TOTAL QUALITY MANAGEMENT IN HIGHER EDUCATION:

MODELLING CRITICAL SUCCESS FACTORS

ABDUL TAMBI Ph.D. 2000

Total Quality Management In Higher Education: Modelling Critical Success Factors

Abdul Malek bin A.Tambi

A thesis submitted in partial fulfilment of the requirements of
Sheffield Hallam University
for the degree of Doctor of Philosophy

February 2000

ACKNOWLEDGEMENTS

This research was made possible by the generous funding of University TEKNOLOGI MARA, Malaysia.

The encouragement and advice provided by my supervisor, Professor Gopal K. Kanji, are very much appreciated. His patient supervision and constructive criticisms facilitated many of the developments in the research. My appreciation also goes to the second supervisor, Mr William Wallace, who had provided me with a working knowledge on using statistical software and interpreting statistical outputs.

I am grateful to a number of other people that have contributed, in one way or another, to the research --- colleagues, members of staff at Sheffield Hallam University, and friends.

Finally, I wish to express gratitude to my wife, Ruhil, for her ever present love, support and encouragement, and my children, Aimi, Azyan, and, Aiman for their patience and great company.

Abstract

The research is aimed at determining the extent of TQM implementations in higher education institutions in the United States, United Kingdom, and Malaysia, uncovering common TQM critical success factors among the institutions, developing a generic and holistic TQM model for higher education institutions that incorporates the factors, measuring the performance of those factors and their contribution towards organisational excellence, and developing a mechanism for improving them.

The research was conducted in three stages: exploratory study, descriptive, and empirical research. The exploratory study involves a literature review for searching structural TQM models that measure TQM essential elements. A criteria of modelling has been proposed for model selection. Based on this criteria, the Pyramid Model (Kanji, 1996) has been selected as a tentative model for further analysis. Further justification for selecting this model was provide by comparing it with the philosophical and system dimensions of TQM (Kanji, Morris & Haigh, 1993), ideas about TQM provided by major TQM contributors, and Hackman and Wageman's perspective of TQM philosophy (Hackman & Wageman, 1995).

The descriptive study involved a questionnaire survey of higher education institutions in the U.S., U.K., and Malaysia. The survey result provided information on the extent of TQM implementations in those countries and indicated that the performance of TQM institutions are better then non-TQM institutions. It has also indicated that many higher education institutions in the three countries practiced the elements of the Pyramid Model. In the present research, the model's elements are regarded as critical success factors --- those few things that must go well to ensure the success of a manager or an organisation (Boynton & Zmud, 1984).

The empirical research involved subjecting the Business Excellence Model to a structural analysis based on Partial Least Squares method by Wold (1980). Here, an iniital measurement instrument was developed to measure the model's constructs using multi-item rating scales. An iterative procedure retained only those items that were common and relevant to the higher education institutions in each sample. The final measurement scales had high values of Cronbach reliability coefficient. The model was found to be valid based on the result of χ^2 goodness-of-fit test and values of indices proposed by Bentler (1995).

A mathematical equation that takes into account the mean scores and values of "outer coefficients" (strength of causal connections between items and constructs) was used to compute performance indices for the critical success factors and business excellence.

The structural analysis produced "inner coefficients" that represent the strength of causal connections between the model's independent and dependent variables (constructs). These coefficients were used to determine the unit contributions of each construct toward business excellence. An improvement method that made use of the unit contributions had been developed to improve the values of critical success factor and business excellence. The method applied an algorithm that determined an optimal mix of critical success factors requiring improvements and made the improvements to the factors to achieve a desired business excellence target level. The Business Excellence Model has several notable strengths: simple; systematic; generic; robust; analytical; objective; critical and logical; and predictive.

TOTAL QUALITY MANAGEMENT IN HIGHER EDUCATION : MODELLING CRITICAL SUCCESS FACTORS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE PROBLEM

TQM and the State of Higher Education

Quality in higher education has become a central issue in many countries throughout the world that include the United States, United Kingdom, Europe, Australia, and New Zealand. These are countries traditionally regarded as having high standards of quality in higher education. The literature provides many descriptive reports about TQM being practised in higher education institutions in those countries. Some examples are represented by cases in Fox Valley Technical College, USA (Spanbauer, 1989), Wolverhampton University, U.K. (Doherty, 1993), University of Central Queensland, Australia (Acutt, 1993), and the University of Auckland, New Zealand (Marshall, 1993).

The governments in these countries appoint special agencies that take on roles as stewards for the management of higher education institutions. These are the State Department of Education and State Board of Education in the U.S. (Gates, 1991), Higher Education Funding Council and Higher Education Quality Council, U.K. (Doherty, 1994), Ministerial Committee for Quality Assurance in Higher Education, Australia (Acutt, 1993), and New Zealand Qualifications Authority (Marshall, 1993).

Among the reasons why higher education institutions (HEIs) adopt TQM include decline in student funding (Clayton, 1995), drop in student performance and graduates that do not measure up to employer's expectations (1993a; 1993b, 1993; Guskin, 1994), mismatch of the graduate's skills with jobs (Mukherji, 1993), and government's concern for the quality and accountability of publicly funded institutions (HEFCE, 1997).

The history of TQM application in U.S. higher education institutions is influenced by its success in the country's industry in the 80s. During that time, TQM companies such as Texas Instrument, Xerox, IBM, and Motorola were able to improve their business positions by overcoming threats from global competition and other changes in the business environment (Lozier and Teeter, 1996). These companies were recipients of the coveted Malcolm Baldridge National Quality Award established by the U.S. Department of Commerce to give recognition to organisations that exhibit high standards of product and process quality.

Lozier and Teeter say that U.S. higher education had faced its own crisis during the same decade. The reports by Education authorities such as the National Institute of Education and Education Commission of the States indicate the unfavourable state of U.S. education and realisation of the need for greater involvement in learning. The authorities also acknowledged complaints received from various sectors of the economy including business, industry, and the government over the decline in quality of baccalaureate graduates. TQM was perceived to be the most convincing and accessible approach at that time especially when it was found to have brought many American firms out of the economic crisis that occurred in the eighties (Lozier and Teeter, 1996).

Other writers such as Burkhalter (1996) report the continuing public concern for accountability and responsibility in higher education institutions, spiralling tuition, and decline in student performance in standardised and professional licensing exams. Lozier and Teeter add that signals of higher education dilemma have been received from various facets of the environment within which higher education institutions operate, i.e., demographic, technological, economic, legal, the public, competing institutions and accrediting bodies.

In 1985, the first attempts to implement TQM began in the U.S. that involved two colleges (DeCosmo, Parker and Heverly, 1991; Spanbauer, 1993). The movement spread quickly and in 1990, seventy-eight institutions were reported to be exploring or attempting to implement TQM (Coate, 1993).

A survey conducted some three years later generated responses from 139 universities and 46 colleges (Horine, Hailey & Rubach, 1993). In a similar survey in 1994, 84% of 206 respondents were using some form of quality improvement principles (Rubach, 1994). There have been 160 universities applying quality improvement principles within the U.S., and approximately 50% of the universities have established an organisational structure for quality (Burkhalter, 1996).

In the U.K., the Department of Education were concerned about quality and accountability of universities that have been heavily funded by the government (Doherty, 1994). The Department of Employment were concerned about whether graduates can satisfy the needs of employers (Harvey, Burrows & Green, 1992). In 1992, the White Paper was introduced, which triggered a new era in British higher education, signifying the end of the segregation between polytechnics and universities (Shakor, 1994). This poses a two-fold emphasis on quality to the management of "old" and "new" universities. First, they have to achieve high quality to be competitive in attracting more students. Second, they have to achieve high quality to be accountable for their performance. According to Harrison (1994), although the government did not privatise education, however, as a result of the change, higher education institutions have become incorporated, which made their functioning being subjected to scrutiny from the government.

The first TQM initiatives in U.K. higher education were somewhat later than in the U.S; the first attempts were in the late 1980s-1990 (Owlia & Aspinwall, 1997). In the Quality of Higher Education Study conducted by University of Central England in 1992, which involved a survey of U.K. higher education institutions, only half a dozen TQM institutions had responded (Holloway, 1994). Case studies include applications at South Bank University, University of Ulster, Aston University, and Wolverhampton University (Doherty, 1994). Doherty adds that there were signs of rapid growth of interest in TQM and quality systems standards in higher education since 1993.

In Australia, the higher education sector has been undergoing a radical change, in what has been popularly referred to as the "post-Dawkins" era. This

has been a period in which the federal Labour government dissolved the binary system and Colleges of Advances Education (CAEs) were converted into universities. Colleges in Australia had to merge to become universities when they had sufficient number of students (Acutt, 1993). These colleges are widely referred to as the "post-Dawkins" universities (John Dawkins was Commonwealth Minister for Education and Training). There are only few reports of TQM implementation in Australia's higher education system. Some known cases are at Royal Institute of Technology, University of Western Sydney (Fulop & Rosier, 1993) and University of Central Queensland (Idrus, 1995).

University administrators and academics in Australia often see the remedy to the crisis in universities in the latter's needs for more funding to increase staffing, improve infrastructures, purchase new equipment, and undertake research. The rationale being applied is that if obstructionist central administration were to give universities more monies, many problems could be solved. There is no real sense in which internal wastage and poor management systems or processes are considered as a major part of a reform agenda for higher education (Fulop & Rosier, 1993). Politicians, beurocrats and business are more likely to argue that governments can no longer afford fully funded universities and therefore will press for greater rationalisations, cost cuttings and improved productivity, i.e., they will focus on outputs. Rightly or wrongly, TQM is seen by some as a strategy for achieving this.

In Malaysia, the Ministry of Education introduced TQM in higher public education institutions to improve their productivity (Editorial, 1994) and to expand its higher education sector (Editorial, 1995). The inception of TQM by HEIs was formalised by the launching of a Customer Charter on April 1, 1996 (Editorial, 1996). The Ministry has set up a special department called the Policy and Quality Department to monitor the running of the country's education policy that they should be based on TQM principles at all levels. The Ministry envisages that all schools and universities will eventually adopt TQM principles.

It seems that the introduction of TQM in higher education institutions has to do, in part, with overcoming deficiencies in the processes that take place in the institutions. If the processes are improved, then, universities could

improve results and therefore quality. This is consistent with Deming's famous saying that 85 percent of an organisation's problems come from the systems and 15 percent from the workers (Kanji & Asher, 1993). According to Deming, management's obligation to seek out methods for quality improvement is never-ending.

According to Kanji and Asher (1993) many people are sceptical about the possibility of continuous improvement. Their view is that a system can be improved only to a certain limit, after that the cost of improvement will outweigh the benefits obtained. Unfortunately, Kanji and Asher add, what the critics do not realise is that many costs of quality, including failure and preventive costs are not visible. The prevalent optimal models of quality only record visible costs and therefore do not completely and accurately represent actual costs. Gradual improvement is a continuous process and would not cost when its purpose is to eliminate waste. This argument is consistent with what Crosby (1979) has been asserting --- quality is free.

Because internal and external environments of higher education institutions change over time, they must adapt to these changes in order to maintain their usefulness to the society. The ingenuity of TQM in dealing with changes in the environment is by the continuous improvement of processes. The Japanese term for continuous improvement is *kaizen,* a concept that has been extensively used by Toyota that brought about remarkable improvements of processes in its automobile manufacturing plants in North America (McDougall, 1991).

The application of the continuous improvement concept in higher education is represented by TQM efforts at Aston University (Clayton, 1995), United Kingdom. Here, a diagnosis or pre-assessment of existing processes is carried out at the outset of its TQM process whereby many problems in the ways things are being done are unearthed. Diagnosis is also performed at Albeda College, Netherlands (Wiele, 1995) and Oregon State University (Coate, 1990), America. At Albeda College, the diagnosis revealed that the college had serious problems the with communication process throughout the entire organisation. At Oregon State University the diagnosis unveiled

untoward delay in a remodelling process of a physical plant's renovation projects.

Sherr and Lozier (1991) believe TQM has a better chance than any other management concepts because its values are more compatible. Hackman and Wageman (1995) observe that TQM is a popular approach that is being applied to universities and believe that it will remain so in the future.

Measuring Quality of Higher Education Institutions

Astin (1982) describes four means by which the quality of higher education institutions can be assessed. They are reputational ratings, resource measures, outcome assessment, and value-added measures.

Reputational ratings are judgements about the quality of an institution that are given by peer institutions. Among others, the areas that are being judged are number of earned doctorates, average faculty compensation, and library holdings.

Resource measures include financial, physical, and human resources at the expense of institutions to perform all educational activities. They include measures of faculty members, affluence, and students. Measures that relate to faculty members are the proportion of doctorates, amount of published research, and reputations among peers. Affluence can be measured by the quantity of library holdings, expenditures per student, average faculty salary and student/staff ratio. Student quality is represented by an average measure based on scores on college admission tests. Outcome assessment relates to measures such as student performance, employment record, research output, and amount of published research.

Value-added measures represent a variation of outcome assessment in that initial students' performance at enrolment is compared to their performance when they graduate. These measures provide an assessment of the institution's impact on students' intellectual and personal development.

Miller (1979) identified ten areas of institutions for which their quality can be assessed. They are goals and objectives, student learning, faculty programme, academic programmes, institutional support services, administrative leadership, financial management, governing board, external relations, and institutional self-improvement.

Tuckman and Johnson (1989) suggest the evaluation of quality at different levels or of different units within the organisation. They are individual faculty, academic programmes, departments, and colleges. Another approach to performance measurement is via a systematic model of self-assessment that is capable of evaluating the quality of inputs, goals, programmes, processes, services, outcomes, and external forces (Kells, 1988).

In practice, different approaches to performance measurement may be employed together to provide an overall institutional assessment. In this way it is believed that institutional quality can be increased and the requirements of institutional accreditation can be made (Hogan, 1992).

Hogan has demonstrated that the Malcom Baldridge Award criteria can be used to measure the quality of collegiate administrative services. Zink and Schmitz (1995) suggest the appropriateness of the European Quality Award criteria for use as TQM model in universities together with its evaluation method. However, Finn and Porter (1994) say that the categories in the award models are to an extent arbitrary expert opinion and have not been subjected to rigorous empirical tests, so do the weightings of those categories. According to Schmitz (1993) it seems both logical and responsible for higher education institutions to focus on what they do for students. Astin's student-oriented' approach to quality states that quality is not equated with prestige or physical facilities but rather with a continuing process of critical self-examination that focuses on the institution's contribution to the student's intellectual and personal development (Astin, 1986; cited in Schmitz, 1993).

Programmes of accreditation that are designed to assure quality in higher education are being practised in America. Accreditation is a system for recognising educational institutions and professional programmes affiliated

with those institutions for a level of performance, integrity, and quality that entitles them to have confidence in the educational community and the public they serve (Chernay, 1990). Regional accrediting bodies offer institution-level accreditation to institutions within a geographic area while professional accrediting bodies review specific academic programmes at institutions across the country.

The accrediting bodies, through policies and procedures, mode of self-evaluation and regulation, foster excellence through the development of criteria for assessing educational effectiveness, encourage improvement through continuous self-assessment and review, provide counseling programmes and assistance to established and developing institutions, and protect the institutions against undue external influences.

Such accreditation, as an indicator of quality, has come under strong criticism because it does not generally attempt to define educational quality but rather focuses on measuring inputs and the degree to which an institution fulfils its self–defined mission. This is a very narrow view of the well-being of an institution, which implies that institutions with limited goals would only be assessed according to how well they accomplish those few goals (Marcus, Leaone & Goldberg, 1983).

In the case of the U.K. higher education system, Ashworth and Harvey (1994) state that many sets of performance indicators had been devised such as the University Management Statistics and Performance Indicators and the Polytechnics and Colleges Funding Council's sets of performance indicators. Nonetheless, few, if any, performance indicators have received general acceptance in the academic world. Ashworth and Harvey report on factors to be taken into account in evaluating the quality of an institution. These factors are prerequisites for developing a set of performance indicators that describe an institution's activity. The factors are staffing, accommodation, equipment, teaching and learning, standards achieved, management and quality control.

Many authors believe that performance indicators do not portray the actual quality level of an institutions' processes but merely provide "indicators"

of quality (Green, 1993). This accords with Astin (1986) and Schmitz (1993) that continuing institutional self-examination should focus on the institution's contribution to students' intellectual and personal development.

Today, the quality of award granting higher education institutions in the U.K. is assessed based on a new framework introduced by the Quality Assurance Agency (Baty, 1998). All institutions, whether they have a proven track record or high-risk ones, are subjected to a definitive quality assurance framework plan. The essence of the framework plan covers the following aspects:

1) Sameness of standards of qualifications with the same name.
2) Spelling out the universities' expectations of what they expect students to achieve on their courses.
3) Subject benchmark information and threshold standards.
4) Development of codes of practice to show best practice in overseas provision, student support, governance, etc.
5) Introduction of academic reviewers.

