	>0.2000
	China	1.0575	0.1001	-1.0800	2.5624	0.0808	56	>0.2000
	Large	1.0759	0.0909	-0.8131	0.7062	0.0721	122	0.1855
	Small	1.0800	0.1028	-0.8661	1.7813	0.0724	65	>0.2000
	Manufac -turing	1.0815	0.0901	-0.9000	1.6601	0.0729	165	0.0323
	Service	1.0461	0.1235	-0.2536	-0.4722	0.9659	22	0.6040
INTDP	Hong Kong	1.3367	0.0432	-0.7580	-0.2720	0.1051	38	>0.2000
	Taiwan	1.3391	0.0559	-0.4674	0.2338	0.0914	43	0.0533
	China	1.3418	0.0525	-0.2483	-0.2413	0.0845	56	>0.2000
	Large	1.3416	0.0506	-0.1084	-0.3146	0.0674	122	>0.2000
	Small	1.3354	0.0555	-0.6729	0.5430	0.0683	65	>0.2000
	Manufac -turing	1.3392	0.0522	-0.4000	0.1900	0.0647	165	0.0882
	Service	1.3410	0.0541	0.0006	-0.2747	0.1021	22	>0.2000
RESPC	Hong Kong	1.1622	0.0932	-0.6409	0.8110	0.0682	38	>0.2000
	Taiwan	1.2018	0.0772	-0.3661	0.7324	0.0715	43	>0.2000
	China	1.1561	0.0921	-0.0537	-0.6477	0.1257	56	0.0278
	Large	1.1807	0.0873	-0.3764	0.3320	0.0783	122	0.0634
	Small	1.1789	0.0885	-0.4846	0.0742	0.0630	65	>0.2000
	Manufac -turing	1.1855	0.0864	-0.4501	0.3748	0.0706	165	0.0432
	Service	1.1393	0.0870	-0.2182	-0.3040	0.1148	22	>0.2000

H4: There is no significant difference among the CCV survey scores of the three regions.

To test the above hypothesis, a MANOVA design was employed. The six Chinese cultural values represented the six dependent variables and region was the independent effect variable. Univariate homogeneity was well fulfilled at 0.05 in the six variables. However, the Box's M test indicated a significant p-value (0.010). Thus the determinants were assessed. The logarithm of the largest determinant (-35.77025) was found to be associated with group C (China) which was the largest group of the three. Thus the MANOVA was assessed using a lower alpha level of say, 0.03 or 0.01. At the 0.01 level, the hypothesis was not to be accepted ($p = 0.008$).

This hypothesis warrants some explanations here. In fact, H4 was believed to be untenable because the three regions Hong Kong, Taiwan, and China, though Chinese dominated, do possess great differences in socio-political backgrounds. These differences lead to different manifestations of the underlying Chinese values as already argued earlier. Therefore, expecting the people in the three regions to possess the same degree of "Chinese-ness" is not reasonable. The result of the hypothesis testing supported the proposition that the respondents in Hong Kong, Taiwan, and mainland China do possess differences in their degree of "Chinese-ness" due to different social and political settings but some core underlying Chinese values are shared by them.

Table 4.37. Homogeneity and MANOVA results of H4.

Items for H4	Bartlett-Box F (2, 61,543) /Univariate F (2, 190)	p-value	Box's M	Box's M χ^2 (42)	p-value	Wilks' λ	Wilks' λ F (12, 370)	p-value
ABASE	0.07778 /2.44041	0.925 /0.090						
ADAPT	1.31068 /3.87982	0.270 /0.022						
HARPE	1.10398 /1.06751	0.332 /0.346						
HARUN	0.43905 /2.76544	0.645 /0.065						
INTDP	0.71671 /0.37680	0.488 /0.687						
RESPC	1.47058 /7.61384	0.230 /0.001						
			69.97143	66.38531	0.010	0.86615	2.29689	0.008

H5: There is no significant difference between the CCV survey scores of the two industry sizes.

H6: There is no significant difference between the CCV survey scores of the two industry types.

The idea of posing H5 and also H6 was mainly to validate the underlying nature of the Chinese cultural values. Assuming the "terminal" feature (Rokeach, 1973) of these cultural values, they should not be affected seriously by the size and nature of the respondents' workplace. Results in tables 4.38. and 4.39. showed that univariate homogeneity was mostly well met at 0.05. In the case of H6, multivariate homogeneity was violated and the determinants were thus checked. The logarithm of the largest determinant (-35.32811) was found to be with group M (manufacturing) which was the larger group. As such, H6 was assessed using a somewhat lower alpha level of 0.01. Finally, as both H5 and H6 were not rejected, the underlying terminal nature of the six Chinese cultural values was validated.

Table 4.38. Homogeneity and MANOVA results of H5.

Items for H4	Bartlett-Box F (1, 79,026)	p-value	Box's M	Box's M χ^2 (21)	p-value	Wilks' λ	Wilks' λ F (6, 180)	p-value
ABASE	0.05426	0.816						
ADAPT	1.79446	0.181						
HARPE	0.37369	0.541						
HARUN	1.29730	0.255						
INTDP	0.73122	0.393						
RESPC	0.01402	0.906						
			28.40887	27.29613	0.161	0.98064	0.59223	0.736

Table 4.39. Homogeneity and MANOVA results of H6.

Items for H4	Bartlett-Box F (1, 11,587)	p-value	Box's M	Box's M χ^2 (21)	p-value	Wilks' λ	Wilks' λ F (6, 185)	p-value
ABASE	0.60930	0.435						
ADAPT	2.80256	0.094						
HARPE	0.10757	0.743						
HARUN	4.43384	0.035						
INTDP	0.02908	0.865						
RESPC	0.00195	0.965						
			51.90165	46.59248	0.001	0.93712	2.06896	0.059

4.9. Structural Equation Models

In this section, the hypothesized model explaining the inter-relationships among Chinese cultural values (COCCV), quality climate (QC), quality processes (QP), quality methods (QM), and quality results (QR) were tested using SEM techniques. However, before putting all variables together and testing the final model, it is often a good practice to test each of the measurement model of each latent variable first (Jöreskog, 1993; Schumacker & Lomax, 1997). Each of the four quality variables' measurement models was estimated in the following sections. Then the six-factor COCCV model was again re-confirmed. Finally, the entire structural equation model incorporating COCCV, QC, QP, QM, and QR was estimated. All data used in this section were from sub-sample 2 consisting of 192 observations. Before proceeding, the following table shows some descriptive statistics of the 18 variables.

Table 4.40. Descriptive statistics of 16 variables.

Note: * denotes after transformation taking natural logarithm, † denotes after taking square root.

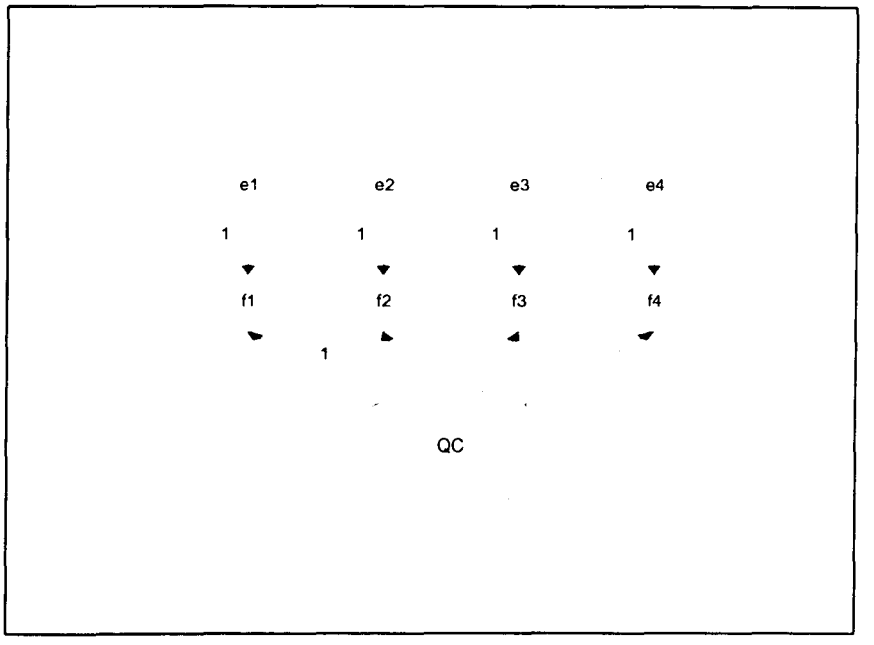
Variable	Mean	Standard deviation	Skewness	Kurtosis	KS (Lilliefors) (192 df)	p-value of KS
ABASE	24.4115	2.8029	-0.1683	-0.3738	0.0679	0.0313
ABASE†	4.9325	0.2865	-0.3113	-0.2446	0.0579	>0.2000
ADAPT	23.0417	2.7455	-0.0593	0.1292	0.1050	0.0000
ADAPT*	1.3594	0.0530	-0.5026	1.0320	0.0811	0.0037
HARPE	29.1615	2.8870	-0.2012	0.0119	0.0640	0.0538
HARPE†	5.3934	0.2698	-0.3533	0.1818	0.0560	>0.2000
HARUN	12.4740	2.4214	0.0277	-0.5270	0.0880	0.0010
HARUN*	1.0875	0.0875	-0.4255	-0.2409	0.0611	0.0780
INTDP	22.4635	2.6760	-0.2557	0.2165	0.0820	0.0031
INTDP*	1.3483	0.0536	-0.6662	0.7864	0.0624	0.0664
RESCP	15.0990	2.9544	-0.3303	-0.2726	0.0716	0.0179
RESCP†	3.8659	0.3936	-0.6356	0.5231	0.0650	0.0466
f1	54.8750	8.4899	-0.6433	0.7730	0.0475	>0.2000
f2	31.6979	5.0715	-0.6254	0.6843	0.0596	0.0940
f3	32.6771	4.3846	-0.5334	0.4492	0.0499	>0.2000
f4	17.0677	3.3080	-0.2259	0.5890	0.0797	0.0047
f4†	4.1104	0.4166	-0.7842	2.7096	0.0576	>0.2000
f5	67.5208	11.3483	-0.7470	1.1604	0.0612	0.0774
f6	53.2188	9.0063	-0.5455	0.7195	0.0450	>0.2000
f7	17.1927	3.4911	-0.3957	0.6333	0.0544	>0.2000
f8	8.2292	2.0311	-0.4256	0.3135	0.0875	0.0011
f9	26.5260	4.7048	-0.6907	1.1121	0.0583	>0.2000
f10	16.7760	3.2995	-0.5982	1.4511	0.0653	0.04500

As seen in table 4.40., all COCCV variables were not normally distributed. After data transformation by taking either the square root or the natural logarithm, normality improved substantially except ADAPT which did not respond to any of the four common data transformation methods. Concerning the TQM survey variables, all demonstrated acceptable normality except f8 which did not improve upon data transformation. As stated earlier, the ML estimation method would be used and 1,000 bootstrap samples would be taken in order obtain robust estimates of standard errors so as to deal with the impact of non-normality.

4.9.1. Measurement Model of QC

The measurement model for QC is depicted in figure 4.4. The latent variable quality climate (QC) is explained by four manifest variables namely employee commitment (f1), communication (f2), unity of purpose (f3), and leader commitment (f4). Each manifest variable is associated with a measurement error (e1 to e4). As usual, certain regression paths are set at unity in order to allow for model identification.

Figure 4.4. Measurement model of QC.



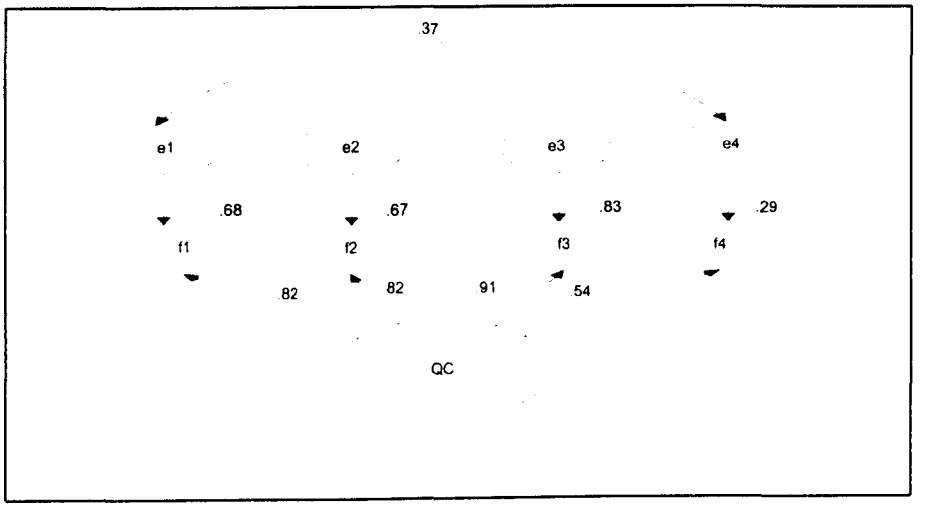
Using ML estimation, the model was not accepted at any alpha level [$\chi^2(2, N = 192) = 20.951$, $p = 0.000$]. However, there appeared to be room for improvement. The modification indices as calculated suggested a strong covariation between e1 and e4. Considering the meanings of f1 and f4 which are "employee commitment" and "leader commitment" respectively, the suggested covariation between e1 and e4 is nonetheless conceptually admissible since an unmodeled common cause of variation appeared to exist. Thus, e1 and e4 were

allowed to covary and the model re-estimated. An excellent fit was obtained after the modification [$\chi^2(1, N = 192) = 1.013$, $p = 0.314$; GFI = 0.997, AGFI = 0.974, RMR = 0.027]. All regression paths were in their intended directions and were significant at the alpha level of 0.05. They are carried in table 4.41. Figure 4.5. shows the standardized output of the model. All square multiple correlations (SMC) were satisfactory (f1: 0.680, f2: 0.671, f3: 0.831, and f4: 0.287) indicating high construct validity.

Table 4.41. Unstandardized output of measurement model of QC.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
f1 ← QC	1.000			1.000		
f2 ← QC	0.593	0.046	12.856	0.595	0.046	12.935
f3 ← QC	0.571	0.041	13.799	0.574	0.042	13.667
f4 ← QC	0.032	0.004	8.815	0.032	0.004	8.000
QC	49.009	7.361	6.658	48.846	7.228	6.758
e1	23.069	3.305	6.980	22.759	3.266	6.968
e2	8.460	1.188	7.122	8.361	1.168	7.158
e3	3.243	0.823	3.940	3.161	0.806	3.922
e4	0.124	0.013	9.202	0.123	0.013	9.462
e1 ↔ e4	0.632	0.161	3.926	0.623	0.160	3.894

Figure 4.5. Standardized output of measurement model of QC.



4.9.2. Measurement Model of QP

A similar approach was followed to test the measurement model of quality processes (QP). The measurement model is depicted in figure 4.6. There are two manifest variables namely organizational planning and evaluation (f5), and employee training and evaluation (f6), each associated with a measurement error (e5 and e6). A model of this kind with one latent and two manifest variables is under-identified. That is to say, degree of freedom is negative because the number of parameters to be estimated exceeds the number of free parameters. There is no way to estimate any parameters for an under-identified model unless at least one constraint is imposed to make it just identified with zero degrees of freedom. Therefore, in order to proceed, the two measurement errors e5 and e6 were fixed to have the same weight denoted by "a" in figure 4.6.

Although it is impossible to conduct the usual hypothesis testing with an under-identified model, one can still assess whether the regression paths are in their intended directions and significant or not. As shown in table 4.42., the regression path from QP to f6 was in its intended direction and significant at the 0.05 level. High SMCs were obtained (f5: 0.937 and f6: 0.899). The standardized output of the model is shown in figure 4.7.

Figure 4.6. Measurement model of QP.

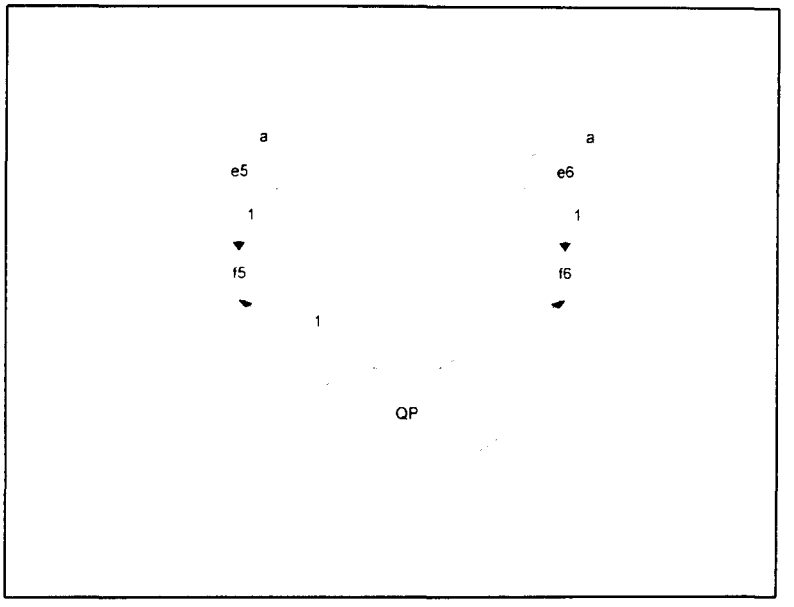
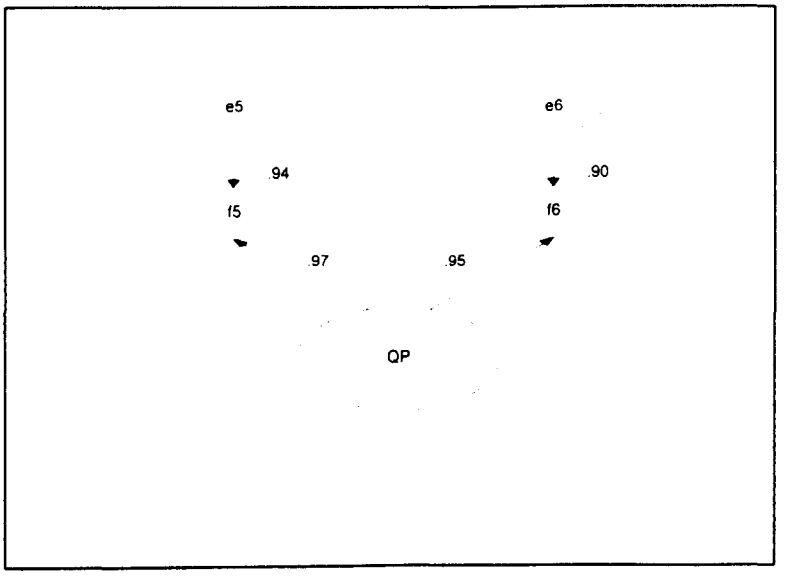


Table 4.42. Unstandardized output of measurement model of QP.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
f5 ← QP	1.000			1.000		
f6 ← QP	0.778	0.024	31.927	0.778	0.024	32.417
QP	120.613	13.185	9.148	120.035	13.299	9.026
e5	8.172	0.836	9.772	8.058	0.808	9.973
e6	8.172	0.836	9.772	8.058	0.808	9.973

Figure 4.7. Standardized output of measurement model of QP.



4.9.3. Measurement Model of QM

The measurement model for quality methods (QM) is depicted in figure 4.8. The latent construct QM is explained by two manifest variables namely, scientific approach (f7) and teamwork and involvement (f8), each associated with a measurement error (e7 and e8). Again, this model was under-identified and therefore the measurement errors of e7 and e8 were fixed equal at "a" and only the regression weights and the variances could be assessed. As seen in table 4.43., the regression path from QM to f9 was in the intended direction and was significant at the 0.05 level. The standardized output of the model is shown in figure 4.9. The SMCs were satisfactory (f7: 0.881 and f8: 0.648).

Figure 4.8. Measurement model of QM.

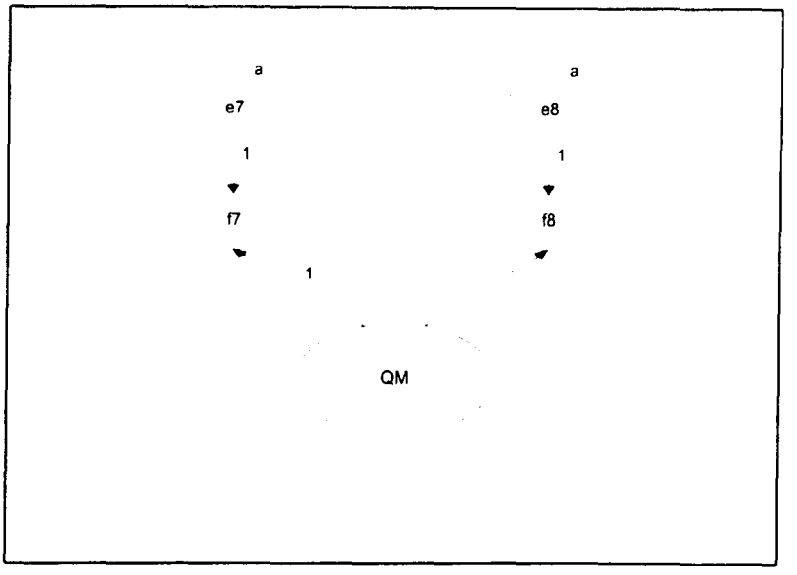
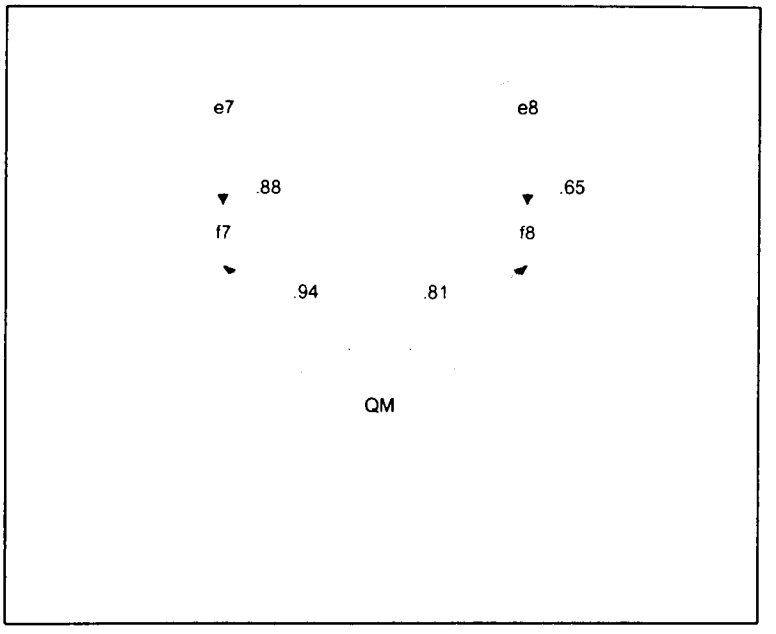


Table 4.43. Unstandardized output of measurement model of QM.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
f7 ← QM	1.000			1.000		
f8 ← QM	0.499	0.031	15.949	0.500	0.031	16.129
QM	10.737	1.252	8.573	10.683	1.230	8.685
e7	1.451	0.148	9.772	1.430	0.142	10.071
e8	1.451	0.148	9.772	1.430	0.142	10.071

Figure 4.9. Standardized output of measurement model of QM.