The new approach for assessing the quality of higher education is based on a quality assurance method, hence its name --- the quality assurance framework plan. From a quality management perspective, the quality assurance method has a downside in that conformity of process and products to specifications do not warrant that resultant products will be free from defects (James, 1996).

TQM Approach to Managing Quality

According to Van Der Wiele *et al.* (1997) TQM has been described as a clear successor of quality assurance method because it involves an application of quality management principles to all aspects of an organisation, including customers. The emphasis on prevention, continuous improvement, customer focus and other guiding principles would raise the likelihood of producing high quality products and services that will satisfy the needs of customers. Kanji and Asher (1993) also provide a similar description on the succession of TQM.

TQM is associated with a total quality process and having a number of fundamental properties: everyone in the organisation has a customer (internal or external), improvement comes from understanding and improving business processes, and quality has to be seen to be led by senior management.

Van Der Wiele *et al.* (1997) add that if a process of continuous improvement is to be sustained and its pace increased, it is essential that an organisation monitors on a regular basis what activities are going well, those which have stagnated and what needs to be improved. Self-assessment employed against a recognised TQM model provides a framework, and is now being given a considerable amount of attention by organisations throughout the world. The Malcolm Baldridge National Quality Award model and European Excellence model are examples of such a framework.

Bolton (1995) says that an open-minded study of TQM reveals points of convergence with HEIs' values and needs:

1. Emphasis on individuals;
2. Matching of customer needs to product design capabilities;
3. TQM encompasses the service sector, including HEIs;
4. Measurement of performance;
5. TQM can help to reduce costs.

In quality award models and other assessment models, an organisation is broken down into a number of quality dimensions, for which indicators have been created. These dimensions are believed to represent key organisational areas that must be well managed for the success of the organisation. They are synonymous with critical success factors based on the work on critical success factor methods by Rockart (1982), Boynton and Zmud (1984), Hofer and Schendel (1984), Jenster (1987), and Ferguson and Dickinson (1982).

Critical Success Factors for Higher Education

Contemporary research works seem to suggest that the success of TQM implementation is influenced by a group of factors known as the critical success factors (CSFs) (Holloway, 1994). Critical success factors are those few things that must go well to ensure the success of a manager or an organisation (Boynton & Zmud, 1984).

The critical success factor concept has been applied in various kinds of organisations, including higher education institutions. Applications in higher education can be designated into two groups: those that are associated with the TQM process and others that are not.

Examples of TQM applications that incorporate critical success factors are represented by cases at Aston University (Clayton, 1995), U.K. and University of Pareaus, Greece (Dervisiotis, 1995). Non-TQM applications include cases at Indiana University (Burello & Zadnik, 1987) and University of Sheffield (Pellow & Wilson, 1993). TQM applications were aimed at improving the institutions' while Non-TQM applications were concerned with organisational or managerial effectiveness.

Leadership is ubiquitous in all TQM implementations in higher education institutions and seems to be the most important ingredient for their success. Leadership commitment has been significant for the success of TQM implementations at Fox Valley Technical College (Spanbauer, 1989), Wolverhampton University (Doherty, 1993), Aston University (Clayton, 1995), and Oregon State University (Coate, 1990). In these universities, the leaders were not themselves TQM specialists but, like other organisational members, they had undergone organisational training conducted at all levels to grasp the required knowledge and skills of TQM. One of the leader's important tasks is to remove barriers from the workplace that keep the workers from taking pride in their work (Deming, 1982). In addition, senior leaders empower teams to make decisions and take actions.

There is variation in groups of critical success factors described by higher education institutions suggesting that critical success factors differ among institutions. Nevertheless, the variation may have stemmed from the judgmental process by which critical success factors have been identified. Holloway (1994) quotes the findings of a number of researchers that tend to point toward predictable critical success factors of institutional quality, training, top management commitment, good information, and the like. Studies on industries have reported that critical success factors may vary among industries (Hofer & Schendel, 1978; Daniel, 1961; Sabherwal & Kirs, 1994). However, from a survey of nine companies, Rockart (1982) says that each industry has a generic set of critical success factors.

These findings form the premise of the present research, which involves determining the critical success factors of higher education institutions and developing means of measuring them. Institutions could then profile the performance of their key organisational areas and business excellence and work toward continuous improvement.

Measuring Critical Success Factors

Saraph, Schroeder and Benson (1989) suggest a means of how critical success factors of quality management could be measured. Based on a literature review, they have devised a measurement instrument consisting of 120 measurement items. By way of a judgmental process, the measurement items were grouped into eight separate categories or critical success factors. Then the instrument was subjected to a statistical analysis to test its reliability and validity.

The measuring of critical success factors for business excellence has also been demonstrated by Kanji (1998b) in using his Business Excellence Model for assessing the performance of manufacturing and service organisations in Europe. Kanji's Business Excellence Model is characterised by a conceptual network of principles and core concepts of TQM that culminate in business excellence. The model's constructs are measured by a specially designed measurement instrument that, along with the model, is tested for

statistical rigour. The final outputs of the model are critical success factor and business excellence indices, which are numerical representations of organisational performance. Several benefits can be obtained by using the model. Indices can be computed for an entire nation, types of industry, individual organisations, departments, etc. The performance of those entities can be compared using the indices. The indices can also be used to perform cross-sectional and longitudinal studies of individual organisations and their divisions.

Total Quality Management and Business Excellence Models

More often than not, implementations of TQM process are carried out by way of implementation models that guide quality practitioners through the process of improvement. Although the models' components appear different in kind, number, and in the way they are related, the models are actually underpinned by similar concepts and assumptions (Hackman & Wageman, 1995).

The variety of TQM models existing today have been developed based on ideas about Quality management proposed by major quality writers such as Edward W. Deming (1982), Joseph M. Juran (1986), Philip Crosby (1979), Kaoru Ishikawa (1985), David Garvin (1988), Feigenbaum (1991), and Genichi Taguchi (Taguchi,1986). TQM models can be divided into conceptual models, which isolate TQM processes into several key areas, and measurement models (special types of conceptual models), which measure the performance of the key areas.

Conceptual models are characterised by a number of definitive concepts subsumed in them. The more widely known models and associated definitive concepts are summarised in (Table 1.1). A summary of measurement models is given in Table 1.2.

Originator	Concepts
• Pyramid Model (Kanji 1996)	Leadership, delight the customer, management by fact, people-based management, continuous improvement, internal customer satisfaction, external customer satisfaction, all work is process, measurement, teamwork, people make quality, prevention, continuous improvement cycle.
• Key elements of TQM (Spanbauer, 1985)	Leadership, education and training, scientific methods and tools, meaningful data, team problem solving, organisational climate.
• Philosophical and systems dimensions (Kanji, Morris & Haigh, 1993)	Vision, mission, strategy, values, key issues.

Table 1.1: Conceptual Models and their Definitive Concepts.

TQM models may be generic, i.e., constructed to suit diverse organisations such as award models, or special-purpose, including in-house models, which are developed by individual organisations to be used internally. Originally TQM models were associated with manufacturing organisations of the eighties in the U.S. such as Texas instruments, Rank Xerox, IBM, and Motorola (Lozier & Teeter, 1996). Today, many service organisations such as those in retailing (Eisman, 1992), leisure (Tawse & Keogh, 1998), education (Rowlands, 1998; Spanbauer, 1989; Seymour, 1993a; 1993b; De Cosmo, Parker & Heverly, 1991; Coate, 1993; Geddes, 1993; Doherty, 1993; Clayton, 1995), health (Nwabueze, 1999), and police force (Wells, 1998) have adopted the TQM philosophy and developed their own models.

In-house models have a distinct feature of excluding some essential elements of TQM. Examples are:

- TQM process at South Bank University, which is mainly concerned with improving the customer/supplier chain process in providing a high quality of service to students (Geddes, 1993).

Originator	Concepts
• Malcolm Baldridge National Quality Award Model (NIST, 1991)	Leadership, information and analysis, strategy quality planning, human resource utilisation, quality assurance, quality results, and customer satisfaction.
• European Foundation for Quality Management Excellence Model (EFQM, 1999)	Leadership, people, policy and strategy, partnerships and resources, processes, people results, customer results, society results, key performance areas.
• Deming Prize (The Conference Board, 1991)	Policy; organisational structure; education and dissemination; collection, dissemination, and use of information; analysis; standardisation; management system; quality assurance; effects; and planning for the future.
• Business Excellence Model (Kanji, 1998b)	Causal connections between prime, principles, and core concepts in Pyramid Model.
• CSF measures of quality management (Saraph, Schroeder & Benson, 1989)	Top management leadership, role of quality department, training, product design, supplier quality management, process management, quality data reporting, and employee relations.
• SERVQUAL (Parasuraman *et al.*, 1985)	Tangibles, reliability, responsiveness, assurance, and emphaty.
• INTQUAL (Caruana & Pitt, 1997)	Service reliability, management of expectations.
• Critical success factors of quality (Thiagarajan, 1995)	Leadership, internal stakeholder's involvement, customer-driven process, and continuous improvement.
• TQM critical success factors (Black & Porter, 1996)	People and customer management, supplier partnerships, communication of improvement information, customer satisfaction orientation, external interface management, strategic quality management, teamwork structures for improvement, operational quality planning, quality improvement measurement systems, and co-operative quality culture.
• A generic framework for managing quality improvement (Boaden & Dale, 1994)	Organising, culture change, systems and techniques, measurement and feedback.
• Aggregate model of quality measurement in a higher education setting (Owlia,1995)	Tangibles, competence, attitude, delivery, content, and reliability.

Table 1.2: Measurement Models.

- Motorola's quality efforts are concerned with defect and cycle time reduction (Jacob, 1993).
- At Xerox, quality efforts are focused on benchmarking on firms outside its own industry.
- Ritz Carlton Hotel's total quality initiative is grounded in participatory executive leadership, through information gathering; co-ordinated planning and execution; and trained, empowered, and

committed workforce (Watkins, 1993).

- At Toyota, the "Toyota Touch Philosophy" pays close attention on customer satisfaction, teamwork, and continuous improvement (McDougall, 1991).

Business excellence models are special types of TQM models that provide measures of key organisational areas and demonstrate the contributory effect of those key areas to overall organisational performance. According to Peter Drucker, organisational excellence is about how well organisations do their jobs (Drucker, 1981). Drucker believed that there are two concepts that underlie organisational performance: efficiency (doing things right) and effectiveness (doing the right things).

The European Foundation for Quality Management (EFQM, 1999) uses the term excellence to mean outstanding practice in managing organisations and achieving results based on fundamental concepts that include: result orientation, customer focus, leadership and constancy of purpose, processes and facts, involvement of people, continuous improvement and innovation, mutually beneficial partnerships, and public responsibility.

Kanji (1998b) defines a business excellence index (B.E.I) as a means of measuring customers', employers', and shareholders' (stakeholder's) satisfaction simultaneously within an organisation in order to obtain a comprehensive evaluation of organisational performance.

The Malcolm Baldridge National Quality Award is a U.S. award model based on TQM that sets standards for excellence on seven dimensions: (a) leadership, (b) information and analysis, (c) strategic quality planning, (d) human resource utilisation, (e) quality assurance, (f) quality results, and (g) customer satisfaction.

The business excellence concept has not been explicitly considered in other models, which are more concerned with internal assessment as well as continuous improvement of internal processes.

1.2 TQM MODELS IN HIGHER EDUCATION

Conceptual Models

Tofte (1995) has introduced a model that is founded on the idea of "fitness of use" and is based on an organic comprehension of organisations. He named the model "Total Quality Leadership (TQL) in education" that is portrayed in the shape of a four-leaf clover. The model is made up of four elements namely leadership, planning, philosophy, and improvement that acquire separate rooms (clover leaves) and enclose a central heart-shaped room containing "practice" (see Appendix A, Figure 1). All the rooms are filled with literature, training materials and tools for improvement processes. There is no fixed way to use the rooms. Depending on where the leader is located relative to the process, the rooms are used to reflect on quality issues, plan for quality, solve problems, and improve processes.

Ho and Wearn (1996) developed a model named "Higher Education Total Quality Management Excellence " or HETQMEX based on fundamental concepts of service quality: 5-S (Osada, 1991), marketing and education quality control (Wilkinson & Witcher, 1991), quality control circles (Ishikawa, 1984), ISO 9000 (ISO, 1993; 1994), and total preventive maintenance (Senju, 1992) (see Appendix A, Figure 2). The model also incorporates the SERVQUAL model of Parasuraman, Zeithaml and Berry (1990).

The HETQMEX model is almost self-explanatory and can form the basis for services provided by TQM higher education institutions (HEIs) of the 90s and beyond. According to Ho and Wearn, most HEIs concentrate exclusively on students, and perhaps employers, as customers but sometimes overlook the diversity of customers that TQM must satisfy. The stakeholders should include parties such as students, parents, sponsoring employers, employers of graduates, government bodies, franchise colleges, exchange colleges, staff, and professional bodies. Each stakeholder should receive particular benefits from a TQM higher education institution. HETQMEX is built upon rigorous research and experience, emphasising and understanding of customer needs, and encompassing proven quality management techniques that are structured

in an effective sequence.

Spanbauer (1989) launched a TQM effort at Fox Valley Technical College in the U.S. that stemmed from the necessity to improve systems concomitant with the increased control from the government, Governors and the White House. TQM was a natural choice because it was the tool available at the time. It fitted the strategy of the college to improve the system and to serve the needs of customers. It followed that TQM, if done correctly, could create an environment where faculty and staff examine customer needs and do their jobs in the most efficient manner as possible. A cyclical process model was developed for measuring, goal setting, and costing quality. The quality elements in the model are

- human resource;
- curriculum and instruction;
- planning;
- use of technology;
- marketing;
- customer service.

The measurement strategy is divided into the following categories:

- instructional audit;
- north central accreditation evaluation;
- student satisfaction survey;
- indicators of district health;
- other reports.

Distribution charts, Ishikawa diagram, histogram, and data sheet were used to illustrate the College's measurement process. Spanbauer added that the TQM process offers great opportunities for benchmarking and sharing successes and tribulations in education. While the goal was to have a TQM model unique to the College, there were several ideas and activities that could and should be shared and replicated, including TQM itself.

Clayton (1995) described the Quality Improvement Model developed and implemented at Aston University (Appendix A, Figure 3). Aston adopted a continuous improvement approach to TQM implementation that was equivalent to the *kaizen* approach practised in Japan. Here, a project-by-project method recommended by Juran and Gryna (1988) is performed. The model describes a hierarchical structure of TQM organisation that comprises a quality council followed by process councils, quality improvement projects, and quality circles. The institution's mission is stated at the top part of the model signifying focus and direction.

One of the first tasks of Aston's quality council was to analyse top level processes that defined the way Aston worked. These processes were necessary and sufficient to meet the university's mission of being a leading technological university. The processes were in the form of a list of activities based on a premise that the university's core activities are teaching (by which is meant the management of the learning process) and research. These activities were assisted by various support activities. The quality council also defined critical success factors for the university. At a later level of process analysis, each process council defines a set of CSFs for its own process. Clearly, this results in several interdependent sets of critical success factors at every level of the analysis, which illustrate how different organisational functions work as a system.

Each member of Aston's QC owned a particular process and worked with a process council to agree on the purpose of the process, its major steps and its performance measurements. A request for further analysis may be referred to a sub-process council when necessary for members to repeat the steps for a lower level activity. Analysis continued until there was sufficient understanding to permit a team to work on a quality improvement project.

Coate (1993) describes a TQM process at Oregon State University (OSU) consisting of several phases. In one of the phases named "breakthrough planning process", critical success factors were identified. These factors were believed to be essential for achieving the university's mission and laid the foundation for OSU's TQM process. An illustration of

OSU's TQM model called Total Quality Management Implementation model is shown in Figure 4 (Appendix A). The model was developed after a period of initial research, consultation, and cogitation over the adaptability of W. Edwards Deming, J.M. Juran, and Philip Crosby's quality management methods.

Burkhalter (1996) introduced the Continuous Quality Improvement Cycle Model at Auburn University, USA (Appendix A, Figure 5). Burkhalter claimed that regardless of whether a quality improvement process is based on the work of Deming or others, a systematic process is recommended for any organisation wishing to establish a continuous quality improvement system. According to Burkhalter, the six-phase system illustrated in the figure is self-correcting, will lead to policy changes, and helps to make the journey a pleasant one.

Geddes (1993) developed a model for a systematic examination and articulation of customer/supplier relationships that lies at the core of South Bank University's approach. Quality is viewed as being customer rather than system driven. The concept of a "quality chain" is developed to stress and demonstrate the interdependence of all staff in providing a high quality service to students. A quality chain is a host of supplier/customer relationships that run through the entire organisation (Appendix A, Figure 6). The customer is entitled to an appreciable quality of service and the supplier's aim is to meet the customer's requirement in full. It is essential for all staff to appreciate that there exists in each of the university's department a series of suppliers and customers.

Customer/supplier relationships also exist between departments. However, the relationship between the university corporate as a supplier and the student (and other clients) as external customers is most important. Every member of staff in the university has a part to play in supplying a service according to customers' quality requirements. The conceptual premise of the South Bank approach is seeing itself at the bottom of an inverted pyramid. The pyramid supports those who come into contact with the students and external clients in their day to day working, helping them to provide the quality of service the university is seeking (see Appendix A, Figure 7).

McGee (1991) illustrated an integrative TQM implementation model for a university that is designed to address several factors that have been critical to the success of TQM roll-outs in business:

- organisational commitment;
- customer focus;
- employee involvement;
- education and development;
- rewards and recognition;
- management support;
- policies and practices.

The model is organised into five phases. The implementation of each phase is supported by a quality team that is subsumed in an organisational structure for quality. The creation and involvement of various quality teams can be observed in different segments of the structure. The various teams are Quality Design Team in a planning phase, Quality Indicator Lead Team in focusing phase, and Quality Improvement Teams initial implementation phase, expanded implementation phase, and continuous improvement phase. Benchmarking best demonstrated practices in other universities (and even in other organisations outside education where the processes are similar) is considered in the final phase.

Zadelhoff *et al.* (1995) developed a model for a campus in a South African university in the shape of a cause-and-effect diagram. It contains the most important factors affecting the campus's product, i.e., competent operations research (OR) analysts, after they have undergone a five-year academic programme in the campus (see Appendix A, Figure 8). The factors are grouped under the following headings

- paradigm;
- study ability;
- practical skills
- computer literacy;
- Christian education;

- attitude;
- communication;
- subject knowledge.

It was envisaged that if the campus is well equipped, the university could develop well-trained and competent OR analysts. This could motivate employers to acquire the services of the students and has a net effect of increasing the student number substantially. The university put up hope that support from the private sector will increase if there is proof that quality education can indeed be provided.

Measurement Models

At engineering departments in University of Birmingham, Owlia (1995) has studied students and staff perceptions on the applicability of several quality dimensions that could be used to measure the effectiveness of quality efforts. The perceptions of potential employers for the graduates of those departments were also studied. Owlia had performed an empirical analysis on the data collected, which provided an aggregate model of quality measurement in a higher education setting that encompasses six dimensions: tangibles, competence, attitude, delivery, content, and reliability. The means for making improvements in the model is by way of looking at the relationships between quality attributes and a quality management system using Quality Function Deployment. This results in a set of priorities for improvement.

A mathematical model was developed to integrate different aspects of the measures into a hierarchical basis. This was applied to the data showing how the results from the studies can provide information for improvement. Statistical process control approach, such as individual control charts, was also applied to the data. The charts depicted how educational processes could be monitored over time. Owlia also introduced a causal diagram to show the dynamic behaviour of quality-related factors in higher education (see Appendix A, Figure 9).

Hogan (1992) has demonstrated that the Malcolm Baldridge National Quality Award Model can be applied to administrative services of higher education institutions in America. Hogan found that the model is quite comprehensive and therefore needed only one additional variable, i.e., quality of financial management, for it to be used as a self-assessment device. The research indicates that leadership is rated the most applicable category for the evaluation of quality of administrative services in U.S. institutions. This category is followed by customer satisfaction.

Criteria for Modelling

Two major questions arise concerning the applicability of TQM models to all higher education institutions. First, whether these models are transferable across a variety of organisations and second, whether these models provide accurate measures of organisational performance. Regarding transferability of TQM, Holloway (1994) says, TQM models have a contextual application and many research works are being carried out on their applicability. Although some TQM scholars have acknowledged that the application of TQM differs from one situation to the next, most either have advocated that TQM can be applied uniformly to all organisations (Juran, 1986) or have failed to articulate specific contingencies that may affect the implementation of TQM (Langevin, 1977).

The accuracy of a model in measuring organisational performance is a validity issue. Many models have never been empirically tested for validity but the justification for their use was done informally. For example Finn and Porter (1994) say that the categories in MBNQA and the former European Quality Award (EQA) are to an extent arbitrary expert opinion and have not been subjected to rigorous empirical tests. For example, over the years some Baldridge items, such as documentation, have been moved between different categories. The categories are weighted according to their relative importance. This weighting is also arbitrary, although it does represent the consensus of some "experts".

For the purpose of assessing every TQM model, a group of modelling criteria has been developed.

- Simple --- in terms of concepts and conceptual network;
- Systematic --- in terms of model parameters and output;
- Generic --- can be applied in different contexts;
- Robust --- it efficiently yields different outputs when its inputs are changed;
- Analytical --- it includes comprehensive critical success factors and utilises a measurement instrument that is flexible in order to arrive at a final solution;
- Objective --- its results are replicable by other researchers if the same study with the same conditions is performed;
- Critical/ logical --- its validity is statistically proven using a deductive logic;
- Predictive --- it empirically measures all critical success factors and contributes toward business excellence by way of a structural approach.

Total Quallity Management Barriers and Pitfalls

There are many management concepts that have made their way into higher education although not all of them have been successful (Sherr & Lozier, 1991). Kells (1995) indicates that over the past there has been strong resistance of universities to outside interference, which include MBO, political influences, and pressure from the church. So far, universities have succeeded in overcoming these interferences. According to Kells, difficulties in implementing TQM in higher education institutions are due to faculty resistance, complexity of processes in the university, complex ways of decision making, and complicated delegation of authority.

DeCosmo, Parker and Heverly (1991) observed that at Delaware Community College, TQM implementation was inhibited at the outset because organisational members were pressured under their daily work. People had to learn and perform TQM methodology simultaneously and this consumed considerable time. Some of the initial projects were too complex for a short-

term project team. There existed resistance from the organisational members to the introduction of fundamental changes. Some actions taken in the university were found to be at odds with TQM values and practices. For example, some unilateral personal actions were taken that did not go along with the participatory values of TQM. This was overcome when the administration learned to be more consistent in its adherence to TQM.

There was sceptical and reserved interest in TQM at North Dakota University when the university implemented it in 1991 (Clark, 1991). The most common impediments were: (1) insufficient time; (2) insufficient knowledge or skill; (3) insufficient budget; (4) a belief that the approach was just a short-lived gimmick or a fad; (5) lack of commitment; (6) people believed that the idea lacked novelty --- the approach already exists in the university in some way; (7) disbelief in its effectiveness; (8) disbelief in its applicability in education and the university; (9) poor motivation due to the long time needed to realise rewards and the process lacks immediate results; (1 0) complacency; (11) uncertainty of the benefits of the process; (12) fear of failure; (13) fear of losing power; (14); and resistance to using a business model in refering to students as customers.

Oregon State University had faced a number of barriers to its TQM implementation, most of which have been common to other universities (Coate, 1993). The barriers were:

- the barrier of scepticism;
- the barrier of time;
- the barrier of language;
- the barrier of middle management;
- barriers of university governance;
- barriers in dysfunctional units;
- barriers of attitude.

According to Teeter and Lozier (1991), pitfalls are probably much greater for an entire institution that announces the adoption of TQM principles and tools and fails to implement them successfully than for an individual office that tries and fails. The downside of an office implementing TQM, on the other

hand, might be that improvements go unnoticed or are unappreciated by higher level administrators. Maintaining momentum without support is difficult, but this is a small price to pay for potentially improved processes and results, resource reallocation and reduced costs, and higher staff morale.

Bolton (1995) says that HEIs have tended to respond negatively to TQM, overstating its prescriptive nature and citing the additional costs of setting up quality procedures. As a result, they have failed to recognise the convergence of TQM with the needs of higher education and to take a broader view of the customer relationship or of long-term savings.

1.3 STATEMENT OF THE PROBLEM

The quality of higher education institutions, like other organisations, depends on whether they have identified their leading activities and whether these activities are performed in a manner that helps them move toward their goals. In business excellence terms, these leading activities are called critical success factors, which Kanji (1998b) believes are synonymous with the prime, principles and core concepts of the Business Excellence Model. The critical success factors are not detached but exhibit symmetrical relationships. Top management can improve the performance of any factor resulting in a simultaneous improvement of other related factors specified by the relationships in the model. The advantage of using the model is that an analyst can determine the strength of factor relationships, collective contribution of the factors towards organisational performance, and ways by which the factors can be controlled.

1.4 RESEARCH OBJECTIVES

With respect to higher education institutions, the research objectives are as follows:

1. To study the extent of implementation of total quality management in various countries.
2. To determine the reasons that lead to TQM implementation;

3. To determine the barriers of TQM implementation;
4. To determine whether there is an association between TQM and organisational performance;
5. To determine critical success factors of organisational performance;
6. To develop a generic business excellence model that is consistent with the philosophical and system dimensions of TQM, and ideas of major Quality contributors. It must also satisfy the suggested modelling criteria, and incorporates critical success factors;
7. To measure the performance of critical success factors and organisational performance (business excellence);
8. To determine the structural relationships among critical success factors and business excellence;
9. To measure the strength of causal connections among critical success factors and business excellence;
10. To validate the Business Excellence Model with relevant data and testing with suitable statistical methods;
11. To use the model as a tool for continuous improvement.

1.5 RESEARCH METHODOLOGY

The research involves a structure and plan to provide an orderly means for investigating the research problem. It is conducted in three phases: exploratory research, descriptive research, and empirical research as shown in Figure 1.1.

Research Approach

The variety of research approaches can be classified into one of the three general categories of research: exploratory, descriptive, and empirical (causal). These categories differ significantly in terms of research purpose, research questions, and the data collection methods that are used (Aaker, Kumar & Day, 1995). The present research utilises all three approaches to deal with the problem being addressed.

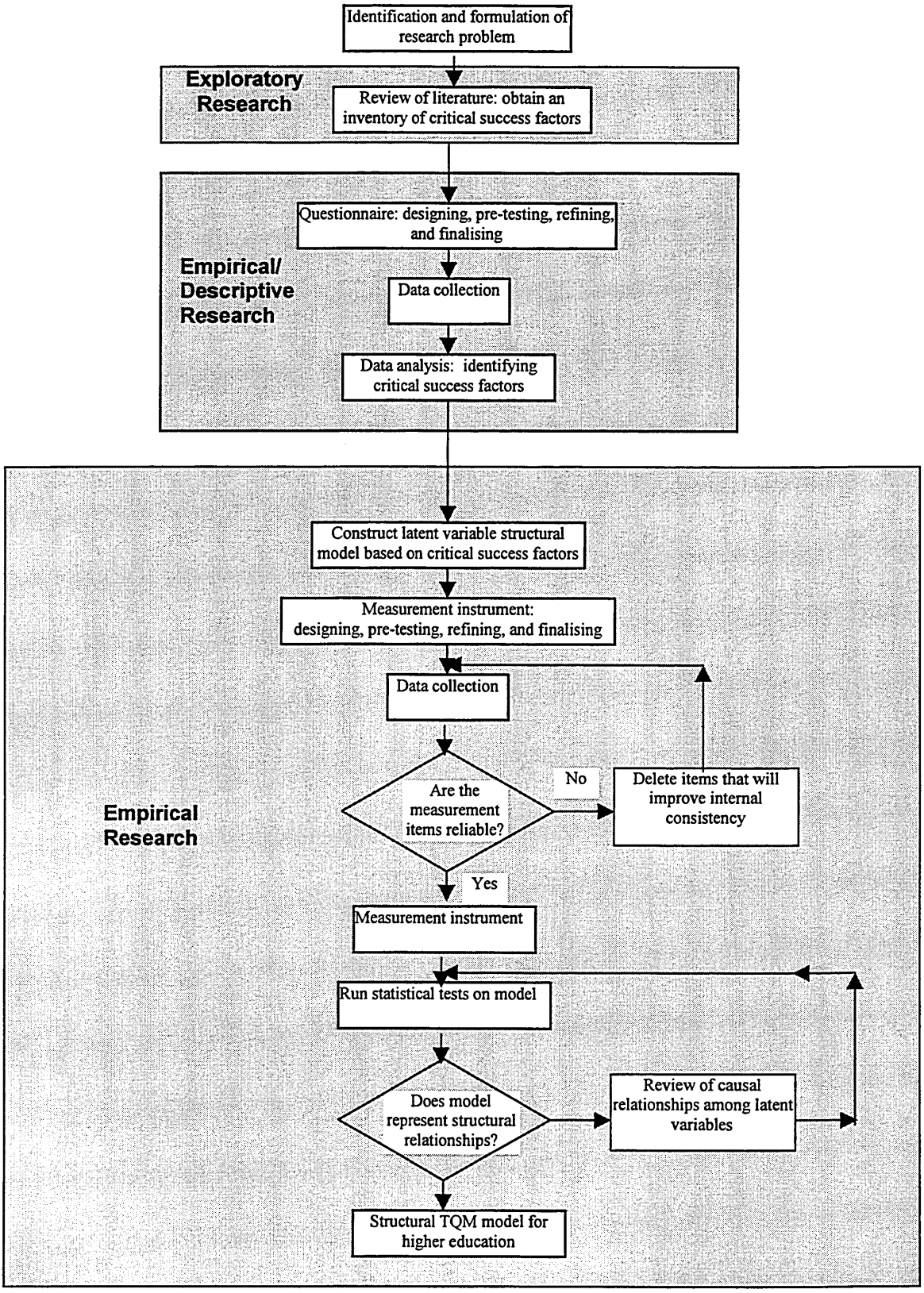


Figure 1.1: The Research Process

Exploratory Research

The purpose of exploratory research is to seek insights into the general nature of the problem and relevant variables that required consideration. Here, a literature review on TQM models, its principles and concepts as well as its implementation in higher education institutions are performed. In this way, the key TQM variables, or critical success factors, their relationships, and contributions toward organisational performance are examined. The findings of previous works on these variables serve as a premise for developing a structural model of total quality management in higher education.

Empirical Research (Descriptive)

The exploratory research is followed by a descriptive research, which is involved in studying and describing the major characteristics of the research problem. This relates to compiling information on quality efforts undertaken by higher education institutions. For this purpose, a survey of quality practices in institutions in the United States, United Kingdom, and Malaysia has been proposed in the research.

Empirical Research (Causal)

Empirical research are strictly based on data collected from respondents on a measurement instrument that was developed to measure institutions' critical success factors. Based on the data collected, generalisations are made on the relationships among critical success factors and business excellence of the Pyramid Model. Performance indices of critical success factors and business excellence are determined using a mathematical equation that takes into account the mean scores of measurement items and their ability in providing the empirical content of quality dimensions. The strengths of those relationships are applied in an improvement method for improving the performance of critical success factors and business excellence.

1.6 THE RESEARCH PROCESS

The following is an outline of the present research:

1. Determination of research design;
2. Determination of data collection procedures;
3. Determination of analytical procedures.
4. Research report and evaluation.

Research Design

Research design is the structure of the research project to solve the problem being addressed in the research (Davis & Cosenza, 1985). It is concerned with controlling potential sources of error in the study, method of study, design of measurement instruments, and the selection of the sample. The potential sources of errors are discussed below while the other aspects of research design are incorporated in the relevant chapters that follow.

Potential Sources of Error in Research Design Process

There are many lists of the types and sources of errors that can potentially affect the results of the present research. The errors can be divided into four major categories: planning, collection, analytical, and reporting errors.

Planning errors. These are errors that are reflected in the set-up of the design to collect information such as mispecification of research problem, and errors associated with inappropriate research design. The strategy of reducing these errors is through the development of a well thought out research proposal that clearly specifies the method and value of the research being undertaken. This has been dealt with in the outset of the research process.

Collection errors. Collection errors are those sources of misinformation due to the actual collection of data. The major concerns of the present research is to minimise collection errors as follows:

1. The measurement procedure is of acceptable quality;

2. The data collected are representative of the population being studied;
3. The data collection methods yields accurate data.

The strategy of reducing this error is through a thoughtful execution of the specified research design.

Analytical errors. These are errors due to the inappropriate analysis of the data. They are reduced through justification of analytical procedures used in manipulating and summarising data.

Reporting errors. These are due to the incorrect interpretation (misinterpretation) of the study results. They are reduced through accurate interpretation of results.

Data Collection Procedures

These are tools and techniques used in the acquisition of information to solve the research problem. Here, two questionnaires were prepared: one for a descriptive study and the other, a measurement item, for an empirical research. A census survey of higher education institutions in three countries: U.S., U.K., and Malaysia identified from available directories were conducted by mail. Respondents were represented by Quality Directors of the institutions.

Determination of Analytical Procedures

These are tools and techniques that are used to analyse and summarise data and reason to conclusion. In the descriptive study, data were summarised into descriptive statistics, and along with the result from frequency analyses, it was possible to formulate the Quality scenario of institutions. In the empirical research, scores to measurement items entered by respondents were subjected to a structural analysis with respect to a structural TQM model. Here, a complex statistical method was applied on the data to establish what constitude TQM dimensions, their relationships, how they contribute toward organisational performance, and along with a mathematical solution procedure, determine how an organisation can improve its performance in terms of the dimensions.

The presentation of the conclusions of the research and the means by which these results were achieved are outlined in a later section.