4.9.4. Measurement Model of QR

The measurement model for quality methods (QR) is depicted in figure 4.10. The latent construct QR is explained by two manifest variables namely, customer satisfaction (f9) and workplace kaizen (f10), each associated with a measurement error (e9 and e10). Again, this model was under-identified. Therefore, in order to proceed, the two measurement errors e9 and e10 were fixed to have the same weight denoted by "a" in figure 4.10.

As shown in table 4.44., the regression path from QR to f10 was in the intended direction and was significant at the 0.05 level. The standardized output in figure 4.11. shows highly satisfactory SMCs (f9: 0.816 and f10: 0.625).

Figure 4.10. Measurement model of QR.

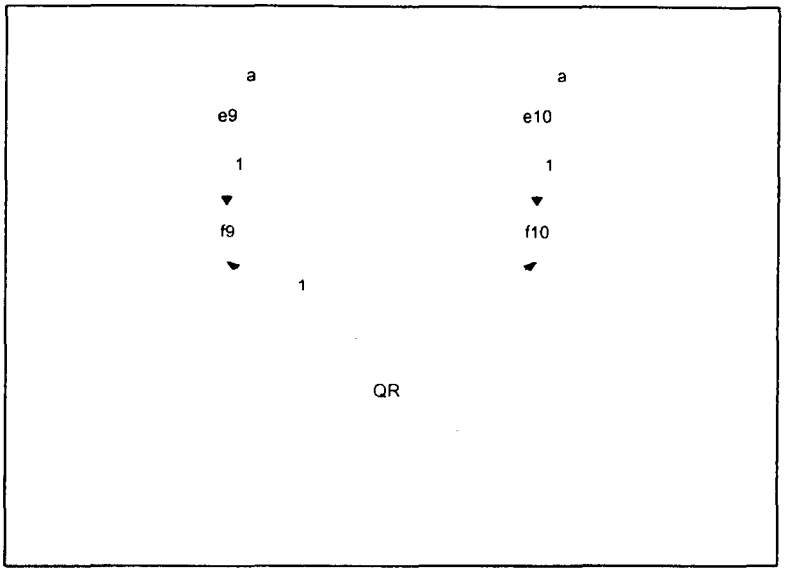
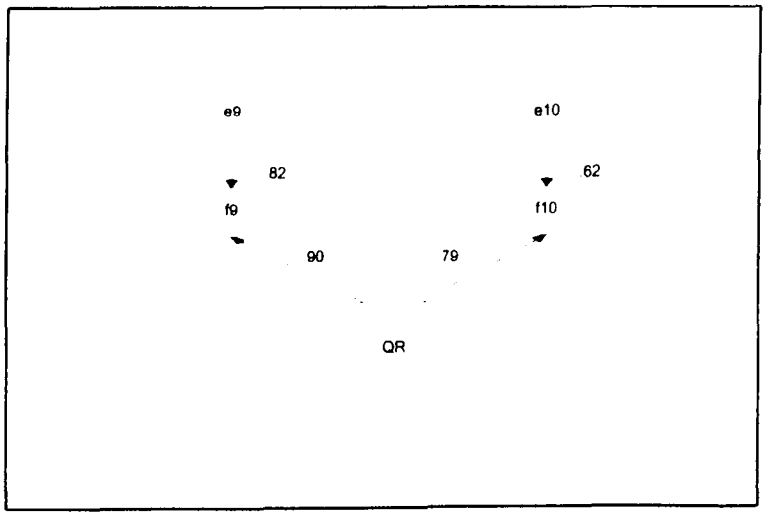


Table 4.44. Unstandardized output of measurement model of QR.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
f9 ← QR	1.000			1.000		
f10 ← QR	0.614	0.044	14.088	0.615	0.043	14.303
QR	18.052	2.282	7.909	17.971	2.232	8.052
e9	4.084	0.418	9.772	4.025	0.400	10.063
e10	4.084	0.418	9.772	4.025	0.400	10.063

Figure 4.11. Standardized output of measurement model of QR.



4.9.5. Measurement Model of COCCV

In this section, the six-factor common Chinese cultural values (COCCV) model previously estimated using sub-sample 1 was tested again using sub-sample 2. Using ML in minimizing the discrepancy function, the model was not to be rejected at the 0.01 level [$\chi^2(9, N = 192) = 21.366$, $p = 0.011$]. Although the various fit indices indicated acceptable fit (GFI = 0.966, AGFI = 0.920, and RMR = 0.003), there appeared to be room for improvement.

A modification index suggested to allow e14 (error of HARPE) and e17 (error of RESPC) to covary freely. In fact, this modification was already suggested when the model was first tested using sub-sample 1. However, no modifications were made at that time as the model was not rejected at the 0.05 level.

In the present instance, this modification was made based on two main reasons. Firstly, according to table 4.30. when the CCV items were firstly classified into factors, a separate factor of "face" was not included although three items did load on the dimension of "face" as in Yau's original research. Secondly, as explained earlier in the literature review, according to the findings of Chu (1967), Hiniker (1969), and Yang (1970, 1986), the typical Chinese takes the policy to behave like a subordinate and to treat others as an authority when the real authority in a role relationship is unclear. This policy is believed to maintain harmony through giving face mutually. As Gabrenya and Hwang (1996) have stated, the avoidance of hurting another's face is essential in social interactions. Thus, there is a reason to believe that an interaction of the measurement errors, especially those of HARPE and RESPC may constitute the dimension of face

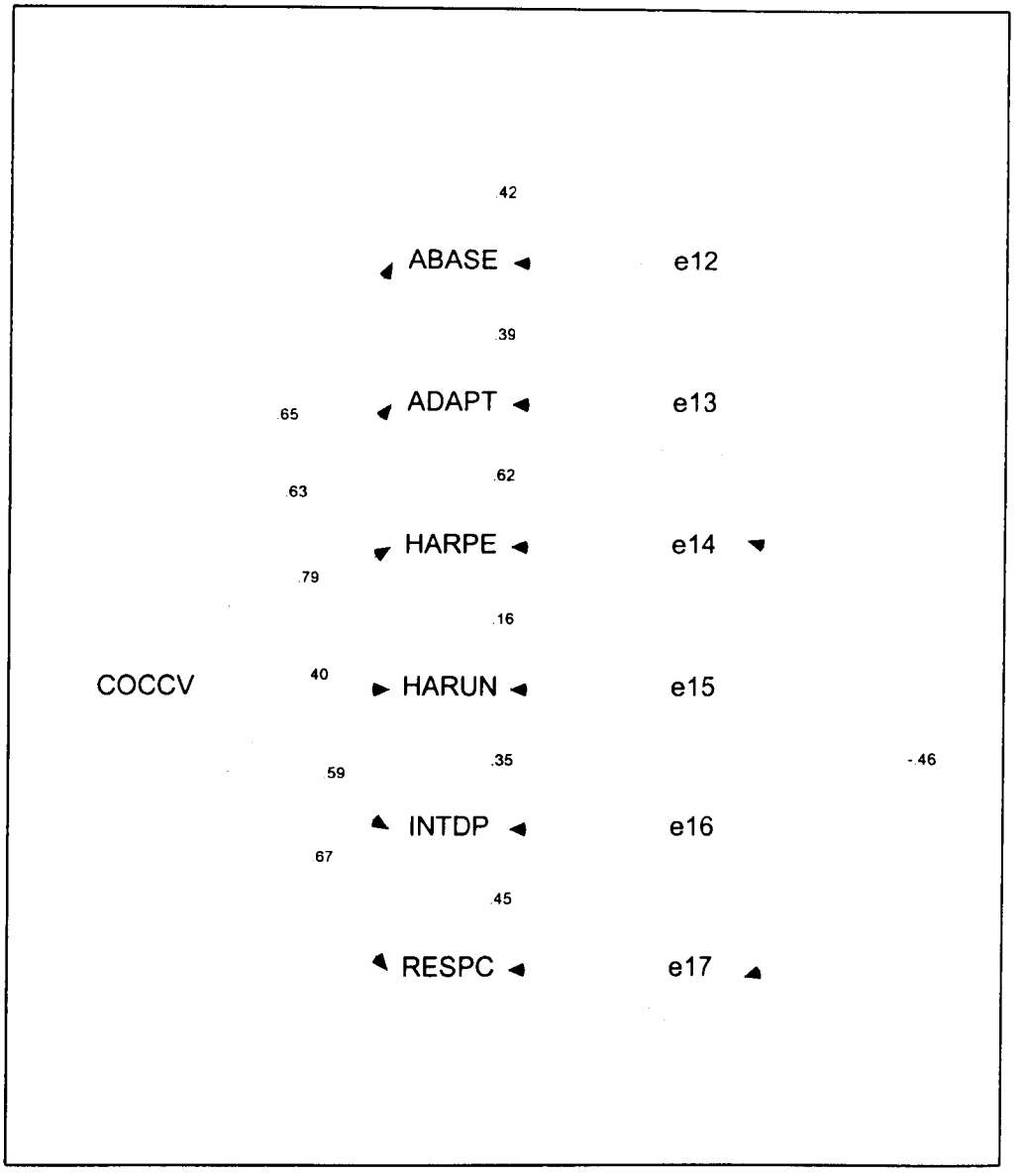
which was not directly measured in the model. Allowing e14 and e17 to covary is nonetheless not unreasonable.

After modification, the model was not rejected at the 0.05 level [$\chi^2(8, N = 192) = 6.817$, $p = 0.557$]. All regression weights were significant at the 0.05 level. SMCs of the six variables ABASE, ADAPT, HARPE, HARUN, INTDP, and RESPC, and SINCE were 0.420, 0.392, 0.617, 0.159, 0.352, and 0.449 respectively. An excellent model fit was achieved (GFI = 0.988, AGFI = 0.969, and RMR = 0.001). The unstandardized regression weights and variances are carried in table 4.45. and the standardized output of the model is shown in figure 4.12.

Table 4.45. Unstandardized output of measurement model of COCCV.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
ABASE ← COCCV	1.000			1.000		
ADAPT ← COCCV	0.179	0.024	7.392	0.179	0.025	7.160
HARPE ← COCCV	1.141	0.146	7.802	1.143	0.151	7.569
HARUN ← COCCV	0.189	0.038	4.950	0.189	0.041	4.609
INTDP ← COCCV	0.172	0.024	7.063	0.172	0.024	7.167
RESPC ← COCCV	1.420	0.206	6.883	1.435	0.207	6.932
COCCV	0.034	0.007	4.629	0.035	0.008	4.375
e12	0.048	0.006	8.366	0.047	0.006	7.833
e13	0.002	0.000	8.551	0.002	0.000	8.551
e14	0.028	0.005	5.333	0.027	0.005	5.400
e15	0.006	0.001	9.469	0.006	0.001	9.469
e16	0.002	0.000	8.780	0.002	0.000	8.780
e17	0.085	0.012	6.933	0.084	0.012	7.000
e17 ↔ e14	-0.023	0.006	-3.894	-0.023	0.006	-3.833

Figure 4.12. Standardized output of measurement model of COCCV.



4.9.6. Hypothesized Model 1

In this section, the hypothesized model of Chinese cultural values affecting a four-variable quality management framework was tested. The theoretical propositions were developed in Chapters II and III and are restated as follows.

Proposition 1: The super-ordinate (national) cultural value system has an influence on the sub-value system (the organization) creating an organizational climate towards quality improvement (quality climate).

Proposition 2: The quality climate in turn determines or directs the processes of quality management (quality processes).

Proposition 3: The quality processes thus derived will lead to the implementation of certain specific quality activities (quality methods).

Proposition 4: The quality methods thus used will lead to consequences (quality results) to be enjoyed or suffered by the members of the organization.

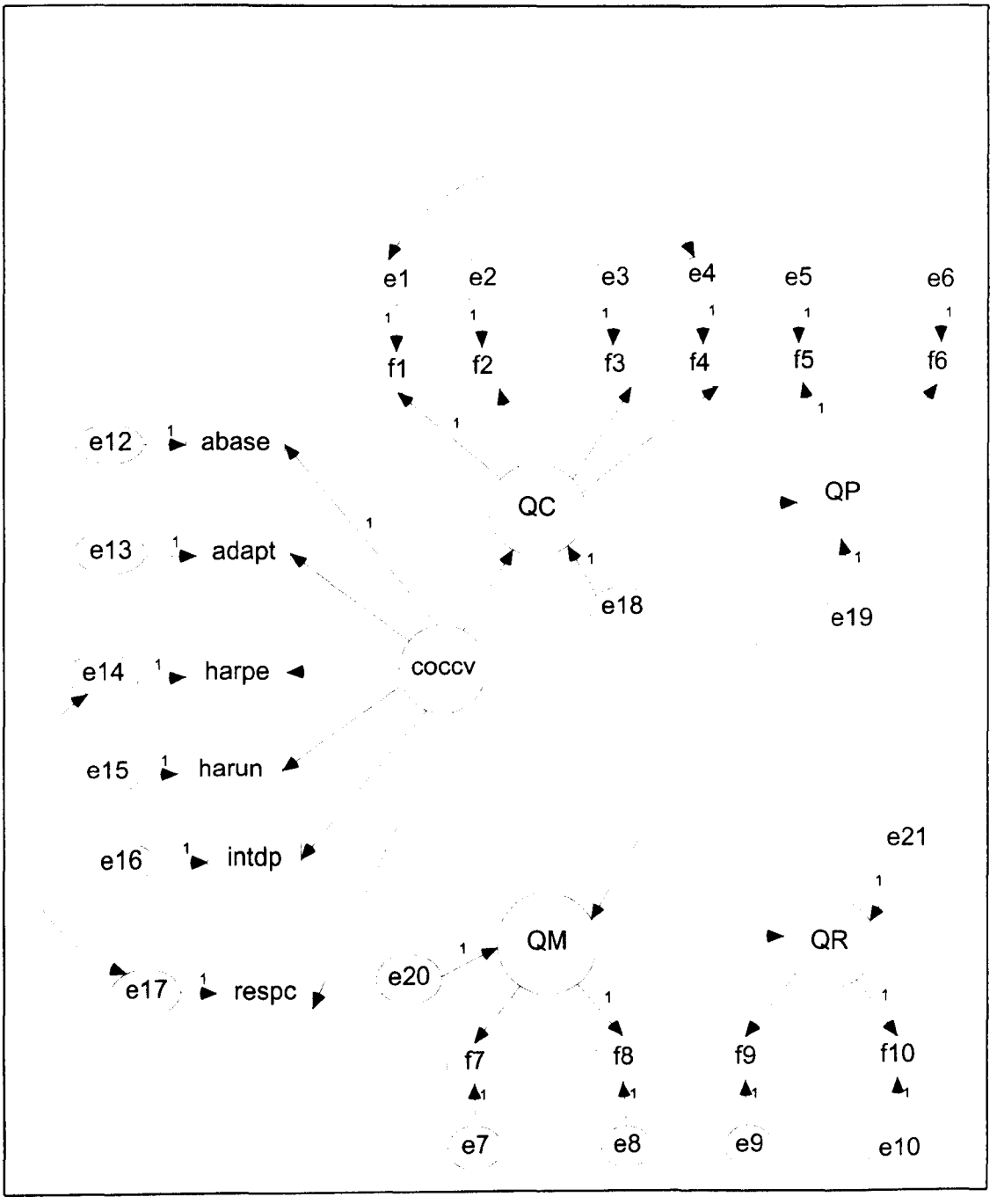
These propositions can now be operationalized into testable hypotheses (H7, H8, H9, and H10) through devising a structural equation model. Before testing the entire hypothesized model, a brief review of its components is given here. Figure 4.13. shows the hypothesized model. For convenience, this model was denoted as model 1 since an alternative model would be tested and compared in subsequent sections. The constituents of model 1 are firstly reviewed. COCCV is a latent variable representing the common Chinese cultural values pertaining to the samples in the three Chinese regions namely Hong Kong, Taiwan, and mainland China. It is measured by six observable or manifest variables namely abasement (ABASE), adaptiveness (ADAPT), harmony with people (HARPE), harmony with the universe (HARUN), interdependence (INTDP), and continuity/respect for authority (RESPC). This six-factor model was validated by CFA twice using sub-samples 1 and 2 and was deemed to be a satisfactory representation of Chinese cultural values. The measurement errors e14 and e17 were allowed to covary based on the model modification made earlier.

The other major part of model 1 is the four-variable quality management framework which was adapted from the US Department of Defense (DoD, 1990). It has four main components namely, quality climate (QC), quality processes (QP), quality methods (QM), and quality results (QR), each being treated as a

latent construct. Manifest variables for each of them have been identified through factor analyses. They include employee commitment (f1), communication (f2), unity of purpose (f3), leader commitment (f4) for QC; organizational planning and evaluation (f5), and employee training and evaluation (f6) for QP; scientific approach (f7) and teamwork and involvement (f8) for QM; and customer satisfaction (f9) and workplace kaizen (f10) for QR. The four-variable quality management framework follows an input (QC)-process (QP and QM)-output (QR) logic which is in line with the definition of quality by Shuster (1990) as stated in Chapter II. Each of the four components of the framework has been validated by CFA in the previous sections. The measurement errors e1 and e4 were allowed to covary as in the earlier CFA model.

The regression path between COCCV and QC represents the impact of Chinese cultural values on the companies' organizational climate. As stated in Chapter II, cultural values at the macro level are exemplified at the micro level in terms of organizational climate. This in turns influences the processes and results of the organization. In other words, QC acts as an intermediary between COCCV and the other quality variables namely, QP, QM, and QR. Model 1 was tested using the ML estimation method. To deal with non-normality of the data, 1,000 bootstrap samples were generated in order to obtain robust parameter estimates.

Figure 4.13. Hypothesized model 1.



Firstly, based on ML estimation, the model was not accepted [$\chi^2(98, N = 192) = 171.853$, $p = 0.001$]. Although all regression paths were in their intended directions and were significant at the 0.05 level, the various fit indices indicated that the model fit was just acceptable and there existed room for improvement (GFI = 0.901, AGFI = 0.862, RMR = 0.630). In fact, the χ^2 hypothesis testing technique tends to be affected by many factors such as sample size and model complexity (Cochran, 1952; Gulliksen & Tukey, 1958; Jöreskog, 1969; Bentler & Bonnet, 1980; Browne & Mels, 1992). As stated by Kaplan (1995: 101), models never fit data perfectly and will always contain specification errors which are often magnified by larger sample sizes and masked by smaller sample sizes.

Assuming that a model is correctly specified, the Hoelter's critical N (Hoelter, 1983 in Arbuckle, 1997) often helps to assess the largest sample size for which one would accept the null hypothesis that the model is correct. The Hoelter test in the present instance indicated that the model would be rejected at the 0.05 level when sample size reaches 136. Thus, given that all regression paths and variances were found to be statistically significant in their intended directions, there were not sufficient reasons to judge the model to be wrong. Rather, it would probably be necessary to introduce some modifications to the model in order to further specify some important relationships.

After considering the various modification indices, four pairs of measurement errors were allowed to covary. According to Hoyle and Panter (1995: 172), post-hoc modifications involving the correlation of measurement errors are frequently problematic and undesirable unless plausible explanations can be offered to support such relationships. With this in mind, and to reduce

improving the model fit by capitalizing on chance (MacCallum *et al.*, 1992), only four pairs of disturbance terms were modified to correlate based on available theoretical support.

Non-directional relations are often allowed in measurement errors of parallel indicators when there are common causes not taken into account by the structural model (Markel & Frone, 1998: 282). Thus, allowing e19 and e21 to covary as autocorrelated residuals appear reasonable since QP and QR have obvious "evaluative" and "result" natures respectively. Then, two modifications were made to reduce the biases due to demographic factors on the employees' commitment (f1) in teamwork (f8) and participation in scientific methods (f7). According to the literature review provided by Hui and Tan (1996), individual characteristics such as age and tenure, level of education, gender, and marital status (S.R. Chen & Huang, 1982; K.H. Cheng, 1980; Chuang *et al.*, 1990; Hsu, 1977; Huang, 1986; Li & Lu, 1982; Su & Huang, 1992; Shen *et al.*, 1989; Z.M. Wang, 1992) can exert considerable influences on the work attitudes of Chinese employees. Thus, e1 was allowed to covary with e7 and e8 in order to control the effect of this unmodeled common influence. Finally, the disturbance terms for f3 (unity of purpose) and f5 (organizational planning and evaluation) were allowed to covary given the possible unmodeled common cause of external environmental factors influencing the process of objective setting and planning in organizations (Ansoff, 1965; Steiner, 1979).

After modifying the model, it was tested again using ML. The χ^2 has reduced slightly [$\chi^2(94, N = 192) = 142.326, p = 0.001$]. All regression paths were in their intended directions and were significant at the 0.05 level. The various fit

indices indicated that the model fit has improved after the modifications (GFI = 0.915, AGFI = 0.877, RMR = 0.377). Other fit indices also indicated that the model fit was nonetheless satisfactory [Tucker-Lewis index (TLI) = 0.969, comparative fit index (CFI) = 0.976, root mean square error of approximation (RMSEA) = 0.052]. The unstandardized parameter estimates and those taken from 1,000 bootstrap samples are depicted in table 4.46. for comparison. The standardized output model is shown in figure 4.14.

Table 4.46. Unstandardized output of model 1.

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
QC ← COCCV	7.738	3.139	2.465	7.907	3.020	2.618
QP ← QC	1.350	0.092	14.606	1.352	0.091	14.857
QM ← QP	0.145	0.009	15.773	0.145	0.009	16.111
QR ← QM	1.468	0.155	9.477	1.464	0.151	9.695
f1 ← QC	1.000			1.000		
f2 ← QC	0.601	0.041	14.578	0.603	0.045	13.400
f3 ← QC	0.530	0.036	14.925	0.531	0.033	16.091
f4 ← QC	0.033	0.003	9.456	0.033	0.003	9.456
f5 ← QP	1.000			1.000		
f6 ← QP	0.789	0.027	29.488	0.790	0.027	29.259
f7 ← QM	1.849	0.127	14.606	1.853	0.114	16.254
f8 ← QM	1.000			1.000		
f9 ← QR	1.681	0.135	12.422	1.434	0.144	9.958
f10 ← QR	1.000			1.000		
ABASE ← COCCV	1.000			1.000		
ADAPT ← COCCV	0.177	0.024	7.395	0.178	0.026	6.846
HARPE ← COCCV	1.139	0.145	7.872	1.146	0.150	7.640
HARUN ← COCCV	0.187	0.038	4.950	0.188	0.041	4.585
INTDP ← COCCV	0.171	0.024	7.068	0.171	0.024	7.125
RESPC ← COCCV	1.424	0.204	6.962	1.434	0.210	6.829
COCCV	0.035	0.007	4.660	0.035	0.007	4.660
e18	49.265	7.006	7.032	48.758	6.861	7.107
e19	25.585	4.643	5.511	25.428	4.595	5.534
e20	0.260	0.080	3.256	0.263	0.093	2.828
e21	2.083	0.445	4.681	2.044	0.439	4.656
e1	21.064	2.694	7.818	20.779	2.528	8.220
e2	7.189	0.935	7.688	7.105	0.940	7.559
e3	4.753	0.675	7.040	4.698	0.686	6.848

Table 4.46. Unstandardized output of model 1 (continued).