1.7 SIGNIFICANCE OF STUDY

Quality of education is important not only to students but to other parties as well, including government, employers, parents, taxpayers, and society, collectively known as the stakeholders. The responsibility of every higher education institution is to satisfy its stakeholders and hence achieve excellent performance. This can be done by way of improvements in the institutions' quality of products and processes.

Previous researches have shown that organisational performance is influenced by a few key organisational areas, i.e., critical success factors (Daniel, 1961; Rockart, 1982; Saraph, Schroeder & Benson, 1989; Thiagarajan, 1995; Kanji, 1998b). Thus, in order to be successful, an organisation, including higher education institutions, should identify the critical factors that affect organisational performance. Once these factors have been identified, they could be measured and improved.

The traditional approaches to measuring the quality of higher education institutions such as accreditation, performance indicators, and self-assessment using award models, were shown to contain some considerable weaknesses. If an alternative could be found that overcame all these weaknesses, then the higher education system will benefit from it in terms of being able to provide good measures of quality, overcome problems in key areas, and provide accurate information to stakeholders.

1.8 RESEARCH ASSUMPTIONS

1. The questionnaire survey method is sufficient to obtain data concerning critical success factors and organisational performance of higher education institutions.

2. Respondents are assumed to provide truthful and honest response;
3. Response rate of less than 100% is acceptable as long as it is large enough to do the required analysis of the model.
4. The institutions are adequately represented by their Quality directors who can provide the required information as specified in the questionnaire.
5. Higher education institutions in the United States, United Kingdom, and Malaysia should sufficiently provide the data required for the research. The U.S. and U.K. are good examples of developed countries that have an international reputation for having high standards of education quality. Malaysian higher education system embodies the education systems in U.S. and U.K.
6. The research results are as accurate as the statistics used to show reliability and validity of the measurement instrument used and validity of the model.

1.9 RESEARCH LIMITATIONS (EMPIRICAL STUDY)

1. Because of the geographical distance of the respondents, data can only be obtained via mail questionnaire. Consequently, other useful information could not possibly be obtained unless direct observations and direct contacts were made.

2. The theoretical development via modelling approach that is employed in this research certainly does not have the luxury of a scientific research where all variables are under the control of the researcher.

1.10 OUTLINE OF THESIS

The thesis contains eight chapters outlined as follows:

Chapter 1 provides a background of the application of TQM and TQM models at higher educations institutions in various countries. The statement of the research problem, research objectives,

significance of the research, and its limitations are described.

Chapter 2 explains the meaning of critical success factors, its origin, application to TQM, and means of identifying and measuring them.

Chapter 3 describes the synthesis of the Business Excellence Model with philosophical and system dimensions of TQM as well as its consistency with the models of major Quality contributors.

Chapter 4 gives the results of a survey on the extent of TQM implementations in U.S., U.K., and Malaysian higher education institutions. A major aspect of this survey is determining the extent to which institutions in these countries implement the principles and core concepts of the Pyramid Model.

Chapter 5 provides theoretical support for the twelve symmetrical relationships of the Business Excellence Model.

Chapter 6 provides a detailed account on the structural analysis of the Business Excellence Model where the model's constructs, relationships, and structure are empirically tested using data collected from a second survey of TQM institutions identified in the first survey. The survey makes use of a measurement instrument to collect data from Quality directors of institutions in each country. An analysis of pooled data of the three countries is also performed. Critical success factor and business excellence indices are computed that provide measures or organisational performance.

Chapter 7 introduces a means of improving organisational performance with an optimising technique that selects an optimal mix of critical success factors for improvement to achieve a higher business excellence target level.

Chapter 8 sums up the significance of the present research in terms of important findings with emphasis on the usefulness of the Business Excellence Model for continuous improvement of critical success factors of higher education institutions; suggests continuations to the present research in areas such as testing the model in a real setting, evaluating the extent to which improvement schemes returned by the model are open to confounding by other factors, and assessing its application as a regular business activity.

CHAPTER 2

CRITICAL SUCCESS FACTORS FOR HIGHER EDUCATION

2.1 INTRODUCTION

Definition of Critical Success Factors (CSFs)

Critical success factors (CSFs) are those few things that must go well to ensure the success for a manager or an organisation. They represent those managerial areas that must be given special and continual attention to cause high performance (Boynton and Zmud, 1984).

Rockart (1982) defines critical success factors as those few key areas of activity in which favourable results are necessary for a particular manager to reach his or her goals. Rockart (1979) specifies that critical success factors are the limited number of areas in which results, if they are satisfactory, will insure successful competitive performance for the organisation. They are the few key areas where 'things must go right' for the business to flourish. If results in these areas are not adequate, the organisation's efforts will be less than desired.

Hofer and Schendel (1978) define critical success factors as those variables that management can influence through its decisions that can affect significantly the overall competitive positions of the various firms in an industry. Jenster (1984) says that critical success factors relate to the basic internal and external conditions for a firm's strategy (e.g., customer acceptance, competitive moves), or those competencies or resources (e.g., human, financial) it must attain. Recent research has expanded this notion into a more comprehensive and strategic concept, suggesting that the definition and monitoring of critical success factors differ for various strategy types (Jenster, 1987).

Ferguson and Dickinson (1982) define critical success factors as those internal and external factors that must be identified and reckoned with because they support or threaten the achievement of a company's objectives, or even the existence of a company. They can create positive or negative impacts on the company.

Development of Critical Success Factors

Daniel (1961) first discussed critical success factors in an article in the early 1960s. The concept received little attention until a decade later, when Anthony, Dearden and Vancil. (1972) utilised the concept in the design of a management control system. Burello and Zadnik (1986) calls any procedure that deals with identifying personnel and organisational factors that can lead to effective and successful performance, as the critical success factor method. Burello and Zadnik acknowledged Daniel (1961) as a pioneer in using the critical success factor method. Daniel had applied the method to systematically identify the critical information needs of managers. Rockart (1979) popularised the method when he used it to define critical areas for the successful performance of information specialists. Rockart offered it as a system that can focus a chief executive officer's attention on few key areas that influence organisational performance.

Traditionally, the CSF method has been applied in business and industrial environments. The areas that have benefited from it are: business process management; planning (Jenster,1987; Schneier, Shaw & Beatty, 1992); information systems (Rockart, 1982); flexible manufacturing system (Gowan & Mathieu, 1996); advanced manufacturing systems (Udo & Ethie, 1996); new product development (Cooper & Kleinschmeidt, 1995); library management (Borbely, 1981); and new service development (Atuahene-Gima, 1996).

2.2 IDENTIFICATION OF CRITICAL SUCCESS FACTORS

In integrating TQM into the strategy of the business, Oakland (1993) suggested that any mission that has already been developed is changed into

its critical success factors to coerce and move it forward. Top managers are responsible for listing CSFs so that they will gain some understanding of what the mission or the change requires. As with the CSFs, each process necessary for a given CSF must be identified, and together the processes listed must be sufficient for the CSFs to be accomplished.

According to Leidecker and Bruno (1984), critical success factors have been instrumental in various organisational processes. The identification of critical success factors is a very important step for applying them in processes. It provides a means by which an organisation can assess threats and opportunities in its environment. CSFs also provide a set of criteria for assesing the strengths and weaknesses of a firm.

Leidecker and Bruno (1984) say that, sensitivity and elasticity analyses are useful tools for identifying critical success factors. However, they are not sufficient nor are they the only useful methods. The CSF concept has been applied at three levels of analysis (firm specific, industry and economic socio-political environment). Analysis at each level provides a source of potential critical success factors. Firm specific analysis utilises an internal focus to provide the link to possible factors. Industry level analysis focuses on certain factors in the basic structure of the industry that have significant impact on any company's performance operating in that industry. A third level of analysis goes beyond industry boundaries for the source of critical success factors. This school of thought argues that one needs to perpetually scan the environment (economic, socio-political) to provide sources that will be the determinants of a firm's or industry's success.

Identification of CSFs can be an important element in the eventual development of a firm's strategy as well as an integral part of the strategic planning process (Leidecker & Bruno, 1984). CSF analysis can aid strategy development process at three specific junctures --- environmental analysis, resource analysis, and strategy evaluation. Eight techniques for identifying CSFs are set forth below:

1. Environmental analysis;
2. Analysis of industry structure;
3. Industry business experts;
4. Analysis of competition;
5. Analysis of the dominant firm in the industry;
6. Company assessment;
7. Temporal/intuitive factors;
8. Profit impact of market strategy.

According to Ferguson and Dickinson (1982), CSFs have particular significant to board of directors of companies. They believed that finding a way to successfully functioning board of directors depends on identifying critical success factors for the company and dealing with them from the perspective of an "outside director". Identification of CSFs can be done by evaluating the corporate strategy, environment, resources, operations, and other similar areas. The researchers say that CSFs for the 1980s are coping with inflation, ensuring the adequacy of financial and managerial resources, finding and keeping competitive position, and strategic development.

Anthony and Dearden (1976; 1980) point out that a management control system, besides measuring profitability, identifies certain key variables (also strategic factors, key success factors, key result areas and pulse points) that significantly impact profitability. Hofer and Schendel (1978) argue that CSFs can easily be identified through a combination of sensitivity and elasticity analysis; they contend that the major problem is in assessing their relative importance.

Rockart (1979) advocates the following sources of CSFs:

- the characteristics of the industry;
- an organisation's competitive strategy and industry positioning;
- environmental factors;
- temporal factors.

Borbely (1981) suggests some general categories that should first be considered to identify CSFs for the manager of an information centre. They are

- general environment of the parent organisation;
- internal corporate environment;
- information profession;
- information centre.

2.3 APPLICATIONS OF CRITICAL SUCCESS FACTOR METHOD

General Applications

As mentioned earlier, traditionally, a critical success factor approach has been applied in business and industry environments. Examples are

- Business Process Management (Elzinga *et al.*,1995);
- Integration of company's strategic planning and control with information system (Jenster, 1987);
- Performance measurement and management for strategy execution (Schneier *et al.*, 1992);
- Identification of CSFs for information system executives (Rockart, 1982; Yang, 1996; Nelson, 1991);
- New product development (Cooper & Kleinschmidt,1995);
- Flexible Manufacturing Management (Gowan & Mathieu,1996);
- Advanced manufacturing systems (AMS) (Udo & Ethie,1996);
- Library management (Borbely,1981)
- New service management (Atuahene-Gima,1996);
- Data management (Guynes & Vanecek, 1996).

Applications in Higher Education Institutions

Dervisiotis (1995) introduced a method called Objective Matrix Model (OMAX) to facilitate a framework for quality assessment and improvement in education. The important tasks of OMAX include

- Translating strategic objectives into critical success factors.
- Determining weights that prioritise strategy objectives.
- Defining appropriate measurement scales for performance that relates to the CSFs, in physical, economic or other units.
- Calculating a performance indicator that combines all weighted values for individual measurements of the CSFs.

In research that involves a business school at University of Piraeus, Greece, Dervisiotis has identified the following CSFs:

- An effective policy for the recruitment and admission of students.
- A solid academic curriculum receptive to innovations that keep it adaptable and current.
- A high calibre of teaching and research staff.
- The necessary facilities for classrooms, libraries, computer and other laboratories, etc.
- A programme of relevant applied research projects appealing to internal and external customers.
- Job opportunities available to graduates through co-operative programmes with business and industry.
- Available opportunities for co-operation and exchanges with other universities through well-developed networks for teaching staff and students.

Such a selection of CSFs is based on the assumption that the quality of output (the graduates) depends on the quality of input (students selected by admissions policy) and the quality of the process (curriculum, teaching, research, etc.). Each CSF of the institution is assessed based on a string of criteria for quality. Each criterion is weighted and its score determined. The product of the weight and score gives the weighted score for that criterion. The overall performance indicator, which is the sum of the weighted scores for all criteria, reflects the quality for a given critical success factor. According to Dervisiotis, the OMAX is a versatile approach that can be scaled up to include larger parts or the entire organisation. Conversely, it may be scaled down to focus on more detailed processes or smaller organisational units.

Process	Performance measure
Admissions	Concordance with enrolment management plan
Curriculum development	Peer acceptance
Teaching	Student teaching evaluation
International development	Number of students going overseas
Research	Number of publications
Service delivery (extension)	Percent community participation
Community relations	Number of complains
Information services	Computer-student ratio
Long-range planning	Percent of objectives met
Work force hiring and development	Percent of first-choice hires
Facilities development	percent of value to money for repairs
Funding development	Money obtained versus money requested

Table 2.1: OSU's Twelve Critical Success Factors (Coate, 1993).

At Oregon State University (OSU) developed a multiphase TQM process that includes the identification of twelve critical success factors given in Table 2.1. The critical success factors are believed to be essential in accomplishing the university's mission and laid foundation for its TQM process.

Clayton (1995) describes a TQM model called Quality Improvement Model that was developed and implemented at Aston University. By using a certain procedure, a Quality Council defines the university's critical success factors as follows:

- maintain a balanced financial performance;
- achieve planned growth;
- improve research performance;
- promote a shared sense of purpose;
- improve teaching/learning performance;
- recruit outstanding staff;
- retain outstanding staff;
- maximise benefits from IT infrastructure.

The university's Quality Council facilitator more graphically calls the CSFs "cold sweat factors", i.e., the things that are of main concern and therefore must be achieved in order to succeed.

The critical success factor method was also adopted by the University of Sheffield for developing the University's management information systems with particular attention to information needs of Heads of Departments (Pellow & Wilson, 1993). Through an interview process involving every Head of Department, department goals and critical success factors associated with those goals were identified, together with a list of management information needs. There were twenty critical success factors identified and grouped into eight categories given below:

- external relationships;
- research and funding;
- internal management;
- student management;
- public relations;
- teaching programmes;
- student requirements;
- use of new technology.

Burello and Zadnik (1986) interview a number of effective local special education administrators representing various organisational structures, sizes, and settings in the U.S. It was found that the critical success factors for the success of administrators and their programmes were hinged to five forces of leadership --- technical, human, educational, symbolic, and cultural.

Variations of Generic Critical Success Factors

From his survey on critical success factors of nine information system companies, Rockart (1982) has found that the companies exhibit a generic set of CSFs. However, Rockart observed that some of the CSFs identified were absent from individual company lists. In this study, it was found that, the variation in actual CSFs was due to four reasons: the stage of development of

the I/S organisations; the recent organisational history of the I/S function; the human, organisation, and makeup of a company; and the perspective of 'world view' that an I/S executive has on the field and his or her role in the company.

According to Hofer and Schendel (1978), critical success factors vary from one industry to another. The CSFs within any particular industry are derived from the interaction of two sets of variables, namely the economic and technological characteristics of the industry involved. The competitive weapons on which the various firms in the industry have built their strategies are also a source of CSFs.

Sabherwal and Kirs (1994) say that CSFs are industry specific. For example in the1970s, CSFs of the automobile industry were efficiency of dealer organisation, manufacturing cost control, and the ability to meet energy standards. During the same time process R&D and the ability to assure a steady supply of inputs were considered the CSFs in the cement industry (Sabherwal & Kirs, 1994).

2.4 MEASURING CRITICAL SUCCESS FACTORS

Schneier *et al.* (1991) say, in the context of Performance Measurement Management method, that once CSFs (driving forces or core competencies) have been identified, performance measures for the CSFs can be developed. Jenster (1987) says that critical success factors can be used as the basis for identifying the strategic performance indicators (SPIs). The indicators can be used in measuring short-term progress toward long-term objectives. They must strive to satisfy six specifications --- operational, indicative of desired performance, acceptable to subordinates, reliable, timely, and simple.

Leidecker and Bruno (1984) say that the profit impact of an activity or condition is usually the most significant factor for CSF identification as well as a determination of factor importance. The authors suggested four starting points for profit impact analysis that will assist in the determination of degree of importance of CSFs. They are --- major activity of the business, large dollars involved, major profit impact, and major changes in

performance. In most cases, the type of company or the nature of the industry will determine which CSFs are important. For example, the success of a retail business is heavily influenced by factors such as store location, and effectiveness of merchandising and inventory control. Wholesalers selling to the same retailer would not normally expect a CSF to be location oriented.

Rockart (1982) deduced from a survey of several companies, that for service CSFs, the most important approaches in these companies involves not only techniques for actual delivery of service but also techniques focusing on measuring user perception of service delivery. Measurement devices vary from a daily "sign-off" inquiry presented to each on-line terminal user; monthly, quarterly, or annual surveys of user opinion through internally generated questionnaires to structured sets of interviews administered by an outside consultant organisation.

Saberwhal and Kirs (1994) provide a profile of information technology (IT) capabilities of academic institutions in the U.S. The IT capabilities are information retrieval, electronic capabilities, student computing facilities, and computer-aided education. The alignment of critical success factors to IT capabilities for different groups of academic institutions provides the performance measure of CSFs for the institutions.

Rai, Borah and Ramaprasad(1996) identified eight critical success factors for strategic alliances in the information technology (IT) industry from a review of existing literature. They are partner congruity, partner evaluation, organisational advocacy, governmental policies, organisational issues, cultural concerns, human resource management (HRM) practices, and partner dominance. According to them, since there were no existing scales for measuring critical success factors existed, a consolidated questionnaire composed of different measurement scales and questions was needed. Respondents were asked to indicate the importance of each questionnaire item on a Likert scale.