Parameter	ML estimate	ML standard error	ML critical ratio	Bootstrap estimate	Bootstrap standard error	Bootstrap critical ratio
e4	0.118	0.013	9.335	0.116	0.012	9.667
e5	9.872	2.073	4.762	9.823	2.106	4.664
e6	7.560	1.323	5.716	7.450	1.391	5.356
e7	2.849	0.398	7.155	2.812	0.423	6.648
e8	1.388	0.168	8.279	1.371	0.177	7.746
e9	3.504	1.048	3.343	3.409	1.109	3.074
e10	4.296	0.561	7.659	4.225	0.577	7.322
e12	0.047	0.006	8.377	0.046	0.006	7.667
e13	0.002	0.000	8.610	0.002	0.000	8.610
e14	0.028	0.005	5.351	0.027	0.005	5.400
e15	0.006	0.001	9.480	0.006	0.001	9.480
e16	0.002	0.000	8.823	0.002	0.000	8.823
e17	0.084	0.012	6.915	0.083	0.012	6.917
e21 ↔ e19	-3.273	1.109	-2.952	-3.172	1.087	-2.918
e17 ↔ e14	-0.023	0.006	-4.000	-0.023	0.006	-4.000
e1 ↔ e4	0.481	0.136	3.532	0.477	0.135	3.533
e1 ↔ e7	2.119	0.694	3.055	2.062	0.696	2.962
e1 ↔ e8	0.161	0.441	0.366	0.151	0.435	0.347
e3 ↔ e5	-2.692	0.792	-3.382	-2.636	0.835	-3.157

As can be seen from table 4.46., all regression weights and variances estimated by ML and the 1,000 bootstrap samples did not differ significantly, providing evidence that the data non-normality did not affect too much on path estimation. Next the SMCs obtained under the two methods are compared in table 4.47.

Figure 4.14. Standardized output of model 1.

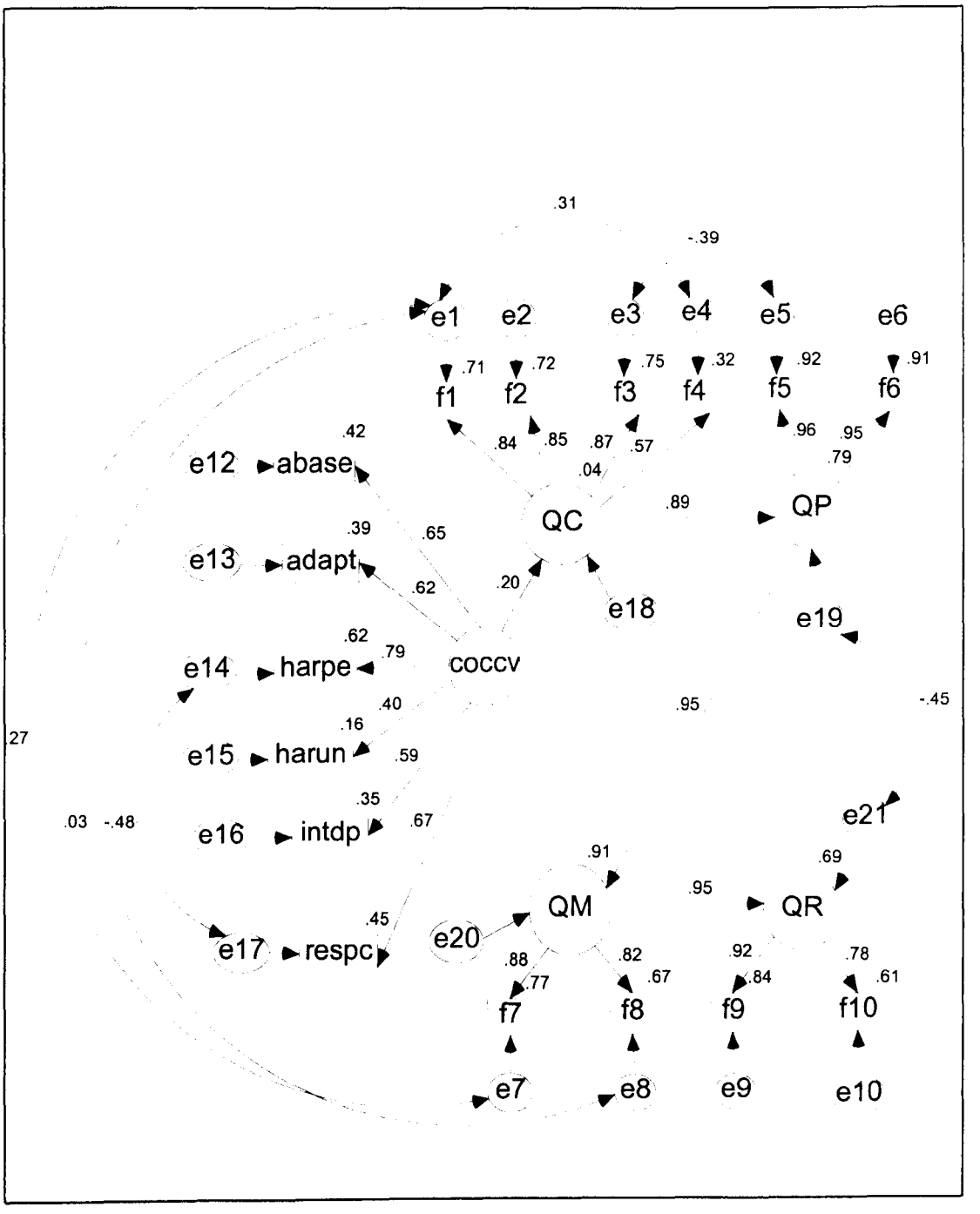


Table 4.47. SMCs of model 1.

Endogenous variables	SMC (ML)	SMC (1,000 bootstrap samples)
QC	0.041	0.048
QP	0.785	0.784
QM	0.906	0.905
QR	0.686	0.688
f1	0.709	0.709
f2	0.720	0.721
f3	0.752	0.752
f4	0.322	0.323
f5	0.923	0.923
f6	0.908	0.908
f7	0.768	0.769
f8	0.666	0.667
f9	0.843	0.845
f10	0.607	0.608
ABASE	0.423	0.428
ADAPT	0.387	0.389
HARPE	0.619	0.619
HARUN	0.158	0.161
INTDP	0.348	0.349
RESPC	0.455	0.458

The SMCs for model 1 obtained under the two estimation methods did not differ much. However, a point needs to be noted here. The SMC for QC was only around four to five percent although the regression path QC ← COCCV was statistically significant at the 0.05 level. According to Bohrnstedt and Knoke (1988: 236), typically, a single independent variable in the social sciences will account for no more than 25% to 30% the variance in a dependent variable, and often as little as 5% or 10%. A possible reason for this low SMC which could be speculated here is that COCCV did have important influences on QP, QM, and QR through the intermediary QC. In other words, COCCV had indirect effects on them. Therefore, the SMC of QC was shared or absorbed by QP, QM, and QR. The argument can be supported by examining the indirect effects as shown in table 4.48. Although the AMOS software does not explicitly estimate the exact

indirect effects, a table showing total effects (Fox, 1980) can be generated and from it the indirect effects can be inferred to.

The table is to be interpreted in the following way. The first row indicated that QC depended directly on COCCV only. The total effect of COCCV on QC was 7.738. This positive effect indicated that a relatively high QC score was likely to be associated with a relatively high COCCV score, and vice versa. The second row indicated that QP depended directly on QC and indirectly on COCCV. Given that the estimate of QP on COCCV (10.445) was a lot higher than that on QC (1.350), it could be said that a relatively high QP score was likely to be associated a relatively high COCCV score and a lower QC score. The third row could be interpreted in the same way. QM depended directly on QP and indirectly on QC as well as COCCV. Again, QM's dependence on COCCV (1.514) was much higher than that on QC (0.196) and QP (0.145). The fourth row also showed that QR depended directly on QM, and indirectly on QP, QC, and COCCV as well. Similarly, QR's dependence on COCCV (2.222) was much higher than that on QC (0.287), QP (0.213), and QM (1.468). The analysis revealed that indirect effects of COCCV on QP, QM, and QR were indeed strong and present. Therefore, the argument raised earlier that the marginal explanatory power of QC had been absorbed by QP, QM, and QR can be supported. This has actually confirmed Kanji and Yui's (1997) argument that organizational culture, influenced by national culture, can in turn influence quality culture.

In fact, there is another way to prove the argument of QC as an important intermediary between COCCV and the other quality variables QP, QM, and QR. In 4.9.7., a further analysis was performed. An alternative model 2 was devised to

test the hypothesis that COCCV did not have any direct effects on QP, QM, and QR. If this is true, than one can reasonably infer that indirect effects were present.

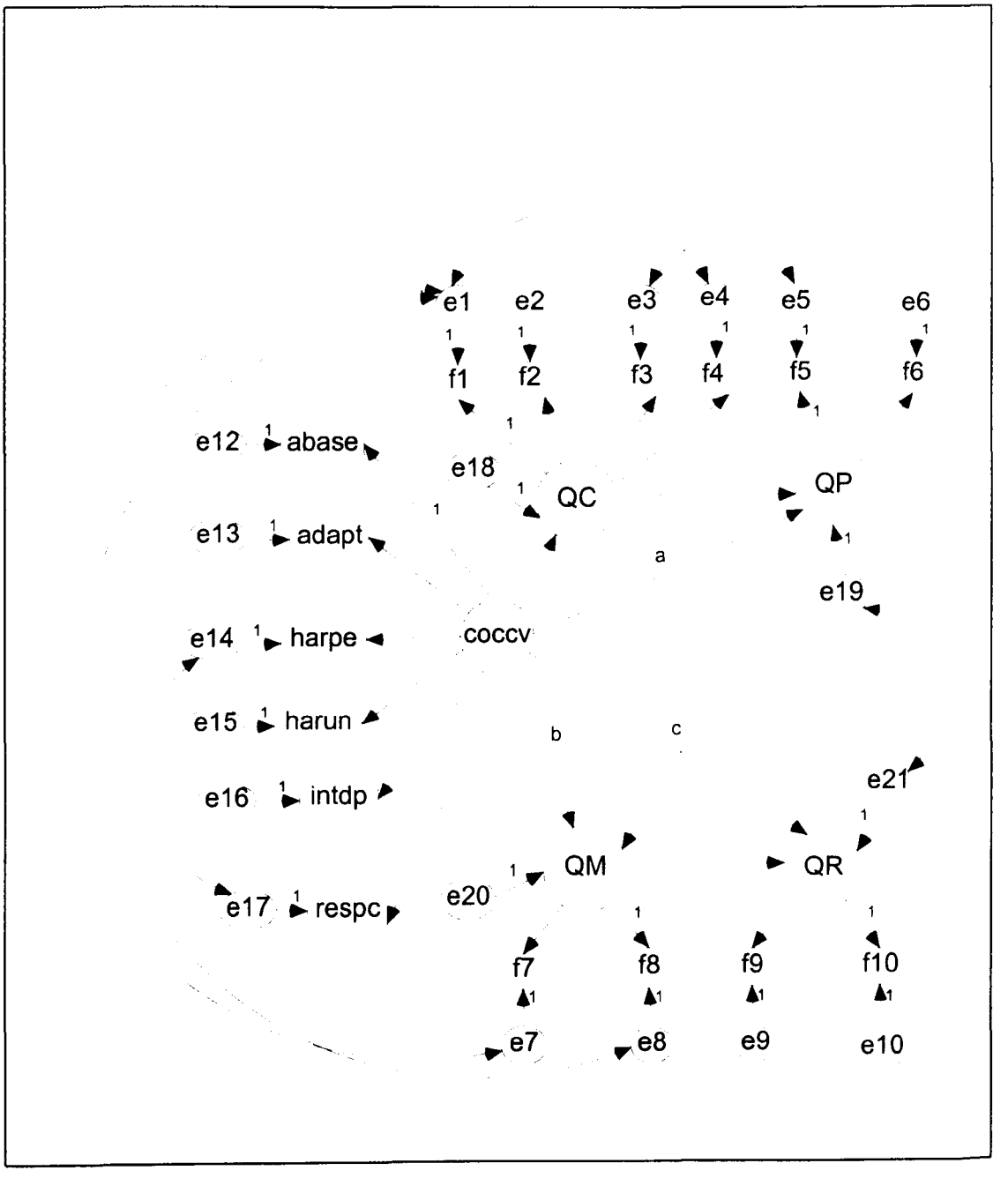
Table 4.48. Total effects of model 1.

	COCCV	QC	QP	QM	QR
QC	7.738	0.000	0.000	0.000	0.000
QP	10.445	1.350	0.000	0.000	0.000
QM	1.514	0.196	0.145	0.000	0.000
QR	2.222	0.287	0.213	1.468	0.000
ABASE	1.000	0.000	0.000	0.000	0.000
ADAPT	0.177	0.000	0.000	0.000	0.000
HARPE	1.139	0.000	0.000	0.000	0.000
HARUN	0.187	0.000	0.000	0.000	0.000
INTDP	0.171	0.000	0.000	0.000	0.000
RESPC	1.424	0.000	0.000	0.000	0.000
f1	7.738	1.000	0.000	0.000	0.000
f2	4.649	0.601	0.000	0.000	0.000
f3	4.102	0.530	0.000	0.000	0.000
f4	0.255	0.033	0.000	0.000	0.000
f5	10.445	1.350	1.000	0.000	0.000
f6	8.246	1.066	0.789	0.000	0.000
f7	2.798	0.362	0.268	1.849	0.000
f8	1.514	0.196	0.145	1.000	0.000
f9	3.736	0.287	0.358	2.468	1.681
f10	2.222	0.483	0.213	1.468	1.000

4.9.7. Hypothesized Model 2

An alternative model 2 was postulated to test the importance of organizational climate being an intermediary between Chinese cultural values and the other quality variables. The hypothesis raised was that if QC was not important as an intermediary, then COCCV can directly, positively, and significantly affect the remaining quality variables namely, QP, QM, and QR. Thus model 1 was modified to include three new regression paths labeled "a", "b", and "c" from COCCV to QP, QM, and QR respectively as shown in figure 4.15.

Figure 4.15. Hypothesized model 2.

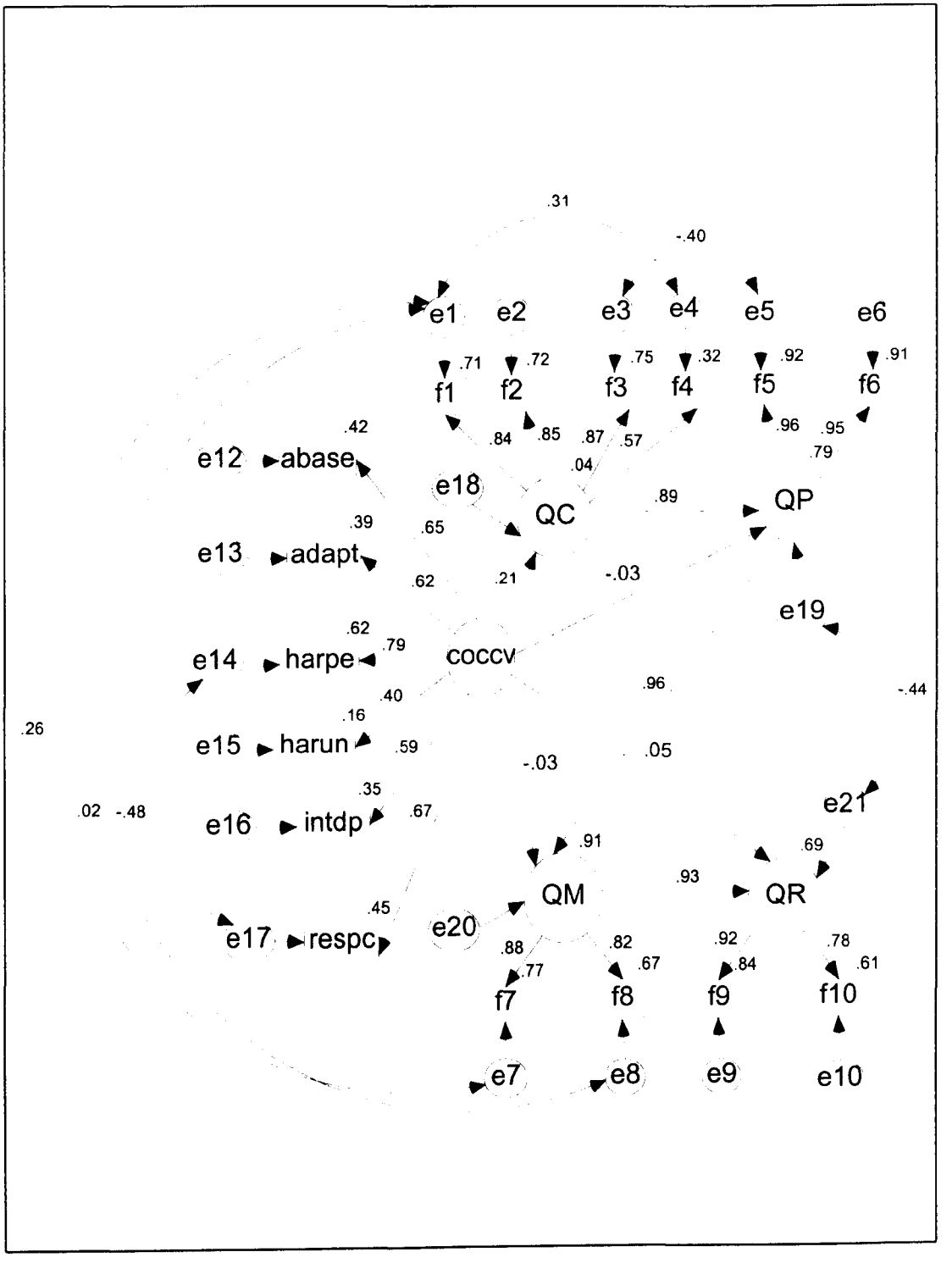


ML estimated that the model was not accepted based on conventional hypothesis testing [$\chi^2(91, N = 192) = 141.047, p = 0.001$] though model fit did not deteriorate much (GFI = 0.916, AGFI = 0.875, RMR = 0.373, TLI = 0.967, CFI = 0.975, RMSEA = 0.054). However, the newly added regression paths indicated that the hypothesis is not correct and QC is indeed an important intermediary.

Firstly, the unstandardized regression weight of QC ← COCCV was 7.999 (standard error = 3.190) which was still significant at the 0.05 level (critical ratio = 2.507). Next, the three newly added regression paths were analyzed. QP ← COCCV (path a) was -1.733 (standard error = 2.868) and non-significant (critical ratio = -0.604). Thus, COCCV did not directly affect QP. QM ← COCCV (path b) was -0.310 (standard error = 0.397) and also non-significant (critical ratio = -0.782). Finally, QR ← COCCV (path c) was 0.724 (standard error = 0.853) and was also non-significant at the 0.05 level (critical ratio = 0.849). Thus, COCCV did not directly affect QM or QR. Also, there appeared to be no plausible reason to explain such negative relationships between COCCV and QP and QM.

Model 2 was indeed incorrect. Therefore, the hypothesis that quality climate, as an important intermediary in bridging cultural values into quality practices and results, was supported. The standardized output of model 2 is shown in figure 4.16. Meanwhile this section on SEM concluded with model 1 as a feasible model explaining the inter-relationships among Chinese cultural values and quality management.

Figure 4.16. Standardized output of model 2.



4.10. Conclusion on Quantitative Findings

The quantitative analyses performed in the present study concluded with several achievements as follows.

1. The study has suggested a comprehensive framework of TQM through exploring the DoD's (1992) TQM model and has supported its veracity through testing it with real data gathered from the industry.

2. The study has re-affirmed the often cited propositions that TQM is applicable to organizations of any size and type.

3. The study has re-affirmed Anderson *et al.*'s (1994) theoretical TQM model and Kanji and Yui's (1997) argument on total quality culture through model testing.

4. The study has extended Anderson *et al.*'s work and developed a theoretical model on the impact of national culture on TQM and has tested the model using real data.

However, what is left undone at this stage is to find out in more details the characteristics of the Chinese-style TQM as argued to exist in Chapter II. The quantitative methods performed could only support that there is indeed a strong relationship between TQM and Chinese cultural values or that a theoretical model of cultural influence on TQM can be developed. As to how Chinese cultural values are manifested in TQM activities, quantitative analyses can hardly tell much. In order to further explore, qualitative analyses have to be conducted. In the next chapter, in-depth interviews were conducted with three ISO 9000 companies operating in Hong Kong and mainland China. It was hoped that through qualitative inquiries, the characteristics of a Chinese-style TQM model could be explored and related back to the quantitative findings obtained in this chapter.

Chapter V

Case Studies

Given the statistical results as obtained in Chapter IV, the impact of Chinese cultural values on TQM was found to exist. However, statistical results can often only demonstrate the existence of relationships. In order to understand in more depth, how these Chinese cultural values are actually influencing TQM, real life examples have to be drawn upon through interviews and case studies. This chapter has provided three case studies on three ISO 9000 certified companies operating in Hong Kong and mainland China. As cultural values are deeply embedded in the members of the organizations, it is through knowing their behaviors and day to day activities, analyzing their personal and corporate mottoes, and learning from some critical incidences that such underlying values be inferred to.

All interviews were conducted with the senior director or manager responsible for the implementation of quality management activities. When available, the human resource director joined in for discussion. The meetings usually started with a thorough plant visit, followed by in-depth interviews at the plant office. No tape recording was used as the interviewees expressed feelings of uneasiness with the presence of a tape recorder. A list of interview questions, translated into Chinese, was given to the interviewees well in advance. The questions can be found in Appendix C. All interviews were conducted in Chinese (Cantonese or Mandarin). The interviews often continued in a less formal manner during tea time or dinner after formal interviews of about two and a half hours. With the exception of the first case study where partial anonymity was requested by the interviewee, all names and figures are factual.

The three cases were firstly presented in a descriptive manner in the following sections. An attempt was then made to analyze the important findings from the cases and to relate them back to the quantitative findings in Chapter IV. It was hoped that the attempt could highlight the important characteristics of the Chinese-style TQM model as argued.