Korpela and Tuominen (1996) suggest the use of an analytical hierarchy process (AHP) as an approach for assessing the importance of critical success factors in logistic operations. This can be performed by conducting customer interviews, and the performance of companies included in the analysis is evaluated with regard to each success factor.

Saraph, Schroeder and Benson (1989) propose eight critical factors of quality management through a process that involved identification and synthesis of critical requirements for quality management that have been prescribed by various eminent quality practitioners and academics. The factors are

- the role of management leadership and quality policy;
- the role of quality department;
- training;
- product/service design;
- supplier quality management;
- process management;
- quality data and reporting;
- employee relations.

The authors developed measures of critical success factors of quality management based on generally accepted psychological principles of instrument design. Operational measures of these factors were developed using data collected from 162 general managers and quality managers of 89 divisions of 20 different companies. The measures can individually or in concert produce a profile of organisation-wide quality practices. Initial selection of measurement items for each critical factor, pre-testing the instrument, and finalisation of the measurement items were used to develop the measurement instrument.

Black and Porter (1996) devised a measurement instrument on a group of quality dimensions, which were based on the Malcom Baldridge National Quality Award criteria and a thorough review of literature. The instrument was used in a survey of a sample of members of the European

Foundation for Quality Management to determine their perceptions of the applicability of those dimensions. The data collected were factor analysed and resulted in ten critical success factors of TQM:

- people and customer management;
- supplier partnerships;
- communication of improvement information;
- customer satisfaction orientation;
- external interface management;
- strategic quality management;
- operational quality planning;
- quality improvement measurement systems;
- corporate quality culture.

Atuahene-Gima (1996) carried out a literature review to develop a survey instrument to find out factors affecting innovation performance in manufacturing and services firms in Australia. The author found that for new services, there exist five most important factors impacting the performance of new services: importance accorded to innovation activity in human resource strategy, management support and teamwork, service innovation advantage/quality, proficiency of market launching activity, marketing synergy, and technological synergy.

Powell (1995) developed a TQM measurement scale based on an exhaustive review of the TQM literature, repeated discussions, and site visits with consultants and quality executives. The TQM factors are executive commitment, adopting the philosophy, closeness to customers, closeness to suppliers, benchmarking, training, open organisation, employee empowerment, zero defect mentality, flexible manufacturing, process improvement, and measurement. TQM performance was represented by financial performance measured subjectively using five questionnaire items.

Critical success factors were also the basis for identifying the strategic performance indicators (SPIs) that Jenster (1987) used in

measuring short-term progress towards the long-term objectives. According to Jenster, strategic performance indicators must strive to satisfy six specifications. They should be operational, indicative of desired performance, acceptable to subordinates, reliable, timely, and simple.

Nelson (1991) researched on the knowledge and skills that every organisation's personnel must posses to perform their jobs successfully. To this end, a measurement instrument was developed, tested, and completed by a sample of IS (information system) and end-user personnel from a number of different organisations. The survey result showed that IS and end-user personnel exhibit certain needs on six different knowledge and skill areas: organisational overview, organisational skills, target organisational unit, general IS knowledge, technical skills, and IS product.

From the groups of critical success factors presented thus far, only those proposed by Saraph, Shcroeder and Benson (1989) and another by Black and Porter (1996) have been developed with TQM in mind and derived from an exhaustive review of the TQM literature. Another model, Pyramid Model by Kanji (1996), embodies the two groups of critical success factors. The Pyramid Model consists of a prime factor (leadership), four principles, two core concepts, and business excellence as shown in Table 2.2. The table also includes a comparison of the essential Quality elements of the three models. As an additional feature, the Pyramid Model includes an outcome measure, i.e., business excellence, which makes the model result oriented. Because of the consistency among the three models, it was decided that an empirical test and validation of the Pyramid Model should be performed in the present research. The decision is further supported by an evidence from a research by Kanji and Yui (1997) that the elements of the Pyramid model were being practiced by a large proportion of Japanese TQM companies surveyed in the U.K. and almost half of their parent companies in Japan.

The prime, principles and core concepts of the Pyramid Model have been illustratively represented in the structure of a four-sided pyramid, hence giving the model its name (Figure 2.1). Leadership forms the pyramid's base, each principle makes the bottom part of the pyramid's faces, the core

Pyramid Model		Saraph *et al.*'s model	Black and Porter's model
Leadership (prime)		Top management leadership	quality culture; Strategic quality management; corporate quality culture
Delight the customer	External customer satisfaction	-	Customer satisfaction orientation
	Internal customer satisfaction	-	Supplier partnerships
Management by fact	All work is process	Supplier quality management; process management	Operational quality planning
	Measurement	Quality data reporting	Quality improvement measurement systems; communication of improvement information; *people* and customer management
People-based management	Teamwork	Employee relations	Teamwork structures for improvement
	People make quality.	Training	-
Continuous improvement	Prevention	-	-
	The continuous improvement cycle	Product design	-
Business excellence		-	-

Table 2.2: A Comparison of the Pyramid Model (Kanji, 1996) with Models by Saraph, Schroeder and Benson (1989), and Black and Porter (1996).

concepts constitute the sides of the faces, and business excellence is represented by a raised flag at the top of the pyramid. A brief description of the elements that constitute the Pyramid model is as follows.

Leadership

Leadership is regarded as the "prime" in the business excellence model because an organisation has to be guided through the TQM principles and core concepts by top management leadership in order to achieve business excellence. A leader is one who assumes that workers aim to do the best job they can, and endeavour to help workers reach their full potential (Deming, 1982). For lower level managers, this entails coaching and arranging for training. Top managers must, in turn, help design and implement a strategic

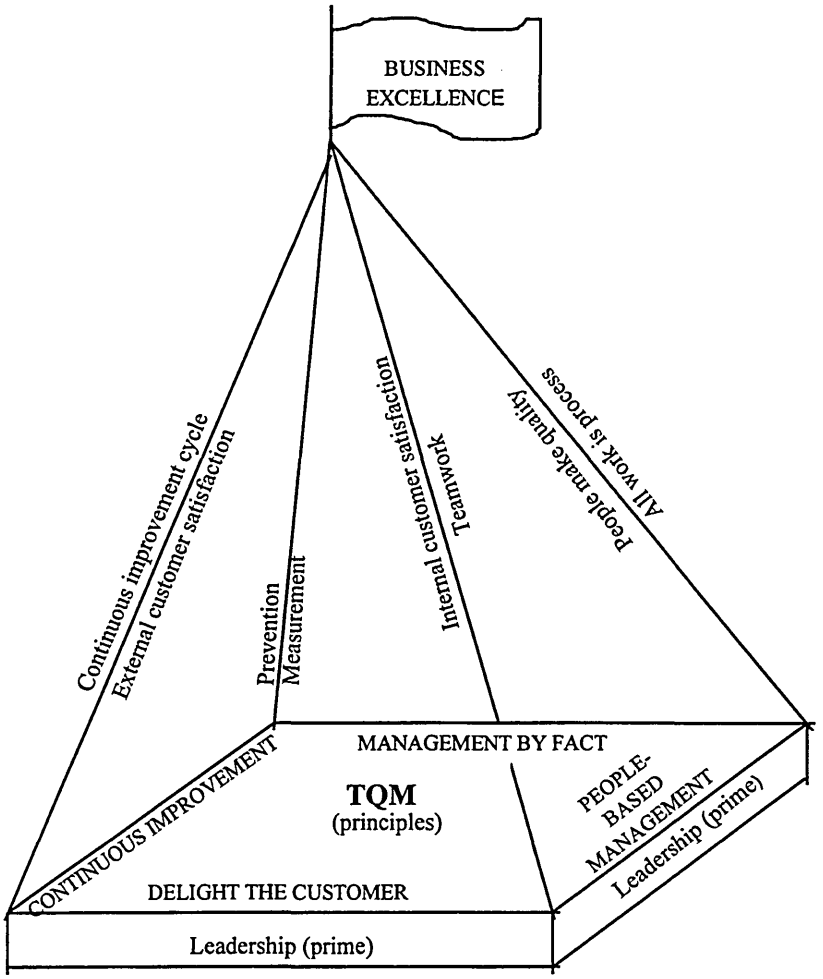


Figure 2.1: Kanji's Modified Pyramid Model (Kanji, 1996).

vision that grounds a TQM culture, and make sure their own behaviour exhibits the values that support such a culture.

Delight the Customer

Delighting the customer means being best at what matters to customers, and this changes over time. A customer might experience various degrees of satisfaction. If the product's performance falls short of expectations, the customer is satisfied. If performance exceeds expectation, the customer is highly satisfied or delighted (Kotler & Armstrong, 1996). An *only* satisfied customer will still find it easy to switch suppliers when a better offer comes along. Customer delight creates an emotional affinity for a product or service, not just rational preference, and this creates high customer loyalty. Creating customer loyalty means reducing customer defection, which will

increase profits by way of excluding all costs that would have been incurred on activities needed to attract new customers.

People-based Management

People need to be equipped with the knowledge and skills for the job, and informed about how well they are doing so that they become encouraged and responsible with their jobs. People will become committed to their jobs if they are involved and committed to customer satisfaction. This principle of TQM recognises that systems, standards, and technology themselves will not mean quality, therefore the role of people is vital.

Juran (1974) derived the term internal customers that stands for organisational employees who form "customer-supplier" relationships among themselves. Each upstream customer had specifications that needed to be met by downstream suppliers and all these internal customers were working toward external customer satisfaction.

Continuous Improvement

Total quality management is not a quick fix or a short term goal that is consummated when a target has been met. Total quality is not a programme or a project. It is a management process that recognises that, no matter however much improvement a company makes, its competitors will continue to improve and its customers will expect more from it. Continuous improvement of customer-driven activities and processes is a basic philosophy that underlies continuous customer satisfaction (McNair & Leibfried, 1992).

Management by Fact

Knowing the current performance levels of the products or services in the customers' hands and of all employees is the first stage of being able to improve. If an organisation knows where it is starting from, it can measure its improvement. Having the facts necessary to manage business at all levels is a

principle of total quality. Giving the facts to people so that decisions are based upon facts rather than "gut feelings" is essential for continuous improvement.

Internal Customer Satisfaction

The definition of quality (i.e., satisfying agreed customer requirements) equally concerns both internal and external customers. Many writers refer to the customer/supplier chain and the need to get the internal relationships working in order to satisfy the external customer. Whatever is being supplied ---- information, products, or services --- people in the organisation depend on their internal suppliers for quality work. Their requirements are as real as those of external customers --- they may be speed, accuracy, or measurement. The concept of internal customers is one of the big ideas of TQM. Making the most of it can be time consuming and many of the structured approaches take a long time and can be complicated. However, one successful approach is to take the "cost of quality" (see Kanji & Asher, 1993) to obtain information about the organisation's performance and analyse it.

External Customer Satisfaction

Many companies, when they begin quality improvement processes, become very introspective and concentrate on their own internal problems almost at the expense of their external customers. Other companies, particularly in the service sector, have gone out to their customers to survey what is important to them, and then to measure their own performance against customer targets. The idea of asking one's customers to set customer satisfaction goals is a clear sign of an outward-looking company. An understanding of survey and statistical methods is needed for the measurement of customer satisfaction.

All Work is Process

Business process is another internal focus for continuous improvement. The term process means any relationship, such as billing customers or issuing

credit notes, that has input, steps to follow, and output. A process is a combination of methods, materials, manpower, machinery, etc., which taken together produce products and services. All processes contain inherent variability and one approach to quality improvement is to progressively reduce variation: first, by removing variation due to special causes; second, by driving down common cause variation. This would bring the process under control and then improving its capability.

Measurement

Having a measure of "how we are doing" is the first stage of being able to improve. Measures can focus internally, i.e., on internal customer, or externally, i.e., on meeting external customer requirements. When discussing a measurement of customer satisfaction, Kristensen, Dahlgaard and Kanji (1992) have used usual guidelines for questionnaire design, survey and statistical analysis to obtain a customer satisfaction index.

Teamwork

Teamwork can provide an opportunity for people to work together in the pursuit of total quality in ways in which they have not worked together before. People who work on their own small, discrete, work groups often have a compartmentalised picture of their organisation and the work they do. They are often unaware of the work that is done even by people who work very close to them. Under these circumstances, they are usually unaware of the consequences of poor quality in the work they themselves do. If people are brought together in terms of a common goal, quality improvement becomes easier to communicate over departmental or functional walls. In this way, the slow breaking down of barriers acts as a platform for change.

People Make Quality

The majority of quality-related problems within an organisation are not within the control of the individual employee. Many problems are caused by the way the company is organised and managed. Some examples of where

the system gets in the way of people trying to do a good job are easy to find, and in all cases simply telling employees to do better will not solve the problem. Exhorting employees to a higher level of performance (for example, by poster campaigns) can have a counter-productive effect when people see that management fails to tackle the real problem. In these circumstances, motivation alone cannot work. People can only become committed to quality through the practical efforts of managers to remove the barriers to quality improvement.

The Continuous Improvement Cycle

The continuous improvement cycle of establishing customer requirements, meeting those requirements, measuring success and keeping on improving can be used both internally and externally to fuel the engine of external and continuous improvement. By continually checking customers' requirements, a company can find areas in which improvements can be made. This continual supply of opportunity can be used to keep improvement plans up to date an reinforce the idea that total quality journey is never ending. In order to practice continuous improvement cycle, it is necessary to obtain information about customers' requirements continuously.

Prevention

The core concept of prevention is central to TQM and one way to move towards continuous improvement. Prevention means causing problems not to happen. The continual process of driving possible failure out of the system can breed a culture of continuous improvement over time.

Business Excellence Index

Business excellence is a measure of customers', employers', and shareholders' (stakeholder's) satisfaction simultaneously within an organisation in order to obtain a comprehensive evaluation of organisational performance.

Stakeholders

Stakeholders are the raison d'etre of every organisation that adopts the TQM philosophy. Stoner, Freeman and Gilbert Jr. (1995) define stakeholders as those groups or individuals who are directly or indirectly affected by an organisation's pursuit of its goals (e.g. suppliers and customers). Stakeholders can be divided into two groups: internal stakeholders and external stakeholders. Internal stakeholders are those that are strictly part of an organisation's environment but for whom an individual manager remains responsible (e.g. employees, shareholders, and board of directors). External stakeholders are those in an organisation's external environment that affect the activities of the organisation (e.g. unions, suppliers, competitors, customers, and government agencies).

Reavil (1998) refers to stakeholders of a higher education institution as those who pay for, contribute to, or benefit from the organisation. There are at least ten stakeholders or stakeholder groups of higher education namely

1. Student --- the direct beneficiary of the transformation process. The student funds the process, directly or indirectly.
2. Employer --- an indirect beneficiary of the process who needs trained staff, and is willing to pay for them.
3. Family and dependants of the students --- this puts together the parents of the younger student, and the dependants of the mature student. Both may be contributing, directly or in kind, to the cost of the process.
4. Universities and their employers --- another conglomerate that includes the university as an entity, and those employees for whom it provides a livelihood.
5. The suppliers of goods and services to universities --- the continued viability of the university is important to organisations that regard it as a customer.
6. The secondary education sector --- supplier of the human input to the university system.
7. Other universities --- these are present in the greater system of

interest, and are essentially competitors to the university. This is particularly valid currently.

8. Commerce and industry --- these are beneficiaries, but indirectly. The activities of the HE sector add to the pool of trained staff.
9. The nation, as represented by the government --- it is generally accepted that education at whatever level is a major benefit to a nation's prosperity.
10. Taxpayers, national and local --- if the nation is the general beneficiary of the output of HE, the taxpayer pays the bill, by either national or local taxes.

Kanji and Tambi (1999a) say that the customers of higher education can be classified into internal and external customers on the basis of their locations with respect to the institution. They can also be classified into primary and secondary customers based on the frequency of interactions an institution has with them. Figure 2.2 shows customer groups where education is the product and students are internal-secondary as well as external-primary customers.

Later Kanji (1998a) transformed the Pyramid Model into the Business Excellence Model (Figure 2.3), which is a conceptual network of the prime, principles, core concepts, and business excellence. Kanji and Tambi (1999b) refer to the prime, principles, and core concepts as TQM critical success factors. Critical success factors are the required number of areas in which results, if they are satisfactory, will insure successful competitive performance for the organisation (Rockart, 1982).