5.1. Case 1: SW Electric

SW Electric is a designer and manufacturer of high quality electric components for automobiles, plant machinery, and household appliances. Founded in 1959 by the late Shanghainese Mr SW and his wife, SW Electric was the first manufacturing operation of its kind in Hong Kong.

SW Electric started as a manufacturer of toy components. As a result of the growth of the Hong Kong toy industry in the 1960s, SW Electric was able to attain high sales volume and achieve economies of scale and started to diversify from making toy components to automobile and industrial components. With Mr RW, son of the late chairman and an U.S. educated engineer, joining in 1972, SW Electric penetrated also the home appliance component market with high quality products.

Mr RW took over as chief executive in 1996 and turned SW Electric into a major supplier of component parts to leading multinationals which mainly export their output to the United States and Europe. With manufacturing plants in Southern China and Thailand, research and development headquarters in Germany, Switzerland, and the United States, sales and marketing offices in the United States, Japan, and Hong Kong, SW Electric is today the second largest manufacturer of its kind in the world.

1998 was a record year for SW Electric in spite of the Asian economic turmoil. Consolidated profit after taxation increased to HK$626 million, a dramatic increase of 43% as compared to that of 1997. From the perspective of the shareholders, SW Electric represents an ideal investment as earnings per share and dividend per share rose 43% and 30% respectively.

SW Electric has adopted all the major tools and techniques for maintaining its high quality. Zero defect, statistical process control throughout all manufacturing processes, failure mode and effects analysis, quality function deployment, and just in time inventory methods have all been effectively adopted. SW Electric's plant in Southern China was certified by ISO 9000 in 1994 and has today attained the highest quality standard in the industry, allowing it to produce parts for the largest American automobile manufacturers, namely Ford, General Motors, and Chrysler. Monthly production in China is expected to soon reach 16 million to cope with the continual growth of the company and the anticipated expanding demand. In 1998, Mr RW was elected Asian businessman of the year by a major business periodical publisher.

5.1.1. Quality Climate

The corporate mission of SW Electric is to achieve a harmonious and ever improving life for people as its corporate slogan says "Making your life better". Management at SW Electric believes that this can be achieved by stressing learning and education as well as commitment to society. The management philosophy of SW Electric, as brought down from the founder, the late Mr SW, has been based on a traditional Chinese saying literally meaning "The kind of wood you get depends on which hill you go to". This reflects a Chinese emphasis

on situation-orientation and adaptiveness through active pursuit of a desirable life. Mr RW strongly believes that a Chinese company should emphasize on the surrounding environment and constantly absorb new knowledge. No matter Western or Eastern, as long as what is good for the long-term well-being of the organization, people should learn and adopt.

Mr RW himself is an excellent example of a learning man constantly searching for good management methods and disseminating them to his subordinates. For example, he picks up many ideas from an annual seminar held at the Harvard Business School and then adapts them to his own philosophy. Very often, when Mr RW reads a good book on management, he would personally buy many copies of the book and distribute them to the members of his management team. This is often followed by personal or group discussions of the topics in the books. It is through Mr RW's constant desire and commitment to learn new things that SW Electric's solid foundation on quality has become its cutting edge.

Mr DP, senior manager for quality management, recalled how Mr RW started the quality education in SW Electric through grasping the essence of the psychology of the Chinese people. He mentioned about how he started from scrap until the attainment of the ISO 9000 certification in the manufacturing plant in Southern China. One vivid example is the story of "bathroom culture". In the early 80s, when SW Electric's China plant first went into operation, Mr RW realized that to attain high quality production, he must firstly educate the mainland Chinese workers. He also realized that education and change need time and any coercive actions will only result in failure. He therefore decided to begin by changing the often ignored daily behaviors of the workers. Since most of the

workers in the China plant were relatively less educated and many of them came from remote villages, the bathrooms in the plant were often unimaginably dirty and the hygiene condition was nearly hopeless. Mr RW decided to launch a "bathroom complaint campaign" and personally encouraged workers to file complaints whenever they find the bathrooms in bad condition. The campaign soon reached a peak and the workers began to realize that complaints do not help. They started to become more self-disciplined and the cleanliness of the bathrooms improved. Mr RW, knowing that the underlying value of the Chinese people is based on harmony, took this opportunity to instill into the minds of the workers the 5S principles, explaining personally to them the importance of cleanliness in the bathrooms, the workplace, and even at the workers' homes. When the condition of the workplace has reached a certain standard, Mr RW further used the example of the "bathroom complaint" incidence to educate the workers the importance of high quality products, drawing metaphors to explain to the workers the feeling of a dissatisfied customer.

Mr RW strongly believes in the Chinese saying that things have to improve gradually while an abrupt increase in anything deems to be a failure. This is even reflected in the Chinese name of SW Electric, which literally means "inch by inch". From a manufacturing plant with the dirtiest bathrooms in Southern China to one which produces the highest quality electric components in the world; from workers with relatively low education to workers who can truly grasp the basic principles of quality, SW Electric has achieved these through gradual education and improvement.

5.1.2. Quality Processes

The underlying purpose of SW Electric getting the ISO 9000 certification is to improve its product quality through strengthening its quality management system. The process of getting the certification also reflects some elements of Chinese culture, especially the value of familism.

As the successor of a family-run business, Mr RW strives to make SW Electric a big family of 15,000 men. Instead of hiring a quality consultant to install the ISO 9000 system like in many Western companies, SW Electric installed the system entirely by itself. Mr RW believes that hiring an outside consultant will only bring many abrupt changes which may distort the harmony of the big family. Therefore, he started by sending employees to training courses on quality and ISO 9000. The trained employees, often managers and front line supervisors, would then teach their own subordinates their learnt knowledge. The ISO 9000 certification journey of SW Electric was thus much longer but Mr RW believes that results have been much more fruitful. With the first certification of a four-phase program in 1994, SW Electric is now embarking on a formal TQM program.

Mr RW understands that to maintain high quality, people have to constantly learn new knowledge. SW Electric has a vigorous training scheme for each and every employee. The training needs of each staff is identified and appropriate training given without delay. Results of training and identification of new training needs are periodically reviewed. Furthermore, identification of training needs is not only one way. Employees are highly encouraged to identify and request the type of training they feel lacking. Whenever there is a job

vacancy, internal staffs who have received the appropriate training or possess multi-talent are firstly considered. The idea is to make each and every employee feel like a member of the caring family and that his or her well-being is considered as the foremost priority. Mr RW's obsession in education is reflected in his personal encouragement to staff undergoing self-study programs. As long as a staff is willing to pursue a course of study (usually evening courses), even if it is not directly related to the staff's work, full sponsorship is provided. There is even special transportation arrangement to take staff to their respective schools.

Staff evaluation in SW Electric is based on performance but not in the conventional Western "management by objective" way. Budgets are set with top management taking a budget horizon of five years, middle management two years, and front-line management one year. However, the attitude towards the budget in SW Electric is flexible, that is to say, activities which are good to the company but not accounted for in the budgets are also considered. Furthermore, budgets are not tools for penalizing low achievers but instead are opportunities for problem identification and problem solving. Mr RW believes that SW Electric takes the best from both Western and Chinese management styles. The former emphasizes on building up a system to be followed by all employees while the latter emphasizes on the maintenance of harmonious human relations. He believes that when human relations are harmonious, people will respect the system and thus take every necessary step to adhere to it.

Mr DP recalled an incidence when a worker accidentally damaged a very expensive mold during production. The worker ran home immediately fearing of punishment. Mr RW on knowing the accident, sent the front-line supervisor to the

worker's home and invited him back to the plant. There was no punishment of any kind but Mr RW, together with the supervisor, taught the worker the proper handling of the mold and let him work on the task again after an immediate replacement of a new mold. It is Mr RW's belief in the Chinese saying "We are all on the same boat" that a harmonious human relation leads the employees to adhere to the organizational system, no matter it is a performance budget at the middle management level or a standard work procedure at the front-line.

It is also due to this harmonious human relation that firing in SW Electric is rare. In an interview given by Mr RW when he was elected Asian businessman of the year, he promised his people that no one would be fired in spite of the recent recession. Mr DP further added that firing is not the personnel policy at SW Electric. During periods of low production, the "redundant" employees are given training or re-training to meet more demanding standards when the situation improves. At the same time, hiring of new employees is frozen. Only when situation demands, annual raises are stopped for low performers. Mr DP commented that the management style in SW Electric is a hybrid of Chinese and Western styles but the tendency is more towards the Chinese emphasis on collectivism and trust rather than the result orientation in traditional Western management. He claimed a Chinese company that one can be proud of is able to learn from the West the establishment of a clear and well-structured organizational system and to use this system to reinforce trust among employees.

5.1.3. Quality Methods

In terms of the hard aspects, SW Electric has a strong commitment to research and development backed up by its international team of experienced engineers and

designers. With the use of computer aided design, SW Electric is able to progressively push forward the frontiers with highly innovative products and manufacturing methods holding international patents.

Each production facility in SW Electric has its own training center within which both management and workers alike are taught the latest in manufacturing and quality control. Statistical process control techniques are practiced throughout all manufacturing processes and all workers are trained to meet zero defect at all production stages. Engineers, laboratory analysts, and designers use modern methods such as Taguchi methods, orthogonal experiments, failure mode effect analysis, and quality function deployment to ensure the highest product quality. SW Electric also employs a vertically integrated manufacturing process so that it is possible to maintain high standards for production parts as the tooling and fixtures are made in-house. This feature allows a customer's request to be custom-made, turning out a prototype exceptionally fast, and transferring new parts into production at high volumes.

In terms of the soft aspect or human aspect, Mr DP stated that SW Electric has always been emphasizing on collectivism. Therefore, group activities such as quality control circles (QCC) have been active since the late 1970s. The QCCs in SW Electric are all voluntary. To encourage active participation in the circles, annual circle report presentations and contests are held. When SW Electric first held its QCC contest, an impressive number of 880 workers participated. Management and workers alike were unexpectedly enthusiastic about the event but they deemed it a failure. What happened was that only one winning circle was selected and thus the members of the other circles demonstrated low morale as a

result. This valuable experience has reminded the management of SW Electric the real meaning of Chinese collectivism and that transferring the QCC activity as it is successful in Japan to Chinese soil is not possible. The winning criterion was thus changed. Whenever a circle's report is evaluated a mark of 80 or above, the circle is a winner. This evaluation criterion was quickly accepted by the circles and up until today, QCC activities are highly active.

Apart from QCC activities, individual suggestions are also welcomed. However, SW Electric does not emphasize too much on individual talent in this aspect since it adheres to its ultimate corporate philosophy of being a big but harmonious family. Therefore, winning circles are awarded a trophy, cash bonus, and are taken photos with the chief executive, while if it is an individual suggestion, the winner is awarded a trophy only. Mr DP claimed that most Chinese workers, especially those in the mainland China plant, welcome the trophy and the photo rather than the cash. This is due to the cultural characteristic of "face" of the Chinese people. Showing the photo taken with the chief executive to family members, relatives, and friends represents a kind of honor which cannot be bought at any price.

The message of quality at SW Electric is well understood by all levels of employees. Every employee is requested to carry a small card in which the "SW Spirit" and the "SW Quality Statement" is written. Employees are requested to read the statement every morning. To create a harmonious and familial atmosphere, employees of SW Electric frequently hold activities in the plant canteen during lunch time. An example is a simple contest where employees are asked to recite the "SW Spirit" and the "SW Quality Statement" quickly and

accurately. Winners are awarded a free soda and so on. Of course, the emphasis is not on getting a free soda but to create an environment where collectivism is valued.

5.1.4. Quality Results

According to Mr DP, the certification of ISO 9000 has helped SW Electric to improve its quality management system greatly. For example, through fulfilling the ISO 9000 requirements, there are now complete and systematic operating procedures concerning all aspects from design and pre-production to selling and distribution. This helps to minimize errors through standardizing the operating procedures. Also, SW Electric's effort in embarking on a TQM journey has obviously been harvesting. For example, aiming at zero defect, the defective rate in each production step has now been minimized to less than one percent. Results from the "*gemba kaizen*" campaign have also been satisfactory.

Nevertheless, Mr DP remarked that the most important improvement is in terms of customer relations. He stressed that high quality products can of course delight customers but most important of all, SW Electric has a completely different view on customer relation from that as seen in most Western companies. Mr RW constantly emphasizes that not only members inside SW Electric are riding on the same boat and should thus maintain good harmony, in fact, SW Electric and its customers are also riding on the same boat. That is to say, the well-being of SW Electric depends also on the well-being of its customers. For a company which is in real harmony, interdependence should extend out of its organizational boundaries.

Mr DP cited one good example of this extended interdependence. A customer who produces a type of rather old-fashioned hair dryer has once sought for an order of an odd type component whose production has been stopped some time ago. Instead of rejecting this odd order as most Western companies might naturally do, Mr RW and his designers requested for a meeting with this customer. In the meeting, they explained to the customer how both parties could benefit if the customer's product design would change slightly to accommodate another type of component. The two parties worked together to find out the best solution, ending up with a delighted customer and a successful order for SW Electric. Mr DP claims that Chinese people emphasize a lot on mutual harmony and reciprocity. The mutual support of the two parties has led to a continuous business relationship until today and it is expected to continue in the future.

5.2. Case 2: Jinling Group Company Limited

Jinling Group Company Limited is a consortium of eleven manufacturing companies situated in Jiangmen city of the Guangdong province in mainland China. Jinling manufactures high quality home appliances with a specialization in washing machines and air conditioners. In 1994, the washing machine plant and the air conditioner plant entered into joint venture agreements with the Hong Kong Wo Kee Hong (Group) Company Limited and the Mitsubishi Heavy Industries in Japan respectively, thus creating the two core companies of the group namely the Jinling Electrical Company Limited and the Mitsubishi Heavy Industries-Jinling Air Conditioners Company Limited.

The group first started its operations in 1983 with 1,020,000 RMB worth of production. In a relatively short period of twelve years' time, Jinling was able

to increase its production value by 1,000%. Today, Jinling boasts an annual production of 300,000 home air conditioners, 500,000 washing machines, and 2,600,000 electric fans. The products of this 3,600 employee group are sold nationally to all major provinces in China and are also exported to other South East Asian and Middle East countries.

The group was certified under ISO 9000 in 1996 and is included in the 500 largest industrial enterprises in China. Since 1986, Jinling's washing machines have been attaining the highest production and exportation volume in the country. Using the latest production technology from Germany and Italy, Jinling received numerous national awards from the various State Commissions. In 1997, Jinling's washing machine production was further awarded the American Underwriters' Laboratories UL certification, making Jinling the first and only manufacturer in China to possess such an internationally recognized quality.

5.2.1. Quality Climate

The Jinling Washing Machine Factory, which has now grown to become the Jiangmen Jinling Group, was founded by Mr Wu Qunxing in 1983. The motto which has been guiding Mr Wu to become the chairman of this successful business is based on a Chinese saying which can be literally translated as "He who desires to establish, let others establish also; He who desires to achieve, let others achieve also". It is based on this philosophy that Jinling has a profound corporate vision to contribute to the growth of China's state enterprises through continuous self-improvement. To achieve this long-term vision, Jinling has successfully built up an enterprise spirit based on three elements, namely consciousness, independence, and coordination. "Consciousness" refers to the desire for self-

initiated learning, self-initiated labor, and self-initiated cultivation. "Independence" refers to the ability to work independently and the ability to demonstrate personal qualities. "Coordination" refers to collectivism, co-operation, patience, and forgiveness. Mr Wu urges for total commitment towards such qualities in work, learning, and other daily endeavors.

In order to realize Mr Wu's motto to life, and to bring the people of Jinling closer to the ideal "Jinling Men", Mr Wu calls for total participation in quality improvement. He takes a more traditional Chinese approach by acting as a father figure to initiate a total quality movement and to lead all the members of the group towards such an objective. In 1996, he initiated a company-wide quality policy education. Understanding that people at different levels of the organization have different duties and specializations, he requested all middle level managers to take written examinations on quality management principles and all production line supervisors to undergo training. The examinations have helped Jinling to further solidify the foundation of its quality after obtaining the ISO 9000 certification.

According to Mr Liao, senior quality manager of Jinling who has returned to China after substantial total quality control training in Japan (JUSE and the Japan Productivity Council) in the early 1980s, the management style that Mr Wu adheres to is a mixture of paternalistic and participative management. Under this management style, which he claimed as following the socialist "democratic centralism", all employees at all levels are requested to provide suggestions and ideas which are thoroughly discussed and understood. After this, each department or unit will furnish departmental reports to be submitted to top management, which essentially is composed of Mr Wu and a few top leaders, for final decision

making. Although this so called management style does not appear to be in any way different from a bottom-up approach and in some ways resembles the Japanese *ringi* system, Mr Liao reckoned that it is a successful style which incorporates the traditional Chinese management style of paternalism and what people call "industrial democracy" after the political reform of China.

As pointed out by Mr Liao, the Chinese people have always been groupistic and collective decision making has been a method to preserve group harmony. However, due to the rise of communism, many of the positive aspects of traditional Confucianism were actually buried by the rising power. Since then, the Chinese management style or system had become one which was totally based on centralization and authoritarianism. As the political situation has changed during the past ten years, Chinese managers were allowed to revisit the positive aspects of Confucianism and at the same time absorb good management styles and techniques from foreign sources. It is a result of this gradual change that Jinling has adopted a management style which incorporates both the traditional Chinese value of paternalism or authority and a modernized view on democracy. He also mentioned that the present political situation in China does have a profound impact on all state owned enterprises and that its gradual change has also been leading the change of management styles in these enterprises. In other words, the organizational climate of state owned enterprises in China is actually a microscopic view of the country's overall political climate.

With the reform and open door policy of China in gradual progress, the underlying traditional cultural values of the Chinese people, so deeply embedded but were once oppressed, have been gradually re-emerging. What is important is

not to commit the same mistake which communism has committed in throwing away all the traditional Chinese values of the people even when they are of good nature. Jinling, like the country herself, is gradually revisiting and re-emphasizing the positive aspects of traditional Chinese values. For example, paternalism in the past has been abused and has become a tool for people to centralize their powers. In fact, the correct interpretation of the Confucian teaching of paternalism is actually on the creation of a successful and respectable leadership through propriety and benevolence. Many of the Confucian teachings are in fact in line with the characteristics of good management, it is only that people in the past have misinterpreted them.

5.2.2. Quality Processes

According to Mr Liao, Jinling provides a three-month training program to all new entrants. The program consists of four main areas namely company history and development, corporate culture, technical skills, and safety. In order to let all employees grasp a clearer view of the operations, even university graduates who may be taking up posts outside the assembly lines are put to receive six months' training on the various manufacturing processes. Training on quality management techniques are also given to all production workers, however, workers at different levels are given different degrees of quality knowledge. For example, line supervisors are trained to use the various control charts and to interpret collected data, while front-line workers are trained only to collect production data. Nevertheless, they are all briefed the fundamental concepts of ISO 9000 and TQM during specially arranged meetings.

In line with Mr Wu's practice, examinations are given to employees after each training program. These examinations represent also the main criteria for performance evaluation. Under normal market conditions, a staff on failing an examination three times will usually be laid off. Mr Liao stated that most employees welcome this examination system because it is objective and it helps to transmit a clear message to employees on what kind of performances are expected from them. He further added that the creation of a competitive working environment is in line with Deng Xiaopeng's philosophy on pragmatism. Due to this competitive working environment, employee turnover in Jinling is very low.

5.2.3. Quality Methods

In order to disseminate and to better coordinate total quality activities, Jinling has installed a TQC office. The TQC office has recently employed another Japanese-style quality control technique known as "management QC point" (*kanri ten*). In fact, Jinling is able to absorb and implement effectively various Japanese production and TQM techniques. For example, the TQC office is responsible for organizing QCC activities. Each production department has now about three to five QCCs. Basically, Jinling's QCCs are quite different from the ones seen in Japanese companies. Apart from that they all use the same tools such as statistical control charts, pareto charts, and fishbone diagrams, Jinling's QCCs did not start as voluntary circles like in Japan. The TQC office understands that due to a difference in the standard of living in China and Japan, it is not impossible, but difficult to expect voluntary participation in QCC activities. The TQC office thus first started by assigning some task groups with the intention to tackle some specific problems. The task groups were taught the seven tools and the basic

operations of QCCs. Results of successful problem solving were posted on bulletin boards inside the factory and task group members were awarded cash bonus. At the same time, the TQC office encouraged each production department to form their own QCCs. Today, Jinling organizes QCC case report presentations every year. Winning circles are awarded cash benefits. Through the efforts by the QCCs and the now implemented campaign of "one suggestion per person", Jinling is able to reduce its average defective rate of each production department to about 2%. With the use of the *kanri ten* system, Jinling is now heading towards the goal of zero defect. Furthermore, to emphasize the importance of internal customer satisfaction, there are monthly cross production process meetings when workers of different assembly lines or processes meet and exchange experiences and suggestions.

5.2.4. Quality Results

According to Mr Liao, the certification under ISO 9000 has brought substantial benefits. It has assisted Jinling to set up a strong foundation for its quality management system so that product quality could be further strengthened. As a result, Jinling has become the first washing machine manufacturer in China to obtain the Underwriters' Laboratory UL certification. Most important of all, the certification has helped to create a strong quality consciousness among its workers.

Concerning the area of customer orientation, Mr Liao stated that Jinling's attitude to customers has always been following the Chinese saying of "Do not to others what you do not want others do to you". He attributed three different elements to the three types of customers of Jinling. The relationship with

wholesalers is based on trust because what they face is usually not a problem with product quality but with their own liquidity problem. Without trust and understanding of the wholesalers' financial difficulties, it is not possible to establish long-term trading relationships. The relationship with retailers is based on sincerity. Jinling understands that to encourage retailers to sell Jinling's products, Jinling must demonstrate the willingness to co-operate and support them. Thus, Jinling places particular emphasis on after-sales services by establishing 18 after-sales counters covering as far away as Urumqi in Xinjiang province to support the retailers. Finally, the relationship with consumers is simply based on quality. In Jinling, every member adheres to "customer is the king".

5.3. Case 3: Dachangjiang Group Company Limited

Founded in 1992, the Dachangjiang Group is a large-scale sino-foreign joint venture enterprise situated in Jiangmen city of the Guangdong province in China. Specializing in manufacturing motorcycles and engine parts, the 1,900 employee Dachangjiang Group is composed of two core manufacturing plants namely, G.L. River Motorcycle Manufacturing Company Limited and Hualing Precision Machinery Company Limited. The former is one of the largest motorcycle manufacturer in China possessing 27 production lines arranged in a multi-purpose factory which covers an area of 55,000 square meters. The latter is one of the most modern engine manufacturers in Asia equipped with 23 production lines covering an area of 44,500 square meters. The group includes in all major provinces of China a sales network of 26 sales branches and 2,500 exclusive sales departments

and authorized distributors, and a service network of 20 service centers and 2,000 contracted maintenance shops.

The one billion RMB invested group boasts an annual production level of 800,000 motorcycles and engines. Dachangjiang currently produces nine models of motorcycles under the Haojue series. All products are produced using technologies imported from Suzuki Motor Corporation in Japan and are evaluated by the China National Motorcycle Testing Center and Suzuki itself as having the same high quality standard as the "made in Japan" Suzuki models.

The Dachangjiang Group has been practicing TQM since 1995 and was certified under ISO 9000 in 1997 by the Guangdong Audit and Certification Center of Quality Systems in China and TUV Rheinland in Germany. The corporate objective of the Dachangjiang Group is to increase its annual motorcycle production level to 1,000,000 units in the year 2005. Although Dachangjiang does rely on imported Japanese technologies, it also takes a domestic initiative towards research and development by cooperating with science institutes and manufacturing companies from Japan and Europe. Dachangjiang has its own technology development center, its own market research department, and its own team of professional experts, integrating the entire series of production processes, from modeling to designing, to manufacturing, and to testing. In order to satisfy the market, Dachangjiang has achieved world class ability to develop its own motorcycle engines, bodies, electrical parts, and outlook designs.

5.3.1. Quality Climate

The corporate motto of Dachangjiang, which can be seen written all over the plant site, is a Chinese saying which literally means "everything depends on your

effort". It is this positive attitude towards life that has made Dachangjiang one of the most successful joint venture endeavors in Southern China. Mr Zhou Xiaopei, senior manager of the quality management department of G.L. River, described the group's management philosophy as putting foremost emphasis on its employees. As the corporate slogan states "To provide top quality products to users through unremitting effort; to create better future for society through hard work", Mr Zhou said that everything starts with the employees. He believed that through constantly improving employees' well being, employee satisfaction will lead to customer satisfaction.

Dachangjiang essentially emphasizes a lot on management by objective. Understanding that management by objective frequently contradicts with employee benefit, the strategy is to use employee benefit to achieve management objectives. Mr Zhou cited some examples of management objectives. At present, the mid-term objectives are of four main areas and are all quantified. In terms of product quality, Dachangjiang strives to achieve 100% Suzuki quality. In terms of national industry recognition, Dachangjiang aims to be the first in class. In terms of sales/production ratio, Dachangjiang aims to increase from the now 96% to 100%. As to customer satisfaction, Dachangjiang aims at 100% total satisfaction by taking any possible measure. To achieve these, it is only through the effort of its employees and the best way to induce full effort is by taking a caring view on them. Mr Pei Hui, manager of the personnel department mentioned that Dachangjiang offers the best wages of all manufacturing companies in Jiangmen city. It also offers the best employee benefit scheme which includes a free flat to all employees upon their marriage. To upgrade the human quality of its workers,

Dachangjiang places particular emphasis on training and QCC activities whereby monetary as well as intangible awards are given. As a whole, Dachangjinag believes in first creating satisfied employees, then satisfied customers.

Mr Zhou reckoned that after the reform of China from a planned economy to a market economy, interventions from the central government has largely reduced and many Chinese companies are now able and are proud to compete with their Western counterparts through continuous quality improvement. However, he believed that the best Chinese management style is one that is able to assimilate foreign technologies in order to unleash the maximum potential of the Chinese people. The Chinese people are potentially industrious. However, this property was unable to be fully appreciated before the reform of China due to restrictions in absorbing foreign technologies. Today, Dachangjiang is able to fully utilize the hard working quality of the Chinese people through fusion with the latest foreign technologies, including the Japanese way of TQM and the Western quality standards of ISO 9000. In particular, he attributed Dachangjiang's success in quality to three underlying values of the Chinese people, namely the values of collectivism, situation orientation, and adaptiveness. He pointed out that the self-sacrificing collectivism as seen in the 1998 China flood crisis has created a profound impact and reflection in the hearts of the people in Dachangjiang at least, if not in every Chinese person. Through this experience, the importance of Chinese collectivism has been revisited from a higher level and this helps to provide a strong basis for TQM activities like QCC and other group endeavors.

Dachangjiang also has since its inception in 1992 continuously and gradually expended efforts in new product development. Management at

Dachangjiang understands that success is a matter of gradual accumulation of experience and knowledge but not an abrupt change. This clearly reflects the Chinese value of situation orientation. It is also due to the adaptiveness of the Chinese people that Dachangjiang has successfully absorbed Suzuki technologies in its production and is proud that not one Japanese engineer has ever come to station in Dachangjiang to supervise its productions. The relationship that Dachangjiang has with Suzuki is one that is built on mutual co-operation but not dominance.

5.3.2. Quality Processes

Dachangjiang has basically adopted the ISO 9001 standards as the blueprint for its quality management system. This helps to enhance continuous consistency in the production of quality products. Mr Zhou realized that the present quality management system is still insufficient and has since 1995 gradually implemented a company-wide TQM process. At the same time, employee benefits are also upgraded in order to encourage total participation.

After the successful implementation of the 5S campaign, Dachangjiang's TQM activities are now in full vigor since 1999. Some obvious results have been seen from the 5S campaign. For example, the previous 22% defective rate of the painting line has now reduced to 92% "right at the first time" and is expected to catch up with the Suzuki rate of 96%. As TQM is a continuous endeavor involving all employees and external suppliers, obvious results are still to be anticipated.

Mr Pei mentioned that the implementation of TQM in Dachangjiang requires close co-operation between the quality management department and the

personnel department. A typical training program for a new entrant includes a training seminar on corporate culture, when employees are briefed the basic management philosophy and some historical development of Dachangjiang and the code of conduct for being a corporate citizen. Basic quality control, work process, and safety training are also given during a one-week period. What is of particular importance as Mr Pei said is that the purpose of the training is to instill the need for self-improvement in the employees. He added that due to the reform of China, people can no longer adhere to the mentality of relying on the iron rice bowl as in the past. People in Dachangjiang are taught the importance of self-improvement and the spirit of "we are all on the same boat". Mr Zhou also believed that the Chinese people are basically collective in nature and mutual improvement of the self and the organization is by constant education.

5.3.3. Quality Methods

What is so special about Dachangjiang is that its adaptiveness and situation orientation allows it to learn and absorb foreign technologies and to come up with a system which completely belongs to itself. Understanding that its Haojue series of motorcycles is targeted for the domestic market, what Dachangjiang needs from Suzuki in Japan is its basic production technology only but not an entire replication of Suzuki and its products in China. Dachangjiang is able to use Japanese technologies to produce products of the same internationally recognized quality to cater for the needs of the domestic market, thus creating a Chinese product that Chinese people can be proud of. This attitude towards learning and refinement is also seen in Dachangjiang's quality control methods. For example, Dachangjiang is proud to utilize statistical process control and diagnosis (SPCD)

which is an advanced type of statistical process control method developed by a Chinese professor known as Zhang Gongxu at the Beijing University of Science and Technology. SPCD is an example of the Chinese people's ability to draw lessons on the experiences of Japan and the United States. It has made a major breakthrough to be the world's first multivariate statistical diagnosis theory since Walter Shewhart's quality control theory. In fact, Professor Zhang is now researching on another advanced stage of SPCD known as SPCDA (statistical process control, diagnosis, and adjustment) (Zhang, 1999).

In terms of group activities, Dachangjiang started to introduce QCCs in 1995. After three years of gradual expansion, the QCC activities have grown to a company-wide implementation in 1998. The foremost objective of introducing QCC activities in Dachangjiang is to upgrade human quality through enhancement of creativity and experience exchange. Although problem solving is only the second reason for implementing QCCs, the problem-solving rate of the 69 QCCs at present is about 89%.

To enhance the growth of QCCs, management at Dachangjiang takes a gradual approach by arranging three types of QCCs. The first type resembles task forces which are compulsory for all employees to participate upon the need to firefight critical problems. The second type is known as instructive QCCs with improvement topics provided by management. The third type is completely voluntary and self-initiated. Mr Zhou remarked that QCCs are a good way to enhance employee motivation because monetary bonus and other awards are given to circle members when good suggestions are given. The annual QCC presentation also represents a kind of honor which employees accept with good response. Apart

from QCCs, Dachangjiang also encourages individual suggestions in the form of "one suggestion per worker per month". As seen on the bulletin boards inside the factory plant, the monthly individual suggestion participation rate frequently reaches over 90% of the number of employees. Mr Pei said that each worker would get a small amount of cash bonus for each suggestion given. The emphasis is to keep the workers think constantly and to be creative.

Dachangjiang also extends its QCC activities beyond itself to suppliers. At present, 12 inter-company QCCs are formed with the 200 suppliers of Dachangjiang. The purpose is to create a harmonious relationship with them so that Dachangjiang can understand their situations and needs and to better coordinate and co-operate. Dachangjiang also takes the initiative to encourage suppliers to attain ISO 9000 certification by providing technical support and most encouraging of all, a cash bonus of up to 10,000 RMB for successful certification. In order to produce products of the highest quality, Dachangjiang knows how to take a lead role in cooperating with suppliers through sincerity, trust, and harmony.

5.3.4. Quality Results

Mr Zhou mentioned that apart from the hard facts that implementing ISO 9000 and TQM does help Dachangjiang to reduce defective rates and to increase problem solving rates and so on, the most important point is to use the concept of quality management to upgrade human quality. He pointed out that Chinese people are traditionally collective and like to keep themselves in good harmony. However, due to these underlying values, Chinese people sometimes demonstrate some negative aspects of their values. For example, in order to save face and to

preserve good interpersonal harmony, Chinese people may not tell all the truth in some circumstances. This may lead people to not devote entirely towards a certain endeavor. Having a good management system means changing this kind of attitude. Under the system of ISO 9000 and TQM, the Chinese people are able to fully demonstrate the positive aspects of their traditional values and to gradually wipe out the negative side of the coin.

In terms of customer satisfaction, Dachangjiang is aiming at a 100% customer satisfaction through the use of its vast network of service centers and contracted maintenance shops. The implementation of a good quality management system has enabled Dachangjiang to produce products of imported quality at home-made prices. Mr Zhou stressed that Dachangjiang's attitude towards customers is that they are the gods. This attitude is thoroughly professed among every member of Dachangjiang and is believed to be the only way for long-term corporate survival.

5.4. Findings from Cases

It was noticed that the three cases illustrated certain similarities as well as differences. The differences observed are mainly at the more superficial level between the operations of the Hong Kong company and the mainland Chinese companies due to different socio-political settings. In mainland China, management techniques are more towards the mechanistic model. For example, management would put enormous emphases on quantifiable objectives. However, there has been a gradual change in the Chinese management style since the adoption of the open door policy. One good example is illustrated in the interview with Jinling. The quality manager explained that the management system there

follows the socialist democratic centralism and defined it essentially as a mixture of paternalistic and participative management styles. This definition is probably much different from the Maoist understanding of democratic centralism which confronts the so-called bourgeois democracy or ultra democracy (Mao, 1972) and reflects the new socialist ideology. Putting into action in Jinling, it resembles to a certain extent the familiar management by objective system or in some other ways, the Japanese *ringi* system. It is because that Chinese state enterprises are still organized according to the structure of the Party, people would still adhere to certain communist terms such as democratic centralism.

Nevertheless, after the reform of the state enterprises in China, people began to realize the importance to revisit certain Confucian principles. As Lau and Kuan (1988) have commented, the real spirit of democratic centralism of socialist China was much complicated by the hegemony of the Chinese Communist Party. What is precious of the modern organizational leaders in China is their willingness to revisit and reassert the importance of traditional Confucian values and principles which were once thrown into the bonfire.

It was also found that both in the companies in Hong Kong and mainland China, managers have actively acknowledged the importance of Confucian values as positive towards the implementation of TQM. This similarity at the more deeply rooted philosophical level of how Chinese managers view TQM as a system influenced by Chinese cultural values would contribute most towards the development of the argued Chinese-style TQM. These cultural influences have to be addressed carefully and schematically related back to the quantitative findings. To this end, the following table carries some selected remarks or comments taken

directly from the written transcriptions of the interviews. These sentences are then mapped back with the Chinese cultural values as obtained from the quantitative analyses.

Table 5.1. Mapping Chinese cultural values with interview statements.

Note: S, J, and D denote remarks taken from SW Electric, Jinling, and Dachangjiang, respectively.

Abasement
(S) As long as what is good for the long-term well being of the company, we should learn, no matter Western or Eastern.
(S) Mr RW picks up many ideas from the Harvard Business School and adapts them to his management philosophy.
(J) Even university graduates are put into six months' training in the assembly line.
(D) The purpose of training is to induce self-improvement.
(D) Chinese people sometimes demonstrate negative aspects of their values. But combining with a good system like TQM and ISO 9000, the negative side can be gradually corrected.
(D) Problem solving is only the second objective of QCCs. QCCs are to encourage experience exchange.
Respect for authority
(S) The management philosophy at SW Electric was brought down from the founder, Mr SW.
(S) Taking a photo with Mr RW is worthier than to get the trophy.
(J) Mr Wu uses a mixture of paternalistic and participative management.
(J) Employees welcome the examination system.
(J) The Confucian teaching of paternalism is to help create a respectable leader.
Adaptiveness
(S) The Chinese saying "the kind of wood you get depends on which hill you go to" has been the management philosophy of Mr SW.
(S) A Chinese company should emphasize on the surrounding environment.
(S) QCCs cannot be directly implemented without adjustments in Chinese soil.
(J) The best Chinese management style is able to mix the best from the West and the Chinese.
(D) Dachangjiang is proud to use Suzuki technology without even one Japanese engineer ever staying in the factory.
(D) Dachangjiang needs from Suzuki only its basic technology but not a replication of Suzuki.
(D) We use SPCD which is a Chinese invention more advanced than the Western SPC.
Harmony with people
(S) Mr RW considers the well being of the employees as the first priority.
(S) Western management style emphasizes on building up a system. Chinese-style management emphasizes on maintaining human relations.
(S) When human relations are harmonious, people will respect the system.
(S) Instead of hiring an outside consultant, we send our staff to learn ISO 9000. They will then teach other staff.
(S) Having only one winning circle makes other circles' morale to drop.
(J) The Chinese have always been collective.
(J) Collective decision making helps maintain harmony.
(J) Mr Wu stresses "he who desires to establish, let others establish also; he who desires to achieve, let others achieve also".
(J) Our customer focus is based on the saying "do not to others what you do not want others do to you".
(D) Dachangjiang's management philosophy is to put foremost emphasis on its employees.
(D) First create satisfied employees, then satisfied customers.

Table 5.1. Mapping Chinese cultural values with interview statements (continued).

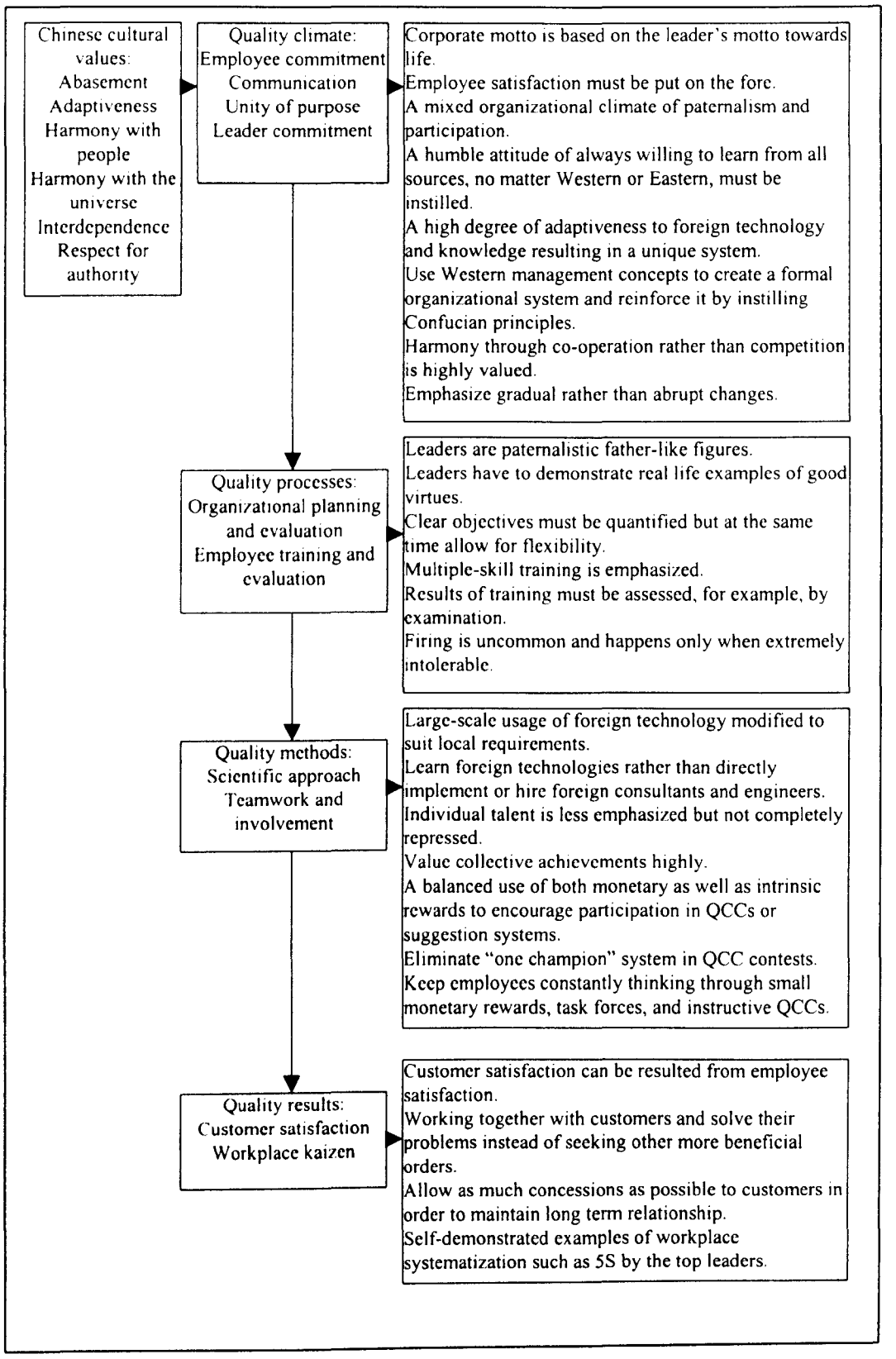
Note: S, J, and D denote remarks taken from SW Electric, Jinling, and Dachangjiang, respectively.

Interdependence
(S) Mr RW often stresses the Chinese saying "we are all on the same boat".
(S) SW Electric's well being depends on its customers' well-being.
(S) We would rather sit down together with the customer to see how to adjust the model rather than to turn down the order.
(J) The relationship with wholesalers is based on trust, with retailers is based on sincerity, with consumers is based on quality.
(D) The relationship with Suzuki is based on co-operation but not dominance.
(D) We would go all the way to Urumqi to provide assistance to our service agent.
Harmony with the universe
(S) The Chinese name of SW Electric literally means "inch by inch".
(J) Success is a matter of gradual accumulation of experience and knowledge, not an abrupt change.
(D) Changes need time while an abrupt change will only result in failure.
Other general acknowledgments on Chinese cultural values
(S) SW Electric is a hybrid of Western and Chinese management styles but the tendency is more towards the Chinese style.
(J) Confucianism is good in nature but was once neglected by communism.
(J) Chinese people are now reusing many of the Confucian principles.
(J) Confucian teachings are in line with good management.
(D) Three values are of particular importance to TQM namely, collectivism, situation orientation, and adaptiveness.

5.5. A Chinese-style TQM

The attempt to map Chinese cultural values with the findings from the three cases has provided substantial insight to identify important characteristics of a Chinese-style TQM system. In order to systematically identify such characteristics, the relationships among the Chinese cultural values and the manifestations as provided in table 5.1. can be further mapped back with the theoretical model of TQM as derived quantitatively earlier. This schematic framework can thus explicitly identify the cultural manifestations at each level of TQM implementation. As such, the main elements of a Chinese culture specific TQM can be identified both at the underlying cultural level as well as the outer manifestation level. Some concluding discussions were then made.

Figure 5.1. Schematic framework of Chinese-style TQM.



From the schematic framework in figure 5.1., a preliminary picture of some characteristics of a Chinese culture specific TQM model is obtained. Cultural values are complex and deeply rooted in the organizational climate. Nevertheless, the success stories as illustrated in the cases did provide some evidences on the theoretical model of cultural influence on TQM as attempted in the present study. Relating back to the emic-etic standpoint and the fusion effect argument, it can be seen that Chinese TQM companies do possess certain differences from companies embedded in other cultural origins.

Chinese companies are mostly paternalistic in nature. However, the definition of paternalism as observed in those Chinese TQM companies is different and is in a much wider sense than the ordinarily perceived meaning of concentrating power and decision making in family hands at the top of the organization (Redding & Wong, 1986). In the Chinese-style TQM model, paternalism extends beyond the familial boundary. The leader has to play the role of not only a spiritual father figure, but also that of a member of the organization who is committed and fully participating. The hierarchical relationship as stressed in Confucianism and the participative nature of TQM have reinforced this.

The leader's personal motto in life often serves as the corporate motto and is instilled into the members of the organization by providing them with examples. Silin (1976) noted that in the typical Chinese organization, the leader does not normally commit oneself openly to a line of action. However, as observed in the Chinese-style TQM model, the leader has to demonstrate his personal beliefs and motto by personally and very often, physically "doing" the job. Through giving real examples, the leader instills into the members the importance of constant

learning and abasement. Thus, in the Chinese-style TQM model, leadership style is not authoritarian but rather a mixture of paternalistic and participative management styles, with an aim of creating a harmonious family extending beyond kinship boundaries.

In fact, it was much argued that the Soviet-style one-man leadership as evolved from the founding of the People's Republic of China as well as the Party leadership style during the 1950s and 1960s were all inconsistent with the Chinese collective tradition (Smith & Wang, 1996: 323). Under a modern framework of Chinese-style management, power has been greatly decentralized. However, adhering to the golden principle of the mean, there is a clear limit for decentralization and empowerment. Organizational members are given appropriate powers to encourage participation and creativity within the custody of a benevolent and caring leader.

The high degree of adaptiveness and situation orientation has rendered the Chinese TQM companies to bravely model on available foreign technologies and knowledge. The leader has to be open-minded and has no sense of shame to use something which is not culturally originated from Chinese soil. Rather, the motto is to learn, adapt, and render a localized version of the foreign technology. In a study of the transfer of Western marketing practices to China, Fan (1998: 205) has systematically pointed out that during the period of a centrally planned economy (1949-1978), Western knowhows were regarded as capitalist evils. The attitude gradually changed during the period of 1979-1992 when certain Western technical knowhows were accepted but still many were perceived as "spiritual pollution". Nevertheless, the situation has changed a lot from 1993 onwards when a socialist

market economy was advocated. A spirit of learning from the West while guarding against any decadent influences has been seen in full force.