The critical success factors and business excellence are treated as constructs that are causally connected in the sequence given. It begins with leadership (prime) that operates on four principles, i.e., delight the customer, management by fact, people-based management, and continuous improvement. Each principle, in turn, operates on to two core concepts. Delight the customer operates on external customer satisfaction and internal customer satisfaction; management by fact on all work is process and measurement; people-based management on teamwork and people make quality; and continuous improvement on continuous improvement cycle and

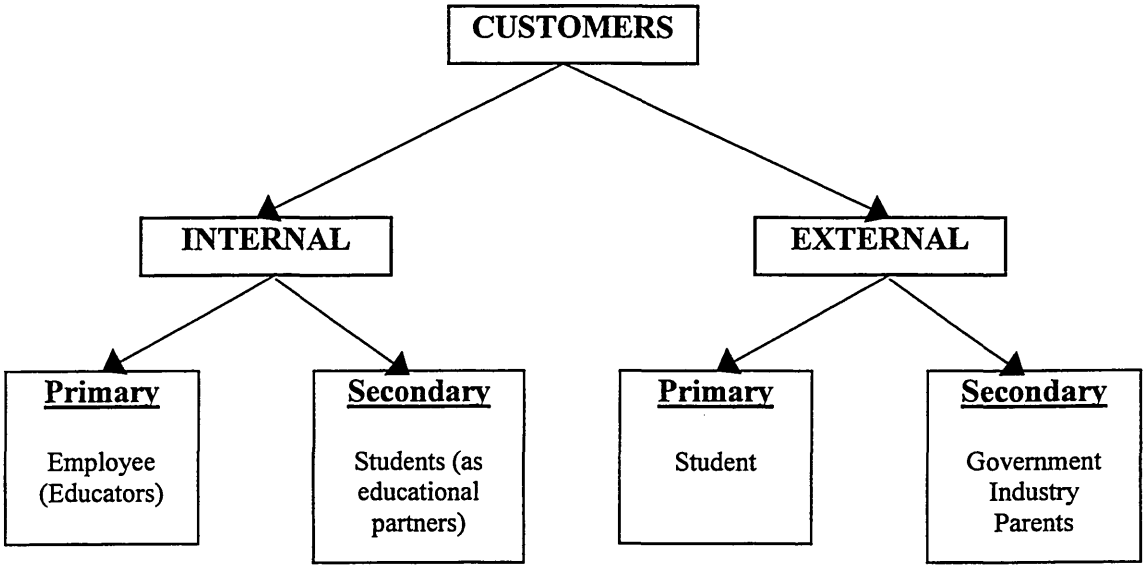


Figure 2.2: Customers for Higher Education (Kanji & Tambi, 1999b).

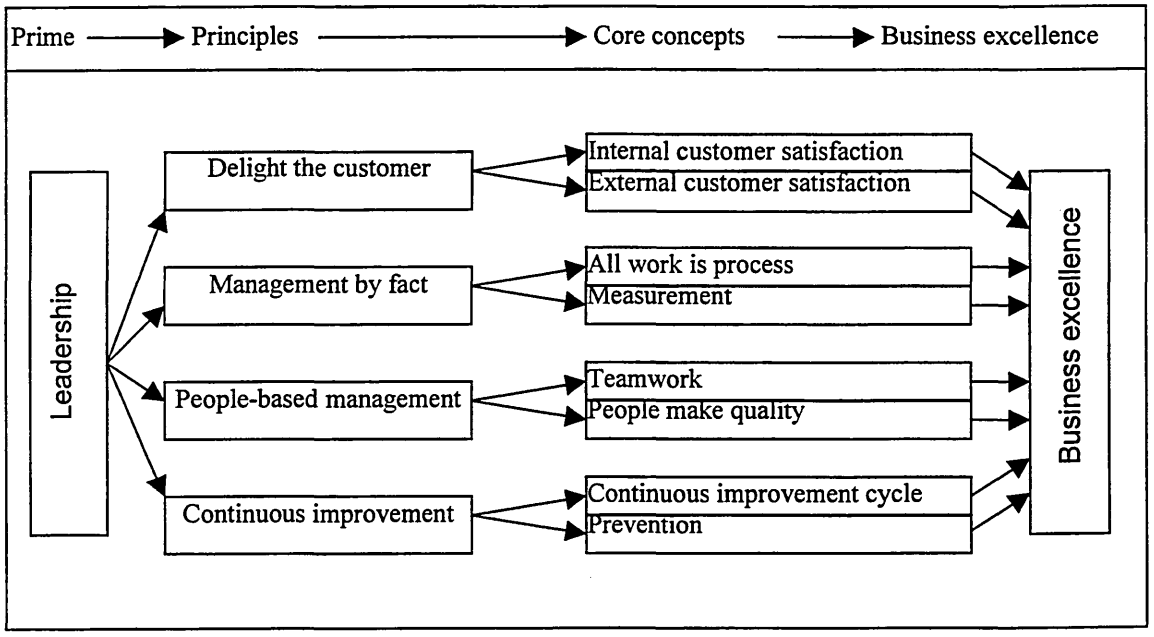


Figure 2.3: The Business Excellence Model (Kanji, 1998a).

prevention. The combined effect of the variable relationships specified in the model contributes to business excellence.

The TQM model in this form represents a theoretical system that can be empirically tested, examined, and analysed. The constructs cannot be directly observed but are inferred indirectly by questionnaire survey method. Here, a measurement instrument is developed and used to obtain scores from respondents on a variety of quality attributes that provide an empirical content to the model's constructs.

In relation to Kanji's definition of Business Excellence Index, indices of critical success factors and business excellence can be determined by performing structural analysis on the model. This analysis is based on data collected using a specially designed measurement instrument that is employed in a survey. The indices can be used to assess the strength of each critical success factor and business excellence at any point in time and permit comparison of business excellence of different organisations and divisions of the same organisation over time. In the model, business excellence refers to the measure of how well an organisation's TQM process is performing.

The Coherence of Critical Success Factors and TQM Process

The preceding review has provided a description of the critical success factor method applied on various kinds of organisations that include higher education institutions. A similar method has been used to identify dimensions of organisational quality or critical success factors (Saraph, Schroeder & Benson, 1989; Parasuraman, Berry & Zeithaml, 1991; Powell 1992; Owlia, 1995; Thiagarajan, 1995; Caruana & Pitt, 1997; Kanji, 1998b).

In studies on quality dimensions, frequently, an initial group of quality dimensions are created and measured by a measurement instrument. These dimensions are factor analysed thereby reducing the initial group of factors into a final solution that summarises a majority of information in the data. It is evident from the findings of those research

works that by applying suitable techniques, it is possible to identify and measure TQM critical success factors.

2.5 TQM MODEL ASSESSMENT

The TQM models surveyed are assessed against a group of criteria given in Chapter 1 to determine whether they represent an accurate and valid TQM model for assessing business excellence. It has been found that only three measurement models from those surveyed in the present research incorporate the concept of excellence. They are MBNQA (NIST, 1991), EFQM Excellence Model (EFQM, 1999), and Business Excellence Model (Kanji, 1998b). However, MBNQA and EFQM models are less attractive partly because of the arbitrary nature of the models' categories that have not been subjected to a rigorous empirical test. In addition, the weightings of the categories have also been arbitrarily assigned.

Models that incorporate valid and reliable measurement instruments are SERVQUAL, INTQUAL, the "Birmingham University" model (Owlia, 1995), and the Business Excellence Model. These models demonstrate causal connections between quality dimensions and organisational performance. However, among them, only the Business Excellence Model measures the quality of all key organisational areas simultaneously, demonstrates causal connections among them, and show their collective influence on organisational performance. Thus, the Business Excellence Model provides a potential solution to the task of finding a representative measurement model for higher education institutions. However, before the model can be used for this purpose, there are two important issues that needed to be clarified. One issue concerns whether the elements of the Pyramid model represent a complete set of TQM dimensions. The other issue concerns whether the principles and core concepts are transferable to the higher education system. These issues are discussed Chapter 3 and Chapter 4.

2.6 TOWARDS MEASURING BUSINESS EXCELLENCE

A prelude to measuring business excellence is elucidating the measurement of TQM process itself. The performance of TQM quality dimensions is usually measured using performance indicators. Odiorne (1987) says that it is possible to manage things for which their performance indicators can be established. Other things for which there are no indicators can be out of control before realising it.

Many authors believe that performance measurement is essential to TQM (Dixon, Nanni & Volmann, 1990; McCamus, 1991; Lynch & Cross, 1991; Sowards, 1992; Sink, 1991; Geanuracos & Meiklejohn, 1993; Hronec, 1993; Zairi, 1994; Smyth & Scullcon, 1996; Van Der Wiele, Dale & Williams, 1997). Dixon *et al.* suggest companies must adapt their measurement and measurement systems to facilitate the introduction of TQM and reap the expected benefits.

Zairi (1992; cited in Sinclair, 1994) gives the following reasons why performance measurement should compliment TQM:

1. You can't manage what you can't measure;
2. To determine what to pay attention to and improve;
3. To provide a "scoreboard" for people to monitor their own performance levels;
4. To give an indication of the cost of poor quality;
5. To give a standard for making comparisons;
6. To comply with business objectives.

Zairi suggests that traditional performance measurement is disadvantageous to management because it only provides information about the organisation's past performance but lacks an improvement aspect for day to day operations. Zairi adds that organisations have not come out with performance measurement systems for TQM, and this has been attributed to

1. Failure to operationally define performance;
2. Failure to relate performance to the process;
3. Failure to define the boundaries of the process;
4. Misunderstood or misused measures;
5. Failure to distinguish between control and improvement measures;
6. Measuring the wrong things;
7. Misunderstanding/misuse of information by managers;
8. Fear of distorting performance priorities;
9. Fear of exposing poor performance;
10. Perceived reduction in authority.

Generally there are three approaches to measuring organisational performance, i.e., financial measures, non-financial, and mixed measures.

Financial Measures

In the past, organisations have been pre-occupied with financial measures of organisational performance such as management accounting (Chadwick, 1991; Kaplan 1984). Many management accounting techniques were developed during 1920s to the 80s and were virtually been the only techniques that were widely practised by organisations during that time. Organisations then had the leisure of being in a favourable economic environment and therefore were not anxious to determine their organisational performance in another way. However, Johnson and Kaplan (1987) have pointed to three weaknesses associated with management accounting:

1. Management accounting information is not up-to-date, not detailed enough, and not focused on critical areas;
2. Management accounting information does not provide accurate costs;
3. Management accounting information causes managers to be concerned with short-term cycle of the profit and loss statement that consequently results in decisions associated with making short-term profits rather than long-term economic health of a firm.

Johnson and Kaplan add that because of the procedures and cycle of an organisation's financial reporting system, management accounting information is too late, too aggregated, and too distorted for use in managerial planning and decision making. Other criticisms have been hurled against management accounting that spawned the emergence of other costing techniques such as Activity-Based Costing (Cooper, 1998). These too were proven to be inadequate and the need for searching alternative performance measures prevailed.

As such there is a need to develop an appropriate performance measure of TQM process that is not accounting-based.

Non-Financial Measures

The shortcomings of financial measures have led to process or functional measures. The use of non-financial indicators has been well accepted in the monitoring and control of process aspects of manufacturing industry (Smith, 1990). Today, these measures are widely used at departmental levels of organisations and wherever processes take place. Many performance measurements of service areas have been adapted from measures used in manufacturing areas. These are for example, measures of productivity (Gass *et. al*, 1987), quality (Graves, 1987; Parasuraman, Berry & Zeithaml., 1991; Saraph, Schroeder and Benson, 1989), and customer satisfaction (Bergendahl & Wachtmeister, 1993; Fornell, 1994; Kristensen, 1999).

There has been a varied view on what constitute a measurement system for organisational processes. Zairi (1994), Hronec (1993) and Bendell *et al.* (1993) believe that process measurements should be derived from internal and external customer requirements. According to Sink (1991b), process measurement is concerned with five "quality checkpoints": selection and management of upstream systems; incoming quality assurance; in-process quality management and assurance; outgoing quality assurance; and pro-active assurance that an organisation is meeting or exceeding customer

requirements. Consequently, Sink suggests seven performance criteria of a process: effectiveness, efficiency, quality, productivity, quality of work life, innovation, and profitability/budgetability. Soward (1992) believes that, in order to improve quality, it is a basic requirement for an organisation to measure those activities that are critical to its success, i.e., key result areas.

Mixed Measures

According to Kaplan and Norton (1992), there is no single measure that can provide a clear performance on the critical areas of a business. Managers would want a balanced presentation of both financial and operational measures. Kaplan and Norton introduced a "Balanced Scorecard" of measures along four dimensions: financial perspective, customer perspective, internal business perspective, and innovation and learning perspective. Ridgway (1956) says that concentration on any single measure of performance would be dysfunctional because it leads to maximisation of that measure to the detriment of overall performance. The notion of a mixed measure of organisational performance is also supported by authors such as Sellenheim (1991), Howell and Soucy (1987a, 1987b, 1988) and Grady (1991). Grady charges that performance measures need to strike a balance, i.e., internal measures and external benchmarks; cost and non-cost measures; result measures to assess the degree goals are achieved; and process measures to evaluate critical tasks and provide early feedback.

The need for a comprehensive measurement system (encompassing financial and non-financial measures) that is adaptable to changes in the internal and external environments of organisations is inevitable. Grady (1991) says that because strategies change from time to time, performance measures must keep pace with these changes. Dixon, Nanni and Volmann (1990) state that while the goal of a measurement system is to conform to evolving actions and strategies, it must also nurture a sense of learning to organisational members. In other words, the measurement system itself should help the firms adapt to changes in competitive environments.

Eccles (1991) believes that because of the prevailing dissatisfaction with conventional measurement systems coupled with emergence of new management approaches such as TQM, and rigid quality requirements specified by manufacturers on their suppliers, there is a renewed interest on the subject of performance measurement. Eccles has said at the time that every company will have to redesign the way it measures its business performance within the next five years.

Measuring Business Excellence

Measuring business excellence can be broken down into a number of activities:

- Design a measurement instrument that contains multiple-item scales for indicator variables to measure the model's constructs;
- Use the measurement instrument in a survey to collect required data;
- Determine reliability of measurement instrument;
- Determine item mean scores. Determine measures of strength of causal connections between
    - each indicator variable and construct (outer coefficients);
    - construct and other constructs (inner coefficients);
- Determine validity of the model;
- Use mean scores and outer coefficients to determine critical success factor and business excellence indices, which as a whole denote organisational performance. The indices can be used to assess the strength of each critical success factor and business excellence at any point in time and permit comparison of business excellence of different organisations and divisions of the same organisation over time.
- Use an optimising technique to improve critical success factors that have poor performance and therefore improve business excellence.

Integrating Total Quality Management and Business Excellence Measures

The performance of an organisation can be regarded as the interface between total quality management and business excellence. Business excellence is a potent concept in that it is a collective measure of key organisational areas that are symmetrically related. As Kanji puts it, a business excellence index is the simultaneous measure of stakeholders' satisfaction within an organisation in order to obtain a comprehensive evaluation of the organisational performance (Kanji, 1998b).

CHAPTER 3

PHILOSOPHICAL AND SYSTEM DIMENSIONS OF TQM IN KANJI'S PYRAMID MODEL

3.1 INTRODUCTION

The suitability of Kanji's Pyramid Model, in terms of a set of criteria for modelling, has been explained in the previous chapter. However, an important question that needs to be addressed before the model could be further analysed is whether it is congruent with the TQM philosophical and system dimensions. If it does, this would warrant its use as a tool for internal assessment of an organisation's quality efforts as well as improving its overall effectiveness.

The notion of philosophy adopted here is based on the views of Kanji, Morris, and Haigh (1993) and by Hackman and Wageman (1995). Kanji, Morris, and Haigh describe the TQM philosophy by way of a schema that relates to four scenarios: a challenge for the status quo, a set of values, a value for change, and a future desired state. Hackman and Wageman's (1995) perspective of the TQM philosophy relates to an organisation's purpose, the assumptions created for achieving normative outcomes, TQM principles, and interventions.

The TQM approach depends on understanding organisations as systems. A system is a series of functions or activities within an organisation that work together for the aim of the organisation (Dowbyns & Crawford-Mason, 1991). In order to focus on TQM, the parts of an organisation must support other parts. The task of management involves having everyone focus on the system aim.

This chapter contains a discourse on the coherence of TQM philosophical and system dimensions according to Kanji, Morris, and Haigh (1993) and Hackman and Wageman (1995), essential elements of TQM proposed by major contributors in the field, namely, Juran (1974), Crosby

(1979), Feigenbaum (1983), Deming (1986), Ishikawa (1985), and Kanji (1996), to derive a comprehensive group of TQM critical success factors.

3.2 PHILOSOPHY OF TQM

Over so many years, TQM has undergone a process of evolution as evident from inclusion of more concepts in its course of development (Black and Porter,1996). Numerous research works have been done on the subject and as such it has been formalised into a philosophy. According to Powell (1995), empirical studies on TQM performance --- intended to help managers implement TQM more effectively --- lack rigour and theoretical support. The present research involves a study on the make up of a TQM philosophy that specifies core values and distinctive set of interventions intended specifically to promote those values. According to Kanji, Morris, and Haigh (1993), every philosophy has four common elements:

- a challenge to the status quo: a critique of the past and present;
- a set of values;
- a vehicle for change: which facilitates the movement from the status quo towards;
- a future desired state.