The value of face of the Chinese also comes into play. Although we say that the leader has to be open-minded, but if the company is able to adapt a foreign technology and come up with an even more improved technology, this actually serves as a balance on the abasement and face-saving paradox. Just as what was seen in Dachangjiang, the managers were proud to adapt 100% Suzuki technology to produce a local line of product targeted for the local market without having one Japanese engineer stationing in the production process. This high ability to adapt and the spirit of "chasing up" is extremely important in the Chinese-style TQM model.

Another good example seen in SW Electric is the willingness to adopt Western management techniques in order to build up a systematic organization while "humanizing" it the Chinese way by reinforcing traditional Chinese values. This again illustrates a balance between the two traditional Chinese schools of thought that human is by nature good and bad.

The values of harmony with the universe and harmony with people are also centrifugal to the Chinese-style TQM. The belief in gradualism as opposed to the Western emphasis on innovation and reengineering (Hammer & Champy, 1994) is a manifestation of the value of harmony. Instead of bringing in outside consultants to induce radical changes which may distort the harmonious relationship being maintained, the Chinese TQM company would rather send employees to learn the techniques. Culturally speaking, this helps to protect the harmonious family-like atmosphere in the company from being intruded by an

outsider who may bring substantial threats to the family members. Pragmatically speaking, as pointed out by SW Electric, this is often more cost saving also. The inter-woven values of face, abasement, familism, and harmony are so complex and delicate that any abrupt change initiated from external forces can cause serious consequences. Of course, it is not to say that Chinese TQM company does not change at all despite of changing environmental requirements. It is only that the Chinese TQM company changes by carefully observing what is in progress outside, then learns, adapts, and even excels.

As harmony is praised, the employees are treated as the most precious assets in the company. This is in line with the traditional Confucian approach to leadership in which the sage believed that the proper management of a country is to satisfy the needs of its people first. As such, and influenced by the strong familial relationship in the company, the Chinese TQM company would view employee satisfaction as a prerequisite for customer satisfaction.

Conventional TQM principles as seen in most Japanese and American companies have put foremost emphasis on customer satisfaction. It is the other way around in the Chinese TQM company. First create satisfied employees, then satisfied customers. Employee satisfaction is thus greatly influenced by the hierarchical relationship in the organization, the father-like figure of the leader, and the harmonious familial atmosphere in the organization. This is in line with Hui and Tan's (1996: 371) argument that when respect is given, the Chinese perceive their personal worth as being reinstated in the group and this leads to increased job satisfaction and work productivity. Some concrete examples of maintaining a harmonious human relationship were seen appealing. For example,

the elimination of the Western "one champion" system in QCC contests is an extremely good example of maintaining workplace harmony, and more importantly, face.

At the extrinsic level of creating employee satisfaction, monetary rewards play an important role in enhancing employees to pay extra efforts. Very much different from the Japanese companies whose QCCs are mostly voluntary, Chinese QCCs usually have to be encouraged with some monetary rewards. As the Chinese are famous for being pragmatic and situation oriented, this is not difficult to understand. For example, Cheng and Chan (1999) reported that Chinese workers in practicing TQM are frequently more motivated by what they call technological factors, referring to factual and visible work improvement and personal career development. The authors also cited the findings of Chau and Chan (1984) and D.Y. Wang (1992) which indicated that good pay and achievement oriented rewards are highly acknowledged by Chinese workers. On the other hand, Kanji *et al.* (1995) found that building teamwork rather than the bonus system is a major contributor towards quality motivation for Japanese and Korean workers.

What is important here is the ability of the father-like leader to play around the thin and delicate line separating extrinsic and intrinsic rewards. At suitable times, mandatory task forces are assigned to solve problems. At other times, employees are encouraged to provide small suggestions on workplace improvement when small monetary rewards are given. Winning circles in QCC contests are given monetary rewards as well as personal acknowledgments by the top leaders. To grasp the psychology of the Chinese employees, a photo taken

with the top leader is much worthier than actual cash rewards. The leader in the Chinese TQM company must be skillful in truly understanding what the employees need at different times and on different occasions.

Interdependence and sincerity play an important role in customer relationships. These intimate and caring relationships are best described by the Chinese sayings so often mentioned by the managers in the companies interviewed, for example, "all men within four seas are brothers", "the mountain and water will meet one day", "we are all on the same boat", and so on. Thus, relationships are aimed to be maintained at the long-term with the best efforts exerted by, for example, allowing generous concessions when possible and giving technical advice to customers so as to reap mutual benefits.

The table below further illustrates how Chinese-style TQM is superimposed on the TQM principles based on Kanji's (1994) pyramid model.

Table 5.2. Kanji's TQM principles and Chinese-style TQM.

Kanji's TQM principles	Chinese-style TQM
Delight the customer Customer satisfaction: External customer satisfaction must be put in the first priority by constantly monitoring requirements. Internal customers are real: All people in the organization have an effect on external customer satisfaction and thus internal customers are equally important.	Delight the customer Customer satisfaction: External customer satisfaction is brought by internal customer satisfaction. Internal customers are real: A family-like organization which caters for the personal well being of the employees is crucial in enhancing internal customer satisfaction.
People based management Teamwork: Cross-functional teamwork with a common goal of quality improvement allows people to identify and adopt new ways of doing things. People make quality: The role of management is to create an environment where people are willing to take responsibility for the quality of their own work. Autocratic and exhorting management result in counter-productive effects.	People based management Teamwork: Collective rather than individual talents are encouraged. Results of teamwork must be championed collectively also. People make quality: A mixture of paternalistic management to maintain a family-like atmosphere and participative management to encourage involvement provides the environment for quality improvement. The leader must also personally demonstrate full participation

Table 5.2. Kanji's TQM principles and Chinese-style TQM (continued).

Kanji's TQM principles	Chinese-style TQM
Management by fact Measurement: Objective internal and external measurements of customer satisfaction must be used. All work is process: The relationships among all activities are focused as processes and variability within processes must be minimized so as to achieve quality improvement. The seven statistical tools serve the purpose.	Management by fact Measurement: Employees require pragmatic, factual, and visible work improvement and personal career development goals. External customer satisfaction is based on long-term and personalized relationships. All work is process: Foreign technologies for quality improvement are adopted with appropriate modifications to suit the local context.
Continuous improvement Prevention: The design of the product as well as the production process itself must emphasize prevention rather than detection of errors. Continuous improvement cycle: Customer requirement information must be continuously obtained so that new areas of improvement can be identified. Continuous improvement is by continually identifying small, incremental improvements.	Continuous improvement Prevention: Adaptation to the external environment and situation-orientation are the foundation for prevention of errors and constant improvement. Continuous improvement cycle: Continuous improvement is based on constant learning and education. Pure innovation and reengineering are not encouraged.

All in all, the relationships between Chinese cultural values and TQM principles are so complex and intimate that it is actually impossible to describe each and every aspect in full. Further descriptions would probably render the Chinese-style TQM as magnificent and invulnerable as the Japanese-style management which was once misunderstood. It is a fact that the TQM journey for the Chinese firms, especially those in mainland China, is still long and winding.

Researchers such as Wacker (1986), Green (1990), Zhao *et al.* (1995), and Yeung and Chan (1999) have pointed out that many Chinese manufacturing firms do suffer from serious drawbacks when compared to their Western counterparts in terms of TQM implementation. For example, under-educated workers who come from remote rural areas in China are often difficult to be properly trained. Furthermore, unenlightened management staff lacking a modern approach to

quality management is also a common problem. Nevertheless, according to the findings of Yeung and Chan (1999), successful TQM firms in China found Chinese cultural values to be positive towards TQM implementation while many firms which were unsuccessful in implementing TQM found some Chinese cultural values to be barriers instead (Chiu, 1999). Thus, it is again a matter of whether the Chinese companies are able to realize the two-sided nature of Chinese values, whether they can fully integrate the positive side of Confucian values with TQM and to gradually wipe out the negative side of the coin as what has been experienced in the case of Jinling.

It is indeed true that the Chinese companies do reveal images of a large and harmonious family, but when it comes to pragmatic situations such as the repercussions from the recent Asian economic turmoil, tradeoffs between pragmatism and morality do exist as difficult decisions for the Chinese managers. External influences as such represent painful experiences not only for the Chinese managers. These rather represent universal problems. What is important in the present study is to point out that the Chinese-style TQM does have its own strengths and weaknesses. In order to be successful in this turbulent age, it is important for the Chinese manager to realize his or her own unique cultural heritage and to make full use of it so as to achieve a satisfactory fusion effect with TQM principles. It is likely to be a worthwhile exercise in determining one's own strengths and weaknesses in all sorts of daily activities, not to mention only commercial endeavors. As Confucius once said in the Analects, "Not to cultivate virtue, not to review what is learned, not to do the righteous though having heard of it, not to rectify what is not good - these things are what I worry about."

The discussion ends here with a quotation taken from Shenkar and von Glinow's (1994: 59) attempt to pinpoint the unconscious inclination of Western researchers to induce models from their own contextual circumstances. "...for Confucius, administrative work was an activity of such paramount importance that it has been translated into a very explicit prescription on organization and management which is nowhere to be found in Western philosophies". Indeed, the study of Chinese cultural values in the context of managerial endeavors is nonetheless a mine of treasures still to be uncovered.

Chapter VI

Summary and Conclusion

The final chapter first begins with a brief summary of the findings, followed by a brief discussion about the contributions of the research. Finally, the chapter ends with some suggestions for further research.

6.1. Summary of Findings

6.1.1. The TQM Survey

To assess the situation of TQM implementation, a modified version of the Quality and Productivity Self-Assessment Guide for Defense Organizations Version 1.0 (DoD, 1992) was administered to a total of 385 ISO 9000 certified Chinese companies operating in Hong Kong, Taiwan, and mainland China. Principal component factor analysis revealed ten underlying factors namely, f1: employee commitment, f2: communication, f3: unity of purpose, f4: leader commitment, f5: organizational planning and evaluation, f6: employee training and evaluation, f7: scientific approach, f8: teamwork and involvement, f9: customer satisfaction, and f10: workplace kaizen. These ten factors assembled around the four major quality dimensions namely, quality climate (QC), quality processes (QP), quality methods (QM), and quality results (QR). A review of the writings of the various writers on quality showed critical TQM elements similar to these ten factors.

Using MANOVA techniques, industry size and industry type were found not to affect TQM activities. This finding has actually confirmed statistically the often stated argument that TQM can be implemented in any organization of any size and type. However, region did have an effect on QC and QP, but not QM and QR. This has led to the belief that companies operating in different Chinese

regions do have different organizational climates due to differences in socio-cultural settings. Such differences should be noted here although Hong Kong, Taiwan, and mainland China are all Chinese regions. Nevertheless, the Chinese people in the three regions should possess some common underlying cultural values, but due to different ways of manifesting such values, the overall picture of their cultural dimensions thus show some differences. These different organizational climates in turn influence the ways of managing quality to vary in the three regions but leading to the same outcome of achieving high quality standards. This finding has actually supported that a fusion between TQM principles and the local culture creates a culture-specific TQM system which can achieve basic objectives in quality management.

6.1.2. The CCV Survey

To assess the value dimensions of the Chinese people, the Chinese cultural value inventory developed by Yau (1994) was employed. In fact, due to differences in social, political, and cultural settings, it was decided that to assume the Chinese people in the three different Chinese regions to have the same degree of Chinese-ness is unreasonable. However, since cultural values are underlying and deeply embedded, some commonalities should be identified. Confimatory factor analysis revealed that a six-factor model of common Chinese cultural value including (1) abasement, (2) adaptiveness, (3) harmony with people, (4) harmony with the universe, (5) interdependence, and (6) respect for authority indicated an excellent model fit. The model is consistent with the value orientation framework of F. Kluckhohn and Strodtbeck (1961) encompassing the man to nature orientation, man-himself orientation, relational orientation, and personal activity orientation.

The terminal feature of the underlying values is also supported by the MANOVA results indicating that the size or type of organizations people work in do not cause any effect of differences.

6.1.3. The Structural Model

A structural equation model explaining the inter-relationships among the four quality dimensions and Chinese cultural values was then postulated. The four quality dimensions took the form of an input-process-output model with QC as the input variables, QP and QM as the process variables, and QR as the output variable. This quality management model is in line with the four propositions as raised by Anderson *et al.* (1994). The inclusion of common Chinese cultural values (COCCV) into the four-variable model proposed a refinement of this four-proposition framework by stressing the importance of the underlying values of organizational members.

Each measurement model of each variable in the model was tested separately and results revealed that loadings of the manifest variables f1 to f10 on the four quality dimensions QC, QP, QM, and QR were all statistically significant, indicating high construct validity.

The proposed structural model incorporating the influence of COCCV on the four-variable quality management model with QC acting as an intermediary was tested. Maximum likelihood estimation indicated a good model fit. To further validate the model, an alternative model was postulated with COCCV having direct effects on QP, QM, and QR. This model was rejected given that no statistically significant nor reasonable influences were exerted by COCCV on

these three quality variables. Thus, the importance of QC as an intermediary and the existence of indirect effects were supported.

6.1.4. Case Studies

The influence of Chinese cultural values on the TQM activities of the Chinese companies was statistically proven. However, the question of how do such relationships exist in reality cannot be easily answered. Therefore, three case studies were presented with the hope of using real life examples to qualitatively support the statistical findings.

Three ISO 9000 companies, one operating in Hong Kong, and the other two in the Guangdong province of mainland China, were depicted. In general, it was found out through interviews that the Chinese company leaders are most instrumental in instilling an organizational climate positive towards TQM. Such instillations are frequently based on personal mottoes of life, which in turn are based on traditional Chinese values. It was also found out that the emphasis on a harmonious and familial relationship is highly valued. Success for Chinese companies is a matter of integrating a systematic management system with the Chinese approach of human relations emphasizing trust and collective harmony. Furthermore, a re-emphasis on traditional Confucian values has recently been stressed by company leaders due to the gradual change in the political situation in mainland China. Nevertheless, the abuse of traditional Confucianism has to be inhibited by implementing a systematic management approach. In particular, the adaptiveness and situation orientation of the Chinese people were found to be highly helpful towards this end.

After schematically mapping back the remarks and statements given by the interviewees with the Chinese cultural values identified statistically, a deeper understanding of how these values are manifested in TQM activities was obtained. In order to describe the characteristics of the Chinese-style TQM model, a schematic framework encompassing all quantitative and qualitative findings was developed. Some of the salient characteristics of Chinese-style TQM are summarized as follows:

1. The organizational climate represents a fusion between the paternalistic and hierarchical relationships as in Confucian principles and the participative management style as advocated in TQM. The essence is to use the former to act as the boundary within which the latter works so as to maintain a harmonious family-like organization.

2. Organizational leaders cannot simply provide tacit spiritual guidance. Rather, they are "down to earth" and have to fully involve and participate in organizational endeavors in order to demonstrate real life examples of the virtuous father-like figure. The realization of personal mottoes in life provides the key ingredients of the meaning of corporate existence.

3. The Western quantum leap or pure innovation approach is not congruent with Chinese cultural values. Rather, the emphasis is on adapting and refining foreign technologies so as to result in a unique system. Thus, the institutional arrangements of good Western management practices are highly acknowledged in the building of a structural organizational system while it is contextualized by underlying Chinese cultural values.

4. Education is highly praised. Multiple-skill training is emphasized and must be assessed periodically through examinations so as to bring about visible expectations and achievements in congruence with Chinese pragmatism.

5. Collective rather than individual talents are encouraged and there must be a contingent application of both monetary and intrinsic rewards to enhance group participation. The Western individualistic "one champion" approach nor the Japanese-style voluntarism are directly applicable.

6. The first priority of the company is to provide employee satisfaction which will in turn lead to customer satisfaction. Familism is extended out of the organizational boundaries to the customers and trading partners.

6.2. Contributions of the Research

It was felt that the research has made several contributions to the study of quality management. Firstly, the theoretical contribution lies in the proposal and development of an explicit and comprehensive model for explaining the inter-relationships among national cultural values and quality management elements. Many researchers have proposed theories dealing with the creation of an organizational culture positive towards the implementation of TQM activities. However, very few have ever linked the study of TQM with national culture in spite of anecdotal evidence that such an impact is clear. This is true as an attempt to search for published articles relating national culture and TQM using some of the popular journal article search facilities such as UMI Proquest, ANBAR, Social Science Index, and so on returned only very few valid results. Even when aspects of national culture were mentioned in these publications, most remained superficial and did not employ any systematic and scientific research methodology

to formally test the relationships. Almost none employed any model building approach. Furthermore, most of these publications mainly concentrated on discussing the impact of organizational culture on TQM. As to how a national culture nurtures a quality climate, very few discussions have been made. The present study thus makes its share of contribution by filling this gap through operationalizing the theoretical variables of national culture, organizational quality climate, and quality management system implementation.

Most theories on organizational climate related with TQM have been based on Western psychological and social processes. The present research is among the first to relate Chinese cultural values, as a foundation for the creation of quality climate, with TQM implementations in Chinese companies following an emic and derived etic approach. With the Chinese economy representing one of the hottest area of research in business management today, the present study has actually presented timely information and an alternative to the American or Japanese TQM literature. Also, most publications to date are limited to a relatively narrow or a singly isolated aspect of TQM rather than studying the impact of culture on TQM as a holistic concept. The present study, in contrast, proposed a more comprehensive model which has captured a holistic view of culture on TQM by operationalizing theoretical variables grounded in sound social and psychological theories.

The study has also made a contribution to the Chinese psychology literature. It is well understood that Chinese psychology is still regarded as a newcomer to the international arena of psychological studies. In terms of formally tested and workable instruments to capture the value dimensions of the Chinese

people, it is widely known that the available choices are scarce. To improve this situation, replications of prior studies help to refine the retest reliability of such instruments. The present instance to employ the Chinese cultural value inventory in three Chinese regions has provided further evidences for comparison and theory building. Moreover, the scope of application of the instrument has also been enlarged.

Finally, the study has also made a modest contribution to the practical aspects of TQM implementation. TQM has never been a miraculous drug for companies wishing to engage in quality improvement. The successful implementation of TQM for visible results requires time and most important of all, adaptation to the local cultural context. There have been many reports on the failure of TQM implementations both in the Western and the Eastern worlds. Most of them accounted failure as a result of direct implementation of TQM processes imported from foreign soil or the adoption of an unsuitable management mentality towards TQM. However, the question lies in what kind of adaptation has to be made for effective implementation? Also, when adaptations are being made, which cultural value is more sensitive to TQM implementation and as such how should practitioners model their TQM activities in order to suit the culture? By referring to the model as suggested in this study, practitioners are able to grasp a better understanding of the cultural values relevant to TQM activities and thus can formulate better strategies for modeling their own TQM activities and implementations. In other words, management needs a thorough self-reflection before a particular systematic management approach can be adopted. TQM is essentially people-oriented management. For the Chinese people to succeed in

today's global competition, understanding their own position as a product of their culture which stems from a civilization of over four thousand years is an essential pre-requisite.

6.3. Recommendations for Further Research

The study has argued that TQM, when implemented in a certain cultural context, leads to a fusion between the underlying values of the members of the culture and the fundamental TQM principles, thus creating a culture-specific TQM. This culture-specific TQM system has its own way of operations and manifestations and can lead to the fundamental objectives of quality improvement. A limitation of the present study is the lack of more in-depth study on how the TQM companies in the three Chinese regions differ, but achieving the same quality results. The study has concentrated more on the aspect of commonalities but less on differences. Delineating these differences is warranted because the three Chinese regions do demonstrate different social, political, and cultural background. A further research as such can contribute more to the existing literature of cross-cultural management theory.

Furthermore, the qualitative case studies performed in the present study have not employed more sophisticated techniques such as ethnography and other advanced qualitative research methods. Also, the number of companies studied remained small for the purpose of achieving generalizability. As the study has already spent its major portion to derive a theoretical model based on sound quantitative techniques, more qualitative studies on a larger number of companies can provide more supportive information.

Finally, as such a culture-specific TQM model is believed to exist, it would be intriguing to conduct cross-cultural studies so as to identify similarities and differences among different culture-specific TQM models.

References

Abo, T. (1994). The analysis of Japanese factories located overseas. In T. Abo (ed.) *Hybrid Factory: The Japanese Production System in the United States*. New York: Oxford University Press.

Amemiya, Y. & T.W. Anderson (1990). Asymptotic chi-square tests for a large class of factor analysis model. *The Annals of Statistics*. 18, pp. 1453-1463.

Anderson, J.C., M. Rungtusanatham, & R.G. Schroeder (1994). A theory of quality management underlying the Deming management method. *Academy of Management Review*. 19, (3), pp. 472-509.

Ansoff, I. (1965). *Corporate Strategy*. New York: McGraw-Hill.

APO (1997). *Productivity Statistics: Productivity Indexes and Levels in APO Member Countries*. Tokyo: Asian Productivity Organization.

Arbuckle, J. (1997). *Amos User's Guide*. Chicago: Smallwaters Corporation.

Bagozzi, R.P. (1980). *Causal Models in Marketing*. New York: John Wiley & Sons.

Bem, D.J. (1970). *Beliefs, Attitudes, and Human Affairs*. Belmont, CA: Brooks.

Bentler, P.M. & D.G. Bonett (1980). Significance tests and goodness of fit in the analysis of covariance structure. *Psychological Bulletin*. 88, (3), pp. 588-606.

Berry, J.W. (1969). On cross-cultural comparability. *International Journal of Psychology*. 4, (2), pp. 119-28.

Berry, J.W. (1990). Imposed etics, emics, and derived etics: Their conceptual and operational states in cross-cultural psychology. In T.N. Headland, K.L. Pike, & H. Harris (eds.) *Emics and Etics*. London: Sage.

Berry, J.W., Y.H. Poortinga, M.H. Segall, & P.R. Dasen (1992). *Cross-Cultural Psychology: Research and Applications*. New York: Cambridge University Press.

Beyer, J.M., D.P. Ashmos, & R.N. Osborn (1996). Contrasts in easing TQM: Mechanistic vs. organic ideology and implementation. Unpublished manuscript.

Blalock, H.M., Jr. (1961). *Causal Inferences in Non-experimental Research*. New York: W.W. Norton & Co.

Bohrnstedt, G.W. & D. Knoke (1988). *Statistics for Social Data Analysis*. Second edition. Illinois: F.E. Peacock Publishers.

Bond, M.H. (1988). Finding universal dimensions of individual variations in multi-cultural studies: The Rokeach and Chinese value surveys. *Journal of Personality and Social Psychology*. 55, (6), pp. 1009-1015.

Bond, M.H. (1996). Chinese Values. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Bond, M.H. & K.K. Hwang (1986). The social psychology of Chinese people. In M. Bond (ed.) *The Psychology of the Chinese People*. New York: Oxford University Press.

Bounds, G., L. Yorks, M. Adams, & G. Ranney (1994). *Beyond Total Quality Management*. Singapore: McGraw-Hill.

Boyer, R. (1998). Hybridization and models of production: Geography, history, and theory. In R. Boyer, E. Charron, U. Jurgens, & S. Tolliday (eds.) *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*. New York: Oxford University Press.

Bright, K. & C.L. Cooper (1993). Organizational culture and the management of quality: Towards a new framework. *Journal of Managerial Psychology*. 8, (6), pp. 21-27.

Brislin, R.W. (1980). Translation and content analysis of oral and written material. In H.C. Triandis & J.W. Berry (eds.) *Handbook of Cross-Cultural Psychology Volume 1*. Boston: Allyn and Bacon.

Brocka, B. & M.S. Brocka (1992). *Quality Management: Implementing the Best Ideas of the Masters*. Illinois: Richard D. Irwin.

Browne, M.W. (1984). Asymptotic distribution-free methods for the analysis of covariance structures. *British Journal of Mathematics and Statistical Psychology*. 37, pp. 62-83.

Browne, M.W. & G. Mels (1992). *RAMONA PC User's Guide*. Columbus: Ohio State University.

Browne, M.W. & A. Shapiro (1988). Robustness of normal theory methods in the analysis of linear latent variate models. *British Journal of Mathematics and Statistical Psychology*. 41, pp. 193-208.

Bryman, A. & C. Duncan (1990). *Quantitative Data Analysis for Social Scientists*. London: Routledge.

Bureau of Business Practice (1992). *ISO 9000: Handbook of Quality Standards and Compliance*. New Jersey: Prentice Hall.

Cameron, K. & W. Sine (1999). A framework for organizational quality culture. *Quality Management Journal*. 6, (4), pp. 7-25.

Chapman, R. (1998). Introduction. In Total-Quality-Culture, an internet discussion forum (http://www.mailbase.ac.uk/lists/total-quality-culture/).

Chau, A. & G. Chan (1984). A study of job satisfaction of workers in local factories of Chinese, Western, and Japanese ownership. *The Hong Kong Manager*. September, pp. 9-17.

Chen, S.R. & K.L. Huang (1982). The relationship between personality, needs, work nature, and job satisfaction (in Chinese). *Management Review*. 1, (1), pp. 18-38.

Chen, W.H. (1997) The human side of total quality management in Taiwan: leadership and human resource management. *International Journal of Quality and Reliability Management*, 14, (1), pp. 24-45.

Chen, W.H. & R.S.Y Lu. (1998). A Chinese approach to quality transformation. *International Journal of Quality and Reliability Management*, 15, (1), pp. 72-84.

Cheng, J.P. (1990). *Confucius as a Teacher: Philosophy of Confucius with Special Reference to its Educational Implications*. Beijing: Foreign Language Press.

Cheng, K.H. (1980). Workers and their job attitudes: Exploratory studies of young factory workers (in Chinese). *Bulletin of the Institute of Ethnology, Academia Sinica*. 21, pp. 1-170.

Cheng, T.C. (1996). Survey report: Hong Kong. In T. Umeda (ed.) *TQM Practices in Asia-Pacific Firms*. Tokyo: Asian Productivity Organization.

Cheng, T.K. & S.F.F. Chan (1999). Quality motivation in China: Humanistic and technological. *Total Quality Management*. 10, (7), pp. 967-978.

Cheung, F.M. (1996). The assessment of psychopathology in Chinese societies. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Cheung, F.M., K. Leung, R.M. Fan, W.Z. Song, J.X. Zhang, & J.P. Zhang (1996). Development of the Chinese personality assessment inventory. *Journal of Cross-Cultural Psychology*. 27, (2), pp. 181-199.

Child, J. (1994). *Management in China During the Age of Reform*. New York: Cambridge University Press.

Chiu, R.K. (1999). Employee involvement in a TQM program: problems in Chinese firms in Hong Kong. *Managerial Auditing Journal*. 14, (1), pp. 8-11.

Chu, G.C. (1967). Sex differences in persuability of factors among Chinese. *International Journal of Psychology*. 2, pp. 283-288.

Chuang, C.J., P.S. Cheng, & J.G. Ren (1990). The relationship amongst employees' career stage, organizational environment, organizational commitment, and job satisfaction: A contingency approach (in Chinese). *National Taiwan University Management Research*. 1, (1), pp. 105-136.

Clegg, S., D. Dunphy, & S.G. Redding (1986). Organization and management in East Asia. In S. Clegg, D. Dunphy, & S.G. Redding (eds.) *The Enterprise & Management in East Asia*. Hong Kong: University of Hong Kong.

Cochran, W.G. (1952). The χ^2 test of goodness of fit. *Annals of Mathematical Statistics*. 23, pp. 315-345.

Cook, T.D. & D.T. Campbell (1979). *Quasi-experimentation: Design and Analysis Issues for Field Settings*. Chicago: Rand McNally.

Crittenden, K.S. (1996). Causal attribution process among the Chinese. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Cronbach, L.J. (1990). *Essentials of Psychological Testing*. Fifth edition. New York: Harper and Row.

Cronbach, L.J. & P.E. Meehl (1955). Construct validity in psychological tests. *Psychological Bulletin*. 52, pp. 282-302.

Crosby, P.B. (1979). *Quality is Free*. New York: McGraw-Hill.

Crosby, P.B. (1986). *Quality Without Tears*. New York: McGraw-Hill.

Dale, B.G. (1991), Starting on the road to success. *TQM Magazine*. 3, (2), pp. 125-128.

Dale, B.G. (1994). Japanese total quality control. In B.G. Dale (ed.) *Managing Quality*. Second edition. Hertfordshire: Prentice Hall Europe.

Dale, B.G. & R.J. Boaden (1994). A generic framework for managing quality. In B.G. Dale (ed.) *Managing Quality*. Second edition. Hertfordshire: Prentice Hall Europe.

Dale, B.G., R.J. Boaden, & D.M. Lascelles (1994). Total quality management: An overview. In B.G. Dale (ed.) *Managing Quality*. Second edition. Hertfordshire: Prentice Hall Europe.

Dale, B.G., D.M. Lascelles, & J.J. Plunkett (1990). The process of total quality management. In B.G. Dale & J.J. Plunkett (eds.) *Managing Quality*. Hertfordshire: Philip Allan.

de Bary, W.T. (1988). *East Asian Civilizations: A Dialogue in Five Stages*. Massachusetts: Harvard University Press.

De Mente, B.L. (1991). *Behind the Japanese Bow*. Illinois: Passport Books.

Deal, T. & A. Kennedy (1992). *Corporate Cultures: The Rites and Rituals of Corporate Life*. Massachusetts: Addison Wesley.

Dean Jr., J.W. & D.E. Bowen (1994). Management theory and total quality: Improving research and practice through theory development. *Academy of Management Review*. 19, (3), pp. 392-419.

Deming, W.E. (1986). *Out of the Crisis*. Cambridge: Massachusetts Institute of Technology.

DeVor, R.E., T.H. Chang, & J. Sutherland (1992). *Statistical Quality Design and Control: Contemporary Concepts and Methods*. New York: Macmillan Publishing Co.

DoD (1990). *Quality and Productivity Self-Assessment Guide for Defense Organizations.* Washington DC: U.S. Department of Defense.

DoD (1992). *Quality and Productivity Self-Assessment Guide for Defense Organizations Version 1.0.* Washington DC: U.S. Department of Defense.

Efron, B. & R. Tibshirani (1986). Bootstrap methods for standard errors, confidence intervals, and other measures of statistical accuracy. *Statistical Science.* 1, pp. 54-74.

Emery, F. (1978). A concern for quality. *Human Futures.* Summer, pp. 100-104.

Fan, Y. (1998). The transfer of Western management to China: Context, content and constraints. *Management Learning.* 29, (2), pp. 201-221.

Feigenbaum, A.V. (1991). *Total Quality Control.* New York: McGraw-Hill.

Ferguson, G.A. & Y. Takane (1989). *Statistical Analysis in Psychology and Education.* New York: McGraw-Hill.

Fishbein, M. & I. Ajzen (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research.* Massachusetts: Addison Wesley.

Fox, J. (1980). Effect analysis in structural equation models. *Sociological Methods and Research.* 9, pp. 3-28.

Gabrenya Jr., W.K. & K.K. Hwang (1996). Chinese social interaction: harmony and hierarchy on the good earth. In M.H. Bond (ed.) *The Handbook of Chinese Psychology.* New York: Oxford University Press.

Gao, G., S.T. Ting, & W. Gudykunst (1996). Chinese communication processes. In M.H. Bond (ed.) *The Handbook of Chinese Psychology.* New York: Oxford University Press.

Garvin, D. A. (1988). *Managing Quality: The Strategic and Competitive Edge.* New York: The Free Press.

Ghauri, P., K. Grønhaug, & I. Kristianslund (1995). *Research Methods in Business Studies: A Practical Guide.* Hertfordshire: Prentice Hall International (UK).

Gitlow, H.S. (1994). Total quality management in the United States and Japan. *APO Productivity Journal.* Winter, 93-94, pp. 3-27.

Goh, T.N. (1993). Taguchi methods: some technical, cultural and pedagogical perspectives. *Quality and Reliability Engineering International.* 9, pp. 185-202.

Goetsch, D.L. & S. Davis (1994). *Introduction to Total Quality: Quality, Productivity, Competitiveness.* New York: Macmillan College Publishing Co.

Goodwin, R. & C.S.K. Tang (1996). Chinese personal relationships. In M.H. Bond (ed.) *The Handbook of Chinese Psychology.* New York: Oxford University Press.

Grant, R.M., R. Shani, & P. Krishnan (1994). TQM's challenge to management theory and practice. *Sloan Management Review.* Winter, pp. 25-35.

Green, K. (1990). The uphill climb towards quality. *The China Business Review*. 17, (3), pp. 10-13.

Guilford, J.P. (1959). *Personality*. New York: McGraw-Hill.

Gulliksen, H. & J.W. Tukey (1958). Reliability for the law of comparative judgment. *Psychometrika*. 23, pp. 95-110.

Hackman, J.R. & R. Wageman (1995). Total quality management: empirical, conceptual, and practical issues. *Administrative Science Quarterly*. 40, pp. 309-342.

Hair, J.F., R.E. Anderson, R.L. Tatham, & W.C. Black (1998). *Multivariate Data Analysis*. Fifth edition. New Jersey: Simon & Shuster Company.

Hakstian, A.R., W.T. Rogers, & R.B. Cattell (1982). The behavior of number-of-factors rules with simulated data. *Multivariate Behavioral Research*. 17, pp. 193-219.

Hammer, M. & J. Champy (1994). *Reengineering the Corporation: A Manifesto for Business Revolution*. New York: Harper & Row.

Hampden-Turner, C. & A. Trompenaars (1993). *The Seven Cultures of Capitalism*. New York: Double Day.

Hansen, W. (1994). *Lecture notes for ISO/DIN/DGQ Regional Training Seminar for Quality System Auditors*. HC Hansen Consult.

Hasegawa, H. (1998). Japanese global strategies in Europe and the formation of regional markets. In H. Hasegawa & G.D. Hook (eds.) *Japanese Business Management: Restructuring for Low Growth and Globalization*. London: Routledge.

Hellersberg, E.F. (1953). Visual perception and spatial organizations: A study of performance on the Horn-Hellersberg Test by Chinese subjects. In M. Mead & R. Metraux (eds.) *The Study of Chinese at a Distance*. Chicago: University of Chicago Press.

Hildebrandt, S., K. Kristensen, G. Kanji, & J.J. Dahlgaard (1991). Quality culture and TQM. *Total Quality Management*. 2, (1), pp. 1-14.

Hiniker, P.J. (1969). Chinese reactions to forced compliments: Dissonance reduction or national character?. *Journal of Social Psychology*. 77, pp. 157-176.

HKQAA (1996). *Buyer's Guide July 1996*. Hong Kong: Hong Kong Quality Assurance Agency.

Hoelter, J.W. (1983). The analysis of covariance structures: Goodness-of-fit indices. *Sociological Methods and Research*. 11, pp. 325-344.

Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values*. London: Sage.

Hofstede, G. (1991). *Cultures and organizations: Software of the Mind.* London: McGraw-Hill International.

Hofstede, G. & M.H. Bond (1988). The Confucian connection: From cultural roots to economic growth. *Organizational Dynamics*, 16, (4), pp. 4-21.

Hoyle, R.H. (1995). The structural equation modeling approach: Basic concepts and fundamental issues. In R.H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues, and Applications*. California: Sage.

Hoyle, R.H. & A.T. Panter (1995). Writing about structural equation models. In R.H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues, and Applications*. California: Sage.

Hsu, C.K. (1977). A research of factory workers' job satisfaction and its correlates (in Chinese). *Bulletin of the Institute of Ethnology, Academia Sinica*. 43, pp. 23-63.

Hu, H.C. (1944). The Chinese concept of "face". *American Anthropologist*. 46, pp. 45-64.

Hu, L.T. & P.M. Bentler (1995). Evaluating model fit. In R.H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues, and Applications*. California: Sage.

Huang, K.L. (1986). Organizational commitment and career commitment among Taiwanese high school teachers (in Chinese). *National Chengchi University Bulletin*. 53, pp. 55-84.

Huang, H.C., K.K. Hwang, & Y.H. Ko (1983). Life stress, attribution style, social support and depression among university students (in Chinese). *Acta Psychologia Taiwanica*. 25, pp. 31-47.

Hui, C.H. & K.C. Tan (1996). Employee motivation and attitudes in the Chinese workplace. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Hwang, K.K. (1987). Face and favor: The Chinese power game. *American Journal of Sociology*. 92, (4), pp. 944-974.

Iizuka, Y. (1996). Integrating ISO 9000 with Japan's TQM. *APO Productivity Journal*. Winter, pp. 3-23.

Imai, M. (1991). *Kaizen: The Key to Japan's Competitive Success*. Singapore: McGraw-Hill International.

Inkeles, A. & D.J. Levinson (1954). National character: The study of modal personality and sociocultural systems. In G. Lindzey (ed.) *Handbook of Social Psychology*. Cambridge: Addison Wesley.

ISO (1994a). *ISO Standards Compendium: ISO 9000 Quality Management*. Geneva: International Organization for Standardization.

ISO (1994b). *Compatible Technology Worldwide*. Geneva: International Organization for Standardization.

ISO 9000 News. January, 1994.

Ishikawa, K. (1982). *Guide to Quality Control*. Tokyo: Asian Productivity Organization.

Ishikawa, K. (1985). *What is Total Quality Control? The Japanese Way*. New Jersey: Prentice-Hall.

Ishikawa, K. (1990). *Introduction to Quality Control*. Tokyo: 3A Corporation.

Japan Productivity Center for Socio-Economic Development (1994). *In Pursuit of Creative Management in the Context of Globalization*. Consultation paper for managerial reform. November.

Jenner, R.A., L. Herbert, A. Appell, & J. Baack (1998). Using quality management for cultural transformation of Chinese state enterprises: A case study. *Journal of Quality Management*. 3, (2), pp. 193-210.

Jöreskog, K.G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika*. 32, pp. 443-482.

Jöreskog, K.G. (1993). Testing structural equation models. In K.A. Bollen, & J.S. Long (eds.) *Testing Structural Equation Models*. California: Sage.

Juran, J. M. (1951). *Quality Control Handbook*. New York: McGraw-Hill.

Juran, J.M. (1988). *Juran on Planning for Quality*. New York: The Free Press.

Juran, J.M. (1989). *Juran on Leadership for Quality: An Executive Handbook*. New York: The Free Press.

Juran, J.M. (1992). *Juran on Quality by Design: The New Steps for Planning Quality into Goods and Services*. New York: The Free Press.

Juran, J.M. (1995). *Managerial Breakthrough: The Classic Book on Improving Management Performance*. New York: McGraw-Hill.

Kaiser, H.F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*. 20, pp. 141-151.

Kanji, G.K. (1990). Total quality management: the second industrial revolution. *Total Quality Management*. 1, (1), pp. 3-12.

Kanji, G.K. (1994). Total quality management and statistical understanding. *Total Quality Management*. 5, (3), pp. 105-114.

Kanji, G.K. (1996). Implementation and pitfalls of total quality management. *Total Quality Management*. 7, (3), pp. 331-343.

Kanji, G.K. (1998). An innovative approach to make ISO 9000 standards more effective. *Total Quality Management*. 9, (1), pp. 67-78.

Kanji, G.K., K. Kristensen, & J.J. Dahlgaard (1995). Quality motivation. *Total Quality Management*. 6, (4), pp. 427-434.

Kanji, G.K. & H.Yui (1997). Total quality culture. *Total Quality Management*. 8, (6), pp. 417-428.

Kano, N. (1994). TQM in Japan: A retrospective and prospective outlook. *APO Productivity Journal*. Winter, 93-94, pp. 3-27.

Kaplan, D. (1995). Statistical power in structural equation modeling. In R.H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues, and Applications*. California: Sage.

Kido, A. (1986). Small group activity: A Japanese American comparison (in Japanese). *Nihon Roumou Gakkai Nenpou*.

Kluckhohn, C. (1951). Values and value-orientations in the theory of actions: An exploration in definitions and classifications. In T. Parsons & E.A. Shils (eds.) *Towards a General Theory of Action*. Cambridge: Harvard University Press.

Kluckhohn, F.R. & F.L. Strodtbeck (1961). *Variations in Value Orientations*. Illinois: Row, Peterson & Co.

Kroeber, A.L. (1917). The superorganic. *American Anthropologist*. 19, (2), pp. 163-213.

Kroeber, A.L. & C.K. Kluckhohn (1952). *Culture: A Critical Review of Concepts and Definitions*. Cambridge: Peabody Museum.

Laaksonen, O. (1988). *Management in China during and after Mao in Enterprises, Government, and Party*. Berlin: Walter de Gruyter.

Lascelles, D.B. & B.G. Dale (1994). Difficulties and barriers to quality improvement. In B.G. Dale (ed.) *Managing Quality*. Second edition. Hertfordshire: Prentice Hall Europe.

Lau, S.K. & H.C. Kuan (1988). *The Ethos of the Hong Kong Chinese*. Hong Kong: The Chinese University Press.

Lee, C.C., C.H. Li, & K. Chan (1996). Survey report: Republic of China. In T. Umeda (ed.) *TQM Practices in Asia-Pacific Firms*. Tokyo: Asian Productivity Organization.

Lee, H.B. & A.L. Comrey (1979). Distortions in a commonly used factor analytic procedure. *Multivariate Behavioral Research*. 14, pp. 301-321.

Lee, R.P.L. (1985). Social stress and coping behavior in Hong Kong. In W.S. Tseng & D.Y.H. Wu (eds.) *Chinese Culture and Mental Health*. Florida: Academic Press.

Lee, T.Y. (1994). A Hong Kong experience of implementing ISO 9000: a research report on company certification (in Chinese). *Hong Kong Economic Journal*. 213, pp. 73-75.

Lee, T.Y. (1998). The development of ISO 9000 certification and the future of quality management: a survey of certified firms in Hong Kong. *International Journal of Quality and Reliability Management*. 15, (2), pp. 162-177.

Leung, K. (1996). The role of beliefs in Chinese culture. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Levitine, T. (1973). Values. In J.P. Robinson & P.R. Shaver (eds.) *Measures of Social Psychological Attitudes*. Ann Arbor: University of Michigan.

Li, Y.Y. & X.Y. Lu (1982). Research on traditional work attitude and its change (in Chinese). In Z.G. Yu (ed.) *Development of Human Resources in Taiwan Vol. 1*. Taiwan: Institute of Economics, Academia Sinica.

Lin, Y.T. (1935). *My Country and My People*. New York: Reynal and Hitchcock.

Lo, H.Y. (1998). A Chinese perspective on total quality management: The recapitulation of Confucian principles. *International Journal of Management*. 15, (4), pp. 508-515.

Lo, H.Y. (1999). The revealing of an oriental approach towards better quality: The intrinsic Confucianism of Chinese. In S.K.M. Ho (ed.) *TQM and Innovation: Proceedings of the Fourth International Conference on ISO 9000 and TQM*. Hong Kong: Hong Kong Baptist University.

Lu, M. (1983). *Confucianism: Its Relevance to Modern Society*. Singapore: Federal Publications.

Lundstrom, W.J. & L.M. Lamont (1976). The development of a scale to measure customer discontent. *Journal of Marketing Research*. 8, pp. 373-81.

MacCallum, R.C., M. Roznowski, & L.B. Necowitz (1992). Model modifications in covariance structure analysis: The problem of capitalization on chance. *Psychological Bulletin*. 111, pp. 490-504.

Maccoby, M. (1994). Creating quality cultures in the East and West. *Research Technology Management*. 37, (1), pp. 57-59.

Malhotra, N.K. (1993). *Marketing Research: An Applied Orientation*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Manly, B.F.J. (1986). *Multivariate Statistics Methods: A Primer*. London: Chapman & Hall.

Mao, T.T. (1972). *Quotations from Chairman Mao Tsetung*. Peking: Foreign Language Press.

Markel, K.S. & M.R. Frone (1998). Job characteristics, work-school conflict, and school outcomes among adolescents: Testing a structural model. *Journal of Applied Psychology*. 83, (2), pp. 277-287.

Martinsons, M.G. (1996). Cultural constraints on radical reengineering: Hammer and Lewin meet Confucius. *Journal of Applied Management Studies*. 5, (1), pp. 85-96.

Martinsons, M.G. & P.S. Hempel (1998). Chinese business process reengineering. *International Journal of Information Management*. 18, (6), pp. 393-407.

Mellenbergh, G.J. (1982). Contingency table models for assessing item bias. *Journal of Educational Statistics*. 7, pp. 105-118.

Miyai, J. (1995). The redesign of Japanese management systems and practices. *APO Productivity Journal*. Summer, pp. 27-41.

Mizuno, S. (1979). *Managing for Quality Improvement: The Seven New QC Tools*. Massachusetts: Productivity Press.

Mizuno, S. (1988). *Company-Wide Total Quality Control*. Tokyo: Asian Productivity Organization.

Mizuno, S. (1994). Introduction. In S. Mizuno & Y. Akao (eds.) *QFD: The Customer-Driven Approach to Quality Planning and Deployment*. Tokyo: Asian Productivity Organization.

Mueller, R.O. (1996). *Basic Principles of Structural Equation Modeling: An Introduction to LISREL and EQS*. New York: Springer Verlag.

Mulaik, S.A. (1987). Toward a conception of causality applicable to experimentation and causal modeling. *Child Development*. 58, pp. 18-32.

Mulaik, S.A. & L.R. James (1995). Objectivity and reasoning in science and structural equation modeling. In R.H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues, and Applications*. California: Sage.

Muthén, B.O. (1992). Response to Freedman's critique of path analysis: Improve credibility by better methodological training. In J.P. Shaffer (ed.) *The Role of Models in Non-experimental Social Science: Two Debates*. Washington DC: American Educational research Association.

Morris, C. & L.V. Jones (1955). Value scales and dimensions. *Journal of Abnormal and Social Psychology*. 51, pp. 523-35.

Napier, I. (1997). Australian culture and the acceptance of TQM. *APO Productivity Journal*. Winter, pp. 104-118.