A Challenge to the Status Quo

One of the factors that has contributed to the birth of TQM has been influenced by the scepticisms about the status quo. Many ideas on TQM known today such as zero defect and quality improvement team (Crosby, 1979), continuous improvement and quality culture (Deming, 1986), internal customer and internal customer chain (Juran, 1974), create a new orientation to quality management divergent from traditional ways. Deming (1986) specifically refered to a movement away from the status quo when he explained the approach of building quality in the design stage where a system of production and service must be constantly improved.

A challenge to the status quo is illustrated by Konosuke Matsushita, founder of Japan's Matsushita Electric, in his comments made toward the managerial style and effectiveness of manufacturing organisations in Europe and North America:

We are going to win and the industrial West is going to lose out: there's nothing you can do about it because the reasons for your failure are within yourselves. ..... Your firms are built on the Taylor model, even worse so are your heads, with the bosses doing the thinking while the workers wield the screwdrivers. You're convinced, deep down that this is the right way to run a business. For you, the essence of management is getting the ideas out of the heads of the bosses into the hands of labour. .....We are beyond the Taylor model. ..... For us, the core of management is precisely the art of mobilising and pulling together the intellectual resources of all employees in the service of the firm. Only by drawing on the combined brainpower of all of its employees can a firm face up to the turbulence and constraints of today's environment. ..... This is why our large companies give their employees three to four times more training than yours. ..... This is why they seek constantly everybody's suggestions and why they demand from the educational system increasing numbers of graduates as well as bright and well-educated generalises: these people are the lifeblood of industry. ..... Your socially minded bosses, often full of good intentions, believe their duty is to protect the people in their firms. We, on the other hand, are realists and consider it our duty to get our people to defend their firms which will pay them back a hundred-fold for their dedication. By doing this, we end up being more social than you.

Konosuke Matsushita (1989)

The radical criticisms presented by Matsushita, though aimed at manufacturing organisations, are applicable to service organisations as well because they too are productive systems that transform inputs into outputs via a conversion process. The effectiveness of service systems is governed by how well organisational resources are being deployed in the conversion process.

Lowe and McBean (1989) described deficiencies of current management practice that have an effect of creating fear among employees so that they feel compelled to do their jobs. Driving out fear is one of Deming's thinking points about total quality management. Employees would feel secure to ask questions, report problems, express ideas, and tell the truth so that quality can be pursued successfully in the workplace. Deming has also suggested that American (Western) management suffers from a number of deadly diseases that conspire to prevent effective management practices from being developed.

A Set of Values

In a study of more than 200 companies, Harvard Business School researchers , Kotter and Heskett (1992) tried to determine which factors make some organisational cultures more successful than others. They reasoned that if success factors could be isolated, then companies could embark on programs to change their cultures in order to be more successful. Kotter and Heskett identified two levels of culture, one visible and one invisible. On the visible level, are group (of employees) behaviour norms and on the invisible level, are the shared values held by most people that belong to groups. The Harvard study indicates that culture has a strong and increasing impact on the performance of organisations.

Based on a research to determine how consumers perceive service quality, Parasuraman, Zeithaml, and Berry (1985) have discovered a culture that is good at preserving organisational performance. The culture is made up of five dimensions of quality that define core values and common behaviours as follows

- tangibles: physical facilities, equipment, and appearance of personnel;
- reliability: ability to perform the promised service dependably and accurately;
- responsiveness: willingness to help customers and provide prompt service;

- assurance: knowledge and courtesy of employees and their ability to inspire trust and confidence;
- Empathy: caring, individualised attention the firm provides its customers.

All of the above, if manifested by an organisation's personnel, will serve to meet the needs and expectations of customers in the service sector, including education.

A Vehicle for Change

TQM, as a vehicle for changing existing management practices to new ways have been widely reported in the literature (Dale *et al.*,1997; Tuckman, 1994; Dale & Cooper, 1994, Melan, 1998; Deming, 1986). Although Quality "Gurus" might give somewhat different emphasis on the means for implementing change, Kanji, Morris, and Haigh (1993) observe that the views suggested by the Gurus share some commonalities:

- Feigenbaum (1983) believes that the customer is king and accordingly describes the first and most important characteristic of TQM as follows:

" ..... start(s) with the customer's requirements and end(s) successfully only when the customer is satisfied with the way the product or service of the enterprise meets those requirements."

(Feigenbaum, 1993)

- Ishikawa (1983) says that everyone participates in TQM:

"Initially, total quality participation extended only to the company president, directors, middle management, staff, foremen, line workers and salesmen. But, in recent years, the definition has been expanded to include subcontractors, distribution systems and affiliated companies."

(Ishikawa, 1983)

- Crosby (1979) says that quality measurement is essential:

"It is necessary to determine the status of quality throughout the company. Quality measurements for each area of activity must be established where they don't exist and reviewed where they do".

Crosby (1979)

- Imai (1986) believes that a corporate system must be aligned with corporate culture to support quality:

"Do the existing systems and corporate structures support the fulfilment of such goals as quality, cost and scheduling? If they are found inappropriate for meeting the cross functioning goals, is top management prepared to make the necessary changes in such areas as organisational structure, planning and control and even in personnel practices, including compensation and personnel reallocation?"

(Imai, 1986)

- Deming (1986) states that an organisation must constantly strive for quality improvement:

"Improve constantly and forever the system of production and service, to improve quality and productivity, and thus to constantly decrease costs".

Deming (1986)

A Future Desired State

Based on the various definitions of TQM, its main goals are

- to produce products and services that meet the needs and expectations of customers (GAO, 1991; Dale & Cooper, 1994);

- for continuous improvement (Imai, 1986; Kossof, 1993; Melan, 1993);
- to create customer satisfaction (GAO, 1991; ANSI, ISO, ASQC 8402, 1994; Dale & Cooper, 1994; BS 4778, 1991).

Van Der Wiele, Dale and William (1997) say that the ultimate objective of every quality management system is to assist an organisation in its quests for financial health. TQM aims to improve all activities and eliminate wastage and continuous basis, reorient all activities and employees to focus on the customer (internal and external) by understanding and meeting their requirements, and to involve and develop all members of the organisation.

Kanji, Morris and Haigh (1993) suggest how the goals of TQM can be achieved by a critique of the status quo, through the espousing of values which are customer focused, and through rigorous and effective implementation of TQM as a vehicle for change. In their view, the transformation to a TQM organisation involves several drivers:

- leadership --- effective performance of leadership roles such as involvement, leadership style, planning;
- manning by top management --- good supervision such as monitoring, controlling and co-ordinating activities;
- a network of co-ordination oversight and technical support --- availability of a working mechanism for co-ordination of organisational tasks;
- carefully selected improvement projects --- team leaders have skills (through training) in identifying worthy projects;
- changes in climate --- orientation toward continuous improvement in policies, customer satisfaction, and use of relevant data and scientific techniques;
- training and education --- training for quality leaders; technical training for Quality team leaders, the quality advisor, and other employees; basic improvement skills and orientation to quality (education);

Based on their literature search, Hackman and Wageman (1995) believe that the philosophy of TQM is associated entirely on the works of Deming, Juran, and Ishikawa. They conclude that the TQM philosophy embraces four aspects as follows:

Organisation's purpose. An organisation's purpose is to stay in business, so that it can promote the stability of the community, generate products and services that are useful for customers, and provide a setting for the satisfaction and growth of organisation members (Juran, 1969; Deming, 1986; Ishikawa, 1985).

Assumptions underlying TQM strategy for achieving normative outcomes. These are assumptions about quality, people, organisations as systems, and senior management involvement. Quality is assumed to be less costly to an organisation than is poor workmanship. People has a natural care about the quality of work they do and will take initiatives to improve it --- so long as they are provided with the tools and training that are needed for quality improvement, and management pays attention to their ideas. Organisations are systems of highly interdependent parts, and the central problems they face invariably cross traditional functional lines. Quality is viewed as ultimately and inescapably the responsibility of top management.

TQM principles. TQM authorities specify four principles that should guide organisational interventions intended to improve quality --- work processes, analysis of variability, management by fact, learning and continuous improvement.

TQM interventions. The three TQM authorities prescribe four interventions to realise the values about people, organisation, and change principles:

- explicit identification and measurement of customer requirements;
- use of cross-functional teams to identify and solve quality problems;

- use of scientific methods to monitor performance and to identify points of high leverage for performance; and
- use of process-management heuristics to enhance team effectiveness.

Hackman and Wageman have shown that the versions of TQM promulgated by its founders and observed in organisational practice have convergent and discriminant validity.

3.3 SYSTEM DIMENSIONS OF TQM

Kanji, Morris and Haigh (1993) describe the concepts associated with a system:

- synergy --- in that the totality of the system is greater than the sum of its component elements;
- system boundary --- which delineated the system and which may be open, partially open or closed in relation to exchanges between the system and its environment;
- subsystems --- comprising interrelations between particular elements within the total system and which themselves have the characteristics of a system;
- flow --- a system has flows of process throughout the system;
- feedback --- serves to keep the system in a state of dynamic equilibrium with respect to its environment.

In relation to quality management standards, a quality system is a systematic means to manage quality in an organisation. It is designed to provide both the support and mechanism for the effective conduct of quality-related activities in an organisation. Examples of quality systems are BS 5750 and ISO 9000.

In the field of operations management, a system is made up of a conversion process, some resource inputs into that process, the outputs resulting from the conversion of the inputs, and information feedback about

the activities in the system. Deming has used this perspective of system to illustrate a general manufacturing system that has given rise to the Deming cycle.

Dobyns and Crawford-Mason (1991) delineate three main systems for which managers are responsible; the social or cultural system, the managerial system, and the technical system. A social system is a set of beliefs and resulting behaviours that are shared throughout an organisation. A technical system is composed of such factors as technologies used and physical infrastructure. A management system defines the effectiveness of those processes by which an organisation manages its human and physical assets. The relationship among the three systems or sub-systems are diagrammed in Figure 3.1.

The system view of Dobyns and Crawford-Mason has two things in common with Kanji, Morris and Haigh's in that both views give emphasis on leadership and culture. Because Dobyns and Crawford-Mason view was based on a manager's perspective, they have included technical system as one of their model's components. However Kanji, Morris and Haigh view a system at an organisational perspective, which regard all key areas affecting an organisation's success should be well managed.

3.4 SYNTHESIS OF PHILOSOPHICAL AND SYSTEM DIMENSIONS

It is possible to perform a synthesis between TQM philosophy and system dimensions for the purpose of developing a comprehensive TQM Model. Kanji, Morris, and Haigh (1993) offer a way for doing this, i.e., by means of a conceptual model that integrates various concepts as shown in Figure 3.2. The meanings of the model's concepts are as follows:

Vision. A vision is an advertisement of the intention to change to a future desired state. All employees should be able to lock on to realise how they can contribute to the vision. Visions are directly associated with what is termed transformational or charismatic leadership (Bass, 1985; Tichy & Ulrich,

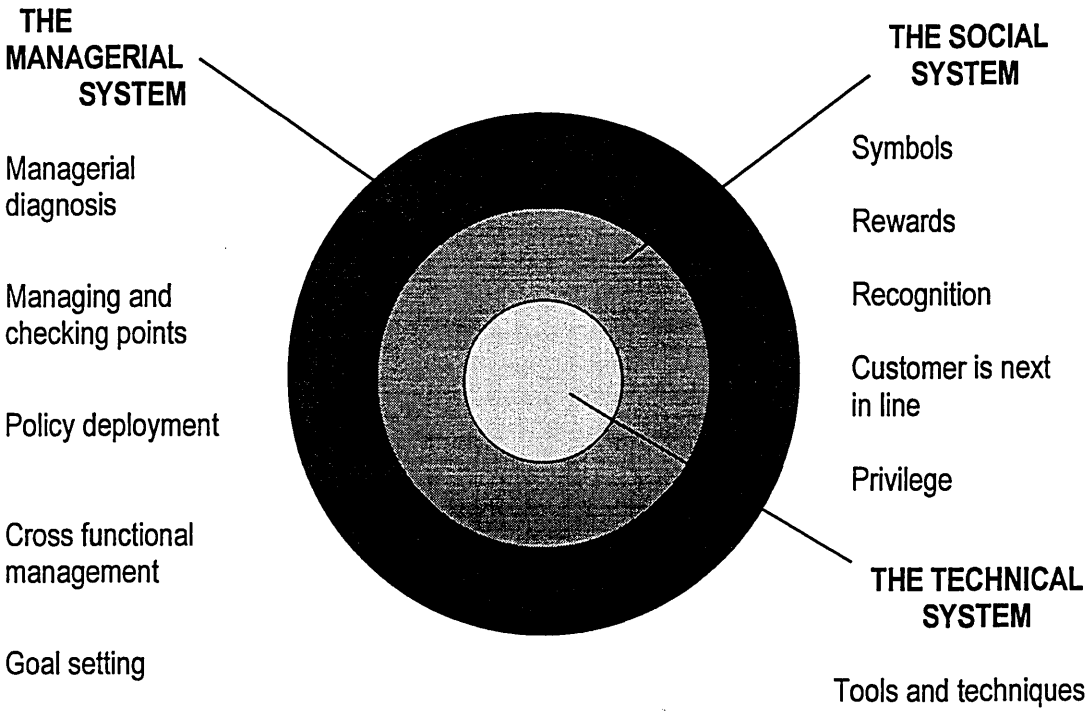


Figure 3.1: The Three Systems For Which Managers Are Responsible (Dobyns & Crawford-Mason, 1991).

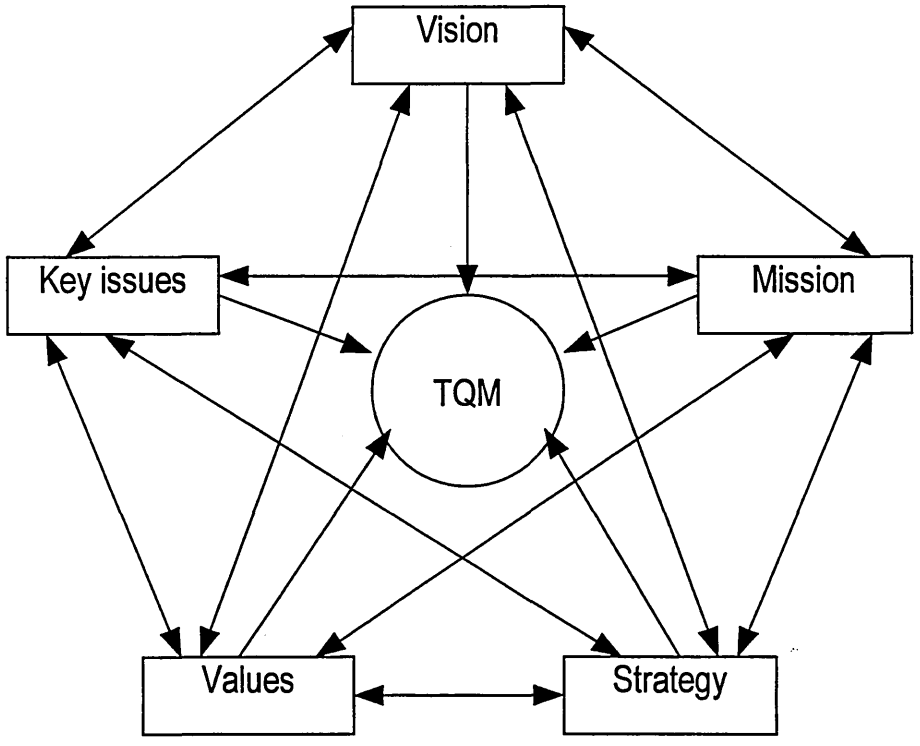


Figure 3.2: Total Quality Improvement (Kanji, Morris & Haigh, 1993).

1984; House, 1976) that involves leaders who have exceptional impact on their organisations.

Mission. A mission is a broad organisational goal (future desired state) , based on planning premises, that justifies an organisation's existence.

Strategy. A strategy is a broad programme for defining and achieving an organisation's objectives or in other words, it is an organisation's response to its environment over time. There are three elements common to strategy implementation of TQM. A successful TQM implementation involves team-orientation, worker-empowered approach, commitment to quality that is institutionalised, and organisation members at all levels thinking about quality. Strategies are developed by managers at all levels, i.e., corporate, business unit, and functional levels.

Values. Group members can share the same concerns and goals that tend to shape group behaviour. The values and common behaviour support a good culture that adapts to changes and preserves the performance of organisations (Kotter & Hesketts, 1992). They create cohesive groups that ensure congruence between organisational actions and external customer demands and expectations. Many successful organisations hold values that relate to people make quality, teamwork, all work is process, and prevention.

Key issues. These are aspects of a unit or organisation that must function effectively if the entire unit or organisation is to succeed. They must be addressed in pursuit of the quality demanded by customers to meet their needs and expectations. Key issues are characterised as follows

- delight the customer;
- external customer satisfaction;
- internal customer satisfaction;
- management by fact;
- measurement;
- people-based management;
- continuous improvement;

- continuous improvement cycle.