Negandhi, A.R. (1986). Three decades of cross-cultural management research: Alice in Wonderland. In S. Clegg, D. Dunphy, & S.G. Redding (eds.) *The Enterprise & Management in East Asia*. Hong Kong: University of Hong Kong.

Nita, M. (1978). JK activity in the iron and steel industry (in Japanese). *Nihon Roudou Kyokai Zasshi*. 9.

Nunnally, J.C. (1978). *Psychometric Theory*. Second edition. New York: McGraw-Hill.

Onglatco, M.L.U. (1988). *Japanese Quality Control Circles: Features, Effects and Problems*. Tokyo: Asian Productivity Organization.

Parsons, T. (1951). *The Social System*. London: Routledge & Kegan Paul.

Parsons, T. (1956). Suggestions for a sociological approach to the theory of organizations - part I. *Administrative Science Quarterly*, June, pp. 63-85.

Peterson, M. & K. Cameron (1995). *Total Quality Management in Higher Education: From Assessment to Improvement*. Ann Arbor: University of Michigan.

Pike, K.L. (1954). *Language in Relation to a Unified Theory of the Structure of Human Behavior*. Glendale: Summer Institute of Linguistics.

Powell, T.C. (1995). Total quality management as competitive advantage: A review and empirical study. *Strategic Management Journal*, 16, (1), pp. 15-37.

Prescott, B.D. (1995). *Creating a World Class Quality Organization: 10 Essentials for Business Success*. London: Kogan Page.

Price, F. (1984). *Right First Time*. Aldershot: Gower.

Redding, S.G. (1990). *The Spirit of Chinese Capitalism*. Berlin: Walter de Gruyter.

Redding, S.G. & G. Wong (1986). The psychology of Chinese organizational behavior. In M.H. Bond (ed.) *The Psychology of the Chinese People*. New York: Oxford University Press.

Revelle, W. & T. Rocklin (1979). Very simple structure: An alternative procedure for estimating the optimal number of interpretable factors. *Multivariate Behavioral Research*. 14, pp. 403-414.

Rokeach, M. (1973). *The Nature of Human Values*. New York: The Free Press.

Roney, J. (1997). Cultural implications of implementing TQM in Poland. *Journal of World Business*. 32, (2), pp. 152-169.

Ross, J.E. (1993). *Total Quality Management: Text, Cases, and Readings*. Florida: St. Lucie Press.

Rugman, A. (1981). *Inside the Multinationals*. New York: Columbia University Press.

Satorra, A. & P.M. Bentler (1990). Model conditions for asymptotic robustness in the analysis of linear relations. *Computational Statistics and Data Analysis*. 10, pp. 235-249.

Satorra, A. & P.M. Bentler (1991). Goodness of fit test under IV estimation: Asymptotic robustness of a NT test statistic. In R. Gutierrez & M.J. Valderrama (eds.) *Applied Stochastic Models and Data Analysis*. Singapore: World Scientific.

Schein, E.H. (1985). *Organizational Culture and Leadership*. San Francisco: Jossey Bass.

Schumacker, R.E. & R.G. Lomax (1996). *A Beginner's Guide to Structural Equation Modeling*. New Jersey: Lawrence Earlbaum and Associates.

Schwartz, S.H. & W. Bilsky (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology*. 53, (3), pp. 550-562.

Schwartz, S.H. & W. Bilsky (1990). Toward a universal psychological structure of human values: Extensions and cross-cultural replications. *Journal of Personality and Social Psychology*. 58, (5), pp. 878-891.

Shen, Q.W., S.S. Liu, & J.Y. Huang (1989). Employees' boycott behavior and attitude towards management control as well as level of satisfaction (in Chinese). *Management Review*. 8, pp. 159-175.

Shenkar, O. & M.A. von Glinow (1994). Paradoxes of organizational theory and research: Using the case of China to illustrate national contingency. *Management Science*. 40, (1), pp. 56-71.

Shewhart, W.A. (1931). *Economic Control of Quality of Manufactured Products*. New York: Van Nostrand.

Shuster, D. H. (1990). *Teaming for Quality Improvement: A Process for Innovation and Consensus*. New Jersey: Prentice Hall.

Silin, R. (1976). *Leadership and Values*. Cambridge: Harvard University Press.

Smith, P.B. & Z.M. Wang (1996). Chinese leadership and organizational structure. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Smith, W.W. (1973). *Confucianism in Modern Japan: A Study of Conservatism in Japanese Intellectual History*. Tokyo: Hokuseido Press.

Spencer, B.A. (1994). Models of organization and total quality management: A comparison and critical evaluation. *Academy of Management Review*. 19, (3), pp. 446-471.

StatSoft Inc.(1997). *Electronic Statistics Textbook*. Oklahoma: StatSoft (http://www.statsoft.com/textbook/stathome.html/).

Steiner, G.A. (1979). *Strategic Planning*. New York: The Free Press.

Stevens, J. (1986). *Applied Multivariate Statistics for the Social Science*. New Jersey: Lawrence Earlbum Associates.

Su, S.L. & K.L. Huang (1992). Secondary school teachers' attitudes towards teachers' union participation and strikes (in Chinese). *Education and Psychology Research*. 15, pp. 173-214.

Sue, D.W. & B.A. Kirk (1972). Psychological characteristics of Chinese-American students. *Journal of Counseling Psychology*. 19, pp. 471-478.

Sugimoto, S. (1979). Development of small group activity. *Report of Statistical Application Research, JUSE*. 25, (2), pp. 61-66.

Taguchi, G. (1986). *Introduction to Quality Engineering: Designing Quality into Processes*. Tokyo: Asian Productivity Organization.

Talley, D.J. (1991). *Total Quality Management: Performance and Cost Measures: The Strategy for Economic Survival*. Wisconsin: ASQC Quality Press.

The Chinese Cultural Connection (1987). Chinese values and the search for culture-free dimensions of culture. *Journal of Cross-Cultural Psychology*, 6, (4), pp. 143-164.

Triandis, H.C. (1972). *The Analysis of Subjective Culture*. New York: Wiley.

Triandis, H.C. & G. Marin (1983). Etic plus emic versus pseudoetic: A test of a basic assumption of contemporary cross-cultural psychology. *Journal of Cross-Cultural Psychology*. 14, (4), pp. 489-500.

Triandis, H.C., C. McCusker, H. Betancourt, S. Iwao, K. Leung, J.M. Salazar, B. Setiadi, J.B.P. Sinha, H. Touzard, & Z. Zaleski (1993). An etic-emic analysis of individualism and collectivism. *Journal of Cross-Cultural Psychology*. 24, (3), pp. 366-383..

Tull, D.S. & D.I. Hawkins (1980). *Marketing Research: Measurement and Method*. Second edition. New York: Macmillan.

Uemura, T. (1998). Japanization and late developer effects from cross-cultural X-efficiency. *Management Japan*. 31, (1), pp. 3-12.

Umeda, T. (1996). Integrated summary. In T. Umeda (ed.) *TQM Practices in Asia-Pacific Firms*. Tokyo: Asian Productivity Organization.

van de Vijver, F. & K. Leung (1997). *Methods and Data Analysis for Cross-Cultural Research*. New York: Sage.

Wacker, J.G. (1986). How advanced is modern Chinese manufacturing management? *International Journal of Operations and Production Management*. 7, (3), pp. 26-35.

Wang, D.Y. (1992). The motivation of workers in the People's Republic of China: A comparison of work goals of employees in foreign-owned and state-owned enterprises. *Hong Kong Journal of Business Management*. 10, pp. 19-36.

Wang, Z.M. (1992). Managerial psychological strategies for Chinese-foreign joint ventures. *Journal of Managerial Psychology*. 7, (3), pp. 10-16.

Weber, M. (1951). *The Religion of China*. New York: The Free Press.

West, S.G., J.F. Finch, & P.J. Curran (1995). Structural equation models with non-normal variables. In R.H. Hoyle (ed.) *Structural Equation Modeling: Concepts, Issues, and Applications*. California: Sage.

Whetten, D.A. (1989). What constitutes a theoretical contribution? *Academy of Management Review*. 14, (4), pp. 490-494.

Wong S.L. (1991). Chinese entrepreneurs and business trust. In G. Hamilton (ed.) *Business Networks and Economic Development in East and Southeast Asia*. Hong Kong: University of Hong Kong.

Wood, J.M. & D.J. Tataryn (1996). Effects of under and over extraction on principal axis factor analysis with varimax rotation. *Psychological Methods*. 1, (4), pp. 354-365.

Yang, K.S. (1967). A comparative study on the motivational and temperamental characteristics of Malaya and Singapore overseas Chinese students in Taiwan (in Chinese). *Bulletin of the Institute of Ethnology, Academia Sinica*. 22, pp. 139-168.

Yang, K.S. (1970). Authoritarianism and evaluation of appropriateness of role behavior. *Journal of Social Psychology*. 80, pp. 171-181.

Yang, K.S. (1986). Chinese personality and its change. In M.H. Bond (ed.) *The Psychology of the Chinese People*. New York: Oxford University Press.

Yang, K.S. (1996). Psychological transformation of the Chinese people as a result of societal modernization. In M.H. Bond (ed.) *The Handbook of Chinese Psychology*. New York: Oxford University Press.

Yang, K.S. & D.Y.F. Ho (1988). The role of yuan in Chinese social life: A conceptual and empirical analysis. In A.C. Paranjpe, D.Y.F. Ho, & R.W. Reiber (eds.) *Asian Contributions to Psychology*. New York: Prager.

Yau, O.H.M. (1994). *Consumer Behavior in China: Customer Satisfaction and Cultural Values*. London: Routledge.

Yeung, C.L. & L.Y. Chan (1999). Towards TQM for foreign manufacturing firms operating in mainland China. *International Journal of Quality and Reliability Management*. 16, (8), pp. 756-771.

Yu, A.B. (1996). Ultimate life concerns, self, and Chinese achievement motivation. In M. Bond (ed.) *Handbook of Chinese Psychology*. New York: Oxford University Press.

Yu, J. & H. Cooper (1983). A quantitative review of reassert design effects on response rates to questionnaires. *Journal of Marketing Research*, 20, pp. 36-44.

Zhang, G.X. (1999). Beyond ISO 9000 certification: A China experience. *Managerial Auditing Journal*. 14, (1), pp. 75-78.

Zhao, X., S.T. Young, & J. Zhang (1995). A survey of quality issues among Chinese executives and workers. *Production and Inventory Management Journal*. 36, (1), pp. 44-48.

Zwick, W.R. & W.F. Velicer (1986). A comparison of five rules for determining the number of components to retain. *Psychological Bulletin*. 99, pp. 432-442.

Appendix A - Quality and Productivity Self-Assessment Guide for Defense Organizations version 1.0

(1: strongly disagree, 2: disagree, 3: somehow disagree, 4: somehow agree, 5: agree, 6: strongly agree)

I. Assessment of Organizational Climate

People in this organization:

1. are aware of its overall mission.	1 2 3 4 5 6
2. are aware of how the organization's mission contribute to higher-level missions and objectives.	1 2 3 4 5 6
3. try to plan ahead for changes that might impact our mission performance.	1 2 3 4 5 6
4. regularly work together to plan for the future.	1 2 3 4 5 6
5. see continuing improvement as essential.	1 2 3 4 5 6
6. Creativity if actively encouraged in this organization.	1 2 3 4 5 6

Every member of this organization:

7. is concerned with the need for quality.	1 2 3 4 5 6
8. knows how to define the quality of what we do.	1 2 3 4 5 6
9. People in this organization emphasize doing things right the the first time.	1 2 3 4 5 6

The leader(s) in this organization (people at the highest level):

10. are committed to providing top quality services/products, work.	1 2 3 4 5 6
11. attempt to find out why the organization may not be meeting a particular goal/objective.	1 2 3 4 5 6
12. People in my work unit know how their supervisors will help them find answers to problems they may be having.	1 2 3 4 5 6

The supervisors in my work unit:

13. make the continuous improvement of our work top priority.	1 2 3 4 5 6
14. regularly ask our customers about the quality of work they receive.	1 2 3 4 5 6
15. The way we do things in this organization is consistent with quality.	1 2 3 4 5 6

People in my work unit:

16. understand how a quality emphasis leads to more productive use of resources.	1 2 3 4 5 6
17. believe that quality and productivity improvement is their responsibility.	1 2 3 4 5 6
18. believe that their work is important to the success of the overall organization.	1 2 3 4 5 6
19. A spirit of co-operation and teamwork exists in this organization.	1 2 3 4 5 6
20. We have good relationship with other organizations that we work with.	1 2 3 4 5 6

21. People in my work unit are involved in improving our services/ products/work. 1 2 3 4 5 6

22. The supervisors in my work unit do a good job of setting work expectations. 1 2 3 4 5 6

23. People in my work unit enjoy their co-workers. 1 2 3 4 5 6

24. We have the right tools, equipment, and materials in my work unit to get the job done. 1 2 3 4 5 6

25. My work unit is structured properly to get the job done. 1 2 3 4 5 6

26. Attempts are made to promote the people in my work unit who do good work. 1 2 3 4 5 6

27. People in my work unit care about our customers. 1 2 3 4 5 6

28. There are effective communication channels between departments in this organization. 1 2 3 4 5 6

People in my work unit:

29. have ample opportunity to exchange information with their supervisors. 1 2 3 4 5 6

30. get the facts and the information they need to do a good job. 1 2 3 4 5 6

II. Assessment of Processes

This organization:

31. has analyzed data concerning goal/objective accomplishments in order to determine whether improvements in quality are needed. 1 2 3 4 5 6

32. is (or might become) committed to quality improvement because we want to improve an already acceptable quality record. 1 2 3 4 5 6

33. has quality improvement policy that has specific goals and objectives. 1 2 3 4 5 6

34. Responsibility for quality performance improvement is accepted by almost all organizational members. 1 2 3 4 5 6

35. Managers at all levels have clearly defined roles in our quality improvement process. 1 2 3 4 5 6

36. The organization has a database or tracking system for relevant quality information. 1 2 3 4 5 6

37. In order to determine what our customers think about our products/ services/work, we conduct surveys on a regular basis. 1 2 3 4 5 6

The leaders at the top level in this organization:

38. have set long-term goals concerning quality improvement. 1 2 3 4 5 6

39. have defined performance measures to monitor progress towards reaching objectives and goals. 1 2 3 4 5 6

40. All work units within this organization have defined performance measures to monitor progress towards reaching their objectives and goals. 1 2 3 4 5 6

41. All organizational members know how performance measures relate to monitoring their accomplishment of goals and objectives. 1 2 3 4 5 6

Long-range planning in this organization includes:

42. prioritizing quality improvement issues. 1 2 3 4 5 6

43. a means for monitoring quality improvement effectiveness over time. 1 2 3 4 5 6

In terms of setting organizational improvement priorities, we have considered or evaluated:

44. changing our business strategy. 1 2 3 4 5 6

45. improving our work methods or procedures. 1 2 3 4 5 6

46. The structure of this organization supports its efforts to carry out its missions. 1 2 3 4 5 6

47. Organizational members have been adequately trained to use the equipment they have. 1 2 3 4 5 6

48. People in charge of similar work units frequently share information about their work methods and practices. 1 2 3 4 5 6

49. Organizational members with good ideas are likely to formally submit them through a suggestion system. 1 2 3 4 5 6

50. This organization has used teams to gather information or solve problems. 1 2 3 4 5 6

51. The future strength of this organization depends on the continuing growth of its members through appropriate training. 1 2 3 4 5 6

52. In order to tell how well we are doing as an organization, we monitor data about the quality of our services/products/work. 1 2 3 4 5 6

53. The performance data that this organization collects are compared with goals, standards, or objectives. 1 2 3 4 5 6

54. The performance data that this organization collects are used to identify opportunities for quality improvement. 1 2 3 4 5 6

55. Organizational members are informed about how this work unit stands in relation to goals, objectives or standards. 1 2 3 4 5 6

56. Top-performing managers at all levels in this organization can expect increased responsibility. 1 2 3 4 5 6

57. The performance appraisals of organizational members include quality improvement criteria. 1 2 3 4 5 6

III. Management Tools Assessment

This organization has:

58. used surveys to assess quality of its work. 1 2 3 4 5 6

59. called groups of individual together to define performance measures to track progress toward goal attainment. 1 2 3 4 5 6

60. used statistical process control charts or graphs to track data over time. 1 2 3 4 5 6

61. arranged workshops to promote quality awareness among its members. 1 2 3 4 5 6

62. attempted to inform and involve everyone in quality improvement. 1 2 3 4 5 6

63. established improvement teams (groups of individuals who come together to solve quality-related problems). 1 2 3 4 5 6

IV. Organizational Assessment

The organizational customers:

64. Once a job or project gets started, it is usually finished without undue delay. 1 2 3 4 5 6

65. People make effort to reuse or salvage excess materials and supplies whenever possible. 1 2 3 4 5 6

66. Tools and/or equipment are maintained and operated at peak efficiency. 1 2 3 4 5 6

67. The personnel turnover is low. 1 2 3 4 5 6

68. Working condition (noise, heat, light, dirt) in this organization are excellent. 1 2 3 4 5 6

69. Organizational members receive the guidance and assistance they need to accomplish their work. 1 2 3 4 5 6

70. This organization 's materials and supplies meet quality specifications. 1 2 3 4 5 6

71. Organizational members rarely need to redo a job or task. 1 2 3 4 5 6

The organization's customers:

72. are satisfied with the quality of our work. 1 2 3 4 5 6

73. find minimal errors in our work. 1 2 3 4 5 6

Appendix B - Chinese Cultural Values Instrument

(1: strongly disagree, 2: disagree, 3: somehow disagree, 4: somehow agree, 5: agree, 6: strongly agree)

1. A family will be prosperous if it is in harmony.	1 2 3 4 5 6
2. Haughtiness invites ruin; humility receives benefits.	1 2 3 4 5 6
3. The best strategy to deal with changes is not to change at all.	1 2 3 4 5 6
4. Children should report everything to their parents.	1 2 3 4 5 6
5. Reflect on our faults when we take a rest.	1 2 3 4 5 6
6. The new generation is worse than the old.	1 2 3 4 5 6
7. I will treat my teacher as my father even though he has taught me for one day.	1 2 3 4 5 6
8. Reject an old man's advice and you'll soon pay for it.	1 2 3 4 5 6
9. An eye for an eye.	1 2 3 4 5 6
10. Live as it is predestined.	1 2 3 4 5 6
11. He who submits to Heaven shall live; he who rebels against Heaven shall perish.	1 2 3 4 5 6
12. Do all that is humanly possible and leave the rest to the will of providence.	1 2 3 4 5 6
13. When in Rome, do as the Romans do.	1 2 3 4 5 6
14. Blessing abound in a family that preserves in good deeds.	1 2 3 4 5 6
15. Life and death are fated; wealth and honors hinge on the will of providence.	1 2 3 4 5 6
16. A family has its rules as a state has its laws.	1 2 3 4 5 6
17. Forgive others whenever you can.	1 2 3 4 5 6
18. At a different time and in a different place we will meet again.	1 2 3 4 5 6
19. To have a son for old age is to stock provision for a rainy day.	1 2 3 4 5 6
20. Children have to respect the decisions of their parents.	1 2 3 4 5 6
21. Talk to people in their own language.	1 2 3 4 5 6
22. Fate is predestined.	1 2 3 4 5 6
23. Those against the laws should be punished.	1 2 3 4 5 6
24. Live with your parents after marriage.	1 2 3 4 5 6
25. Endure and you will find everything all right; retreat and you will find yourself happy.	1 2 3 4 5 6
26. A man depends on his parents at home.	1 2 3 4 5 6
27. Beyond a mountain, yet a higher one.	1 2 3 4 5 6
28. Man can communicate with Nature and exist in harmony.	1 2 3 4 5 6
29. If you honor me a linear foot, I should in return honor you ten feet.	1 2 3 4 5 6
30. There is deceit in excessive courtesy.	1 2 3 4 5 6
31. Shameful affairs of the family should not be spoken outside.	1 2 3 4 5 6
32. Unmarried children should make their parents well and strong.	1 2 3 4 5 6

33. I won't offend others unless I am offended.	1 2 3 4 5 6
34. If we want to criticize others, criticize ourselves first.	1 2 3 4 5 6
35. Of the three practices of unfilial piety, having no son is the greatest.	1 2 3 4 5 6
36. Old parents are just like treasure in your house when living with.	1 2 3 4 5 6
37. A man who can survive in hardship is the man of men.	1 2 3 4 5 6
38. Better bend than break.	1 2 3 4 5 6
39. To please someone without a cause is either adulterous or greedy.	1 2 3 4 5 6
40. Never forget what others have done for you.	1 2 3 4 5 6
41. Face is honored by others; shame is sought by ourselves.	1 2 3 4 5 6
42. No matter what you are doing, don't go too far.	1 2 3 4 5 6
43. It is more urgent to pay back favors than debts.	1 2 3 4 5 6
44. Help each other whenever in need.	1 2 3 4 5 6
45. I will return favors and take revenge as well.	1 2 3 4 5 6

Appendix C - Case Study Semi-Structured Interview Questions

Part A Background information

1. Brief company history.
2. Company structure.
3. Company size and turnover.
4. TQM implementation and ISO 9000 certification history.
5. Current developments and future projections.

Part B Quality climate (QC)

1. What are the company's corporate objectives?
2. Apart from profit maximization (if it is the most important objective), what are other reasons for the existence of the company?
3. What is the vision that management expects?
4. What steps are taken to bring the company closer to this vision?
5. Is the company from top to down committed to one organizational objective?
6. What are some examples representing such a commitment?
7. How does top management communicate with lower levels?
8. What management style is being used?
9. Why is such a style being adopted?
10. Is the company emphasizing the importance of being a "Chinese" company?
11. Is the company proud to be a "Chinese" company?
12. Does management think that Chinese companies have certain advantages over other companies?

Part C Quality processes (QP)

1. What kinds of plan does management set?
2. What is the time span of such plans?
3. What factors are considered when devising a plan?
4. How does management consider the successful achievement of planned actions?
5. What does management do if actual results do not meet planned results?
6. What kinds of leadership style are being adopted by top, middle, and front-line managers?
7. Why are such kinds of style needed in this company?
8. What kinds of training (especially those related with quality) are provided to employees?
9. How do employees react to such training?

Part D Quality methods (QM)

1. What kinds of scientific approach (e.g. SPC) are used in managing quality?
2. What kinds of group activity (e.g. QCC) are implemented?

3. What difficulties are met in implementing such activities?

4. How does management encourage employees to participate?

5. How does management ensure continuity of such quality related activities?

Part E Quality results (QR)

1. How do customers feel about the company?

2. What actions are taken to obtain feedback from customers?

3. What is the view of the company in terms of satisfying customers?

4. What does management do if customers are not satisfied?

5. What obvious improvements have been seen since implementing TQM/ISO 9000?

6. How does management ensure continuity of such improvements?