While Kanji, Morris and Haigh use the term "key issues", Hackman and Wageman (1995) refer to organisational key areas as "TQM assumptions, change principles, and interventions", and Kanji (1998a) calls them "prime, principles, and core concepts. These are synonymous with the term critical success factors used by Daniel (1961), Rockart (1979;1982), Ferguson and Dickinson (1982), Boynton and Zmud (1984), and Jenster (1987), though their works were not specifically related to quality issues.

3.5 PHILOSOPHICAL AND SYSTEM DIMENSIONS OF KANJI'S PYRAMID MODEL

In the Pyramid Model, leadership is designated as a prime that controls the behaviour of every principle and core concept. Kanji believes that leadership is crucial in improving the performance of individuals and groups in an organisation by way of provision of appropriate tools, knowledge, and skills associated with their tasks. Therefore in the Pyramid Model, leadership provides the philosophy and system dimensions of TQM by addressing mission, vision, strategy, values, and key issues. In addition, a system is established for measuring employees' performance that is equipped with a mechanism for providing performance feedback.

Hackman and Wageman (1995) have considered the models posed by Deming, Juran, and Ishikawa as the only sources of the TQM philosophy. It can be confirmed by examining Table 3.1 that the models proposed by these authors supplement each other so that jointly the models provide essential elements of TQM that are consistent with its philosophical and system dimensions.

As can be seen in the table, all essential elements have been incorporated in the Pyramid Model. An additional feature of the Pyramid Model is that it includes "delight the customer" as an element, as well as a measure of overall organisational performance --- business excellence. These elements have not been specifically considered in other models. Delight the customer

Philosophical and system dimensions	Deming (1986)	Juran (1974)	Feigenb-aum (1983)	Crosby (1979)	Ishikawa (1985)	Kanji (1994)
Vision } Leadership	X	X	X	X	-	X
Mission } Leadership	X	X	X	X	-	X
Strategy } Leadership	X	X	X	X	-	X
Values						
• People make quality (T, RI, Rs, E)	X	X	X	X	X	X
• Teamwork (T, RI, Rs, E)	-	X	X	X	X	X
• All work is process (T)	X	-	X	X	X	X
• Prevention (of failures) (A)	X	X	-	X	-	X
Key Issues						
• Delight the customers	-	-	-	-	-	X
• External customer satisfaction	X	X	-	-	-	X
• Internal customer satisfaction	X	X	-	-	-	X
• Management by fact	X	X	X	X	X	X
• Measurement	X	X	X	X	X	X
• People-based management	X	X	X	X	X	X
• Continuous improvement	X	X	-	X	X	X
• Continuous improvement cycle	X	X	-	X	-	X

Table 3.1: Philosophical and System Dimensions Considered by Major Contributors.
SERVQUAL'S dimensions: T= tangibles; RI = reliability; Rs = Responsiveness; A = assurance; E = Empathy.

has been added because previous research works have shown that by delighting customers (creating highly satisfied customers), an organisation achieves better business results --- increased revenues, lower total costs, long-term customer loyalty, and increased customer retention (Whitely, 1993; Reichheld & Sasser, Jr., 1990). Business excellence is added because it provides an overall measure of organisational performance that result from a simultaneous interaction of the model's elements.

Kanji & Tambi (1999a; 1999b; 1999c) refer to the elements of the Pyramid Model as critical success factors. Before the Pyramid Model can be used to represent a genuine TQM Model, the critical success factors must be empirically tested and validated. The validity issue is indeed a major concern of this research and is discussed in Chapter 6.

However, at this stage it suffices, for modelling purposes that Kanji's Pyramid Model is consistent with the TQM philosophy proposed by Kanji,

Morris, and Haigh (1993), and Hackman and Wageman (1995) as well as models proposed by major TQM contributors.

3.6 MODEL SPECIFICATION

Before the Pyramid Model can be applied, a method for measuring the critical success factors, and business excellence must be developed. In addition, to add merit to the model, relationships among the model's elements must be established. For this reason, the model has been transformed into the Business Excellence Model (see Figure 2.3), which is a structural model that defines critical success factors and business excellence as model constructs. The model also specifies causal connections among the constructs. These constructs cannot be directly measured but their empirical content can be obtained by using a measurement instrument that consists of a multi-item scale developed for each construct.

The model is validated by way of a structural analysis to determine its validity and justify its use as a generic TQM model. Here, the variables and relationships are expressed in a suitable mathematical form and suitable statistical methods are applied. The statistical methods used also provide values of structural parameters (path coefficients) whose values indicate the strength of relationships among causal connections in the model.

3.7 OBJECTIVES OF MODELLING

The objectives of the present research are two-fold: (1) description and explanation and (2) optimisation. The model describes and explain the TQM process and its contribution towards business excellence. The Business Excellence Model is theoretical in nature because it suggests testable relationships that can be empirically examined using a broad range of empirical data and statistical tests. The model is also capable of prescribing courses of actions that relates to improvements in critical success factors that are required for an organisation to be able to maximise its business excellence subject to limitations such as organisational constraints (e.g.,

budgets, technology, or personnel) and environmental constraints (behaviour of competitors, demand for product, or government restrictions).

Maximisation or minimisation problems subject to constraints are one of the types of problems commonly modelled, solved, and implemented by management scientists. In the present research, it would also be possible to apply a suitable optimising technique on the Business Excellence Model because it is a network model that has been designed to achieve a desired business excellence by determining an optimal measured value of critical success factors.

3.8 MODEL ANALYSIS

There are several important steps that remain to be accomplished before the Business Excellence Model can be used as a method for continuous improvement. The steps are

- a preliminary survey of higher education institutions to obtain evidence on application of critical success factors;
- a follow-up survey for obtaining data to test and validate the Business Excellence Model;
- development of a continuous improvement scheme using and optimisation method.

These aspects are discussed in chapters 4 to 7.

CHAPTER 4

A PRELIMINARY STUDY OF TOTAL QUALITY MANAGEMENT IN HIGHER EDUCATION

4.1 INTRODUCTION

From the review of total quality management and business excellence models described in Chapter 2, it has been concluded that the prime, principles, and core concepts of the Pyramid Model are consistent with the philosophical and system dimensions of TQM, and agree with the essential elements proposed by major Quality contributors. It appears that the model provides a comprehensive representation of the TQM process that is suitable for implementation in higher education institutions for their continuous quality improvement.

This chapter concerns a descriptive research which involves a survey of Quality directors of higher education institutions in the U.S., U.K., and Malaysia to determine whether they give credence to critical success factors of the Pyramid Model, to find out the extent to which the factors and other related Quality efforts are undertaken in their institutions, and to uncover the presence of any other critical success factors. Consequently, the following information is compiled:

1. Some general information of institutions and extent of TQM implementation;
2. Reasons for Quality Management (i.e., management for quality improvement);
3. Approach to critical success factors;
4. TQM and institutional performance;
5. Implementation of Quality Control Circles.

Some General Information of Institutions and Extent of TQM Implementation.

The information sought is associated with the following variables:

1. Age of institutions;
2. Size of institutions;
3. Type of institutions, e.g. college or university;
4. Type of control of institutions, i.e., public or private institution;
5. Whether the institutions practice some form of Quality management;
6. Whether the institutions implement TQM;
7. Leadership;
8. Quality culture;
9. Cultural transformation;
10. Training and education;
11. Areas of organisation where TQM is being implemented.
12. Knowledge in TQM;
13. Reward system.

Data associate with the abaove variables provide profiles of institutions in the three countries that serve as a basis for making comparisons.

Reasons for Quality Management

The survey data relate to five main reasons why the institutions implement TQM and how important the reasons are. It was anticipated that the institutions differ in terms of reasons for implementing quality management. The reasons given by the institutions can provide information on cultural influences on the practice of TQM in higher education institutions.

Approaches to Critical Success Factors

Critical success factors are those few factors that influence the effectiveness of a manager or an organisation (Rockart, 1982). In the present research, the prime, four principles, and eight core concepts of Kanji's

Pyramid Model are used to represent TQM critical success factors. One of the aims of the survey is to discover the presence of other critical success factors, if any, which influence organisational performance.

TQM and Institutional Performance

Previous case studies indicate that TQM positively influences the performance of business organisations. However, a survey on the influence of TQM on the performance of higher education institutions has never been done. The present research is concerned with conducting such a survey to determine whether

1. The quality of TQM institutions is better than non-TQM institutions;
2. The organisational performance of TQM institutions is better than non-TQM institutions.

Implementation of Quality Control Circles (QCCs)

QCCs are work groups that are involved with quality improvement and problem solving and therefore resemble TQM teams. It is believed that some issues that are important to QCCs are important to TQM as well. Thus an examination of QCC initiatives in HEIs is also included in the descriptive study. The areas included in the study are

- HEIs' response toward QCCs;
- reasons for QCCs' success;
- reasons for their failure;
- barriers to QCCs;
- sustainability of QCCs'; and
- association between the initiation of QCCs and TQM.

The Questionnaire

There are fifty-six questions that make up the questionnaire, both open-ended and closed-ended (Appendix B). Open-ended questions are used

to obtain unrestricted information from respondents, for example --- a question on reasons for implementing TQM. Closed-ended questions are used for classifying subjects, rank items, and rate attributes. All levels of measurement, i.e., nominal, ordinal, ratio, and interval scales are used in the questionnaire. Nominal measurement is used to classify subjects such as classifying TQM and non-TQM institutions. Examples of concepts studied are type of institution and type of control. Ordinal measurement is used for ranking items such as the relative importance of critical success factors and rating of attributes such as quality and organisational performance. Interval measurement is used to represent time and quantity dimensions such as the length of time TQM has been implemented and the size of an institution.

A first draft of the questionnaire was prepared and subjected to a pre-test. This has been carried out by presenting the questionnaire to several heads of Quality at Sheffield Hallam University. Based on their feedback, the questionnaire has been refined, in terms of question wording and questionnaire format to ensure a collection of the highest quality data possible.

The Study Population

The study population is made up of higher education institutions in the United States, United Kingdom, and Malaysia. Only institutions that are involved in quality in administrative areas and curriculum are studied. The U.S. population is represented by 294 institutions listed in the Quality Progress, September 1997 issue (Klaus, 1997). The U.K. population is made up 163 universities and higher education colleges listed in the Quality Assurance and Enhancement Network Directory for 1997-98 (HEQC, 1997). The Malaysian population is made up of 216 institutions that are listed in the 1997th Directory of Public and Private Higher Education Institutions in Malaysia produced by the country's Ministry of Education. For the purpose of the present survey, all institutions are represented by their Quality Directors. Since the populations are finite in terms of their sizes, a census is conducted.

Data Collection

The census process is conducted to obtain data needed to solve the research problem. Data are collected by means of a mail survey. Several reasons influenced the decision to use this procedure:

1. The need for a great deal of data about institutions;
2. The questionnaire could be self-administered;
3. Face-to-face contact is not possible because of the geographical distance and distribution of respondents;
4. Mail survey is the least expensive form of data collection.

Priority has been given to clarity of survey questions so that respondents can provide their responses without any difficulty. The bulk of the questionnaire is made up of close-ended questions that further aid the respondents in providing responses. By providing a reasonable amount of time to respondents to complete the questionnaire, respondents could put in more thought to questions, check records, and consults others, which can improve the accuracy of responses. Furthermore the respondents could be reached conveniently by mail, which otherwise would be uneconomical if other methods were used.

The U.S. and Malaysian surveys were conducted in November 1997 through February 1998 and the U.K. survey in November through December 1998. The response rates were 72 (24.5%) institutions for U.S., 51 (31.3%) for U.K., and 60 (27.8%) for Malaysian institutions.

Data Analysis

The types of analysis performed on the data are

1. frequency analysis;
2. descriptive analysis;
3. crosstabulation;
4. correlation.

Frequency analyses are performed on categorical data, such as type and class of institutions. Descriptive statistics, which give numerical approximation of item distribution, are computed for all other data. Examples are mean and range values of age and size of institutions. Crosstabulation provides a means of looking for association in data sets, such as age, size, and type of control of institutions with their quality status, i.e., TQM or non-TQM. Correlation provides summary indicator of the strength of relationship between pairs of variables, such as TQM and organisational performance.

4.2 RESEARCH FINDINGS

The research findings are divided into five areas:

1. Some general information on institutions and extent of TQM implementation;
2. Reasons for quality management;
3. Approach to critical success factors;
4. TQM and institutional performance;
5. Implementation of quality control circles.

Some General Information on Institutions and the Extent of Quality Management Implementation

- Most institutions in Malaysia (88.5%) and about half of U.S. and U.K. institutions (49.1% and 50.9% respectively) are small in size (less than 5000 FTE students).

- Higher education institutions in the study population in U.S. are older than in U.K. and Malaysia (mean age: U.S. = 75.8 years; U.K. = 52.8; and Malaysia = 11.7 years). For U.K. HEIs, the average number of years the institutions have been established is 74 years for colleges, 63 years for old universities, and 6 years for new universities.

- The proportion of institutions implementing TQM in U.S. is larger than in Malaysia (U.S. = 70.9%; Malaysia = 50.0%). There are only four institutions that implement TQM in the U.K., i.e., 1 college, 2 old universities and 1 new university.

- Most old and new institutions in the three countries have adopted quality management within the last 10 years (U.S. = 95.5%; U.K. = 100%; Malaysia = 83.6%). HEIs that implement TQM range from 5 years to 161 years old. Thus, the practice of quality management does not depend on age of institutions.

- In U.S. and Malaysia, most institutions give great importance to meeting customers' expectations similar to business organisations (U.S. = 68.4%; Malaysia = 67.7%). In the U.K., the largest proportion of institutions (72.5%) defined quality as "fitness for purpose", which is consistent with U.K. Higher Education's Funding Council's definition of quality. The proportion that defined quality as "meeting customers' expectations" is 25.5%. This group includes one TQM-institution. Previous works on TQM organisations have shown that they tend to be more customer focused (Sinclair, 1994). Since there are only 4 institutions in U.K. that are TQM oriented, this had accounted for the low proportion of institutions that focus on their customers in their quality activities.

- Lack of customer awareness among the staff is a general drawback for many institutions. The proportion of institutions which has full customer awareness by all their employees are 27.8% for U.S., 5.9% for U.K., and 11.1% for Malaysia, respectively.

- Although there are non-TQM institutions in both countries practising so called Quality Management (Quality Management in place among non-TQM institutions: U.S. = 54.5%; Malaysia = 36.4%; U.K. = 68.1%), the research indicates that they have adopted some TQM processes (see Appendix C, Table 7).

- Many small to medium-sized institutions are able to implement quality management institution wide (U.S. = 73.1%; Malaysia = 69.2%) due to the fact that it is convenient for them to cover their entire organisations. From the four U.K. institutions that implement TQM, two of them are small institutions and the other two are large.

- The research indicates that the role of leadership is the most important factor to promote quality management in U.S. and Malaysian institutions. Quality management has been introduced by leadership in about 77.4% in U.S. institutions and 75.9% in Malaysia. In U.K., quality management has been introduced by leadership in 73.1% of institutions. The rest was introduced by Quality Directors (15.4%) and other individuals or groups.

- Although a large proportion of institutions in the three countries has adopted quality management in the academic area of the institution (U.S. = 74.1%; U.K. = 100%; Malaysia = 86.2%), nevertheless there is room for improvement in order to manage the complexity and the changing nature of the organisations.

- In general, there are more Quality councils and teams in U.S. institutions than in Malaysia. There are 41.5% U.S. institutions that have Quality councils compared to 20.7% of Malaysian institutions. Teams exist in 84.9% of U.S. institutions, 23.5% in U.K. institutions., and 62.1% institutions in Malaysia. However, it is clear that institutions in U.S. and Malaysia require Quality management consultants and other experts in order to assist them to implement TQM properly (use of consultants: U.S. = 17.0%; Malaysia = 20.7%).

- The survey indicates that some of the barriers to quality management (e.g. lack of commitment, insufficient knowledge, and fear of failure) originate from organisational members. Sometimes these barriers are more difficult to overcome than other barriers in

the institutions. The most common barrier in U.K. institutions is "staff were pressed with daily work", i.e. 69.4%.

- Lack of quality culture exists among organisational members in various institutions which can be developed by engaging quality experts for training and education The proportion of U.S. institutions that has high level of expertise in TQM is 25.9%, (U.K. = 20%; and Malaysia = 17.9%). However, only 63.5% of U.S. institutions use consultants occasionally (U.K. = 43.3%; Malaysia = 64.3%).

- It has been found that a quality culture has not yet been widely adopted in most American HEIs whereas in Malaysian institutions this is embedded in their everyday organisational activities (presence of quality culture: U.S. = 47.2%; Malaysia = 60.7%). It is therefore necessary to develop a quality culture in American institutions where leadership can play a more important role. There is lack of a quality culture and other quality activities in order to transform organisational culture among the U.K.'s old universities, which shows their resistance toward the current trend in quality improvement processes for organisational development. This coincides with the report of the country's Quality Assurance Agency (QAA) (Baty, 1998) that some old universities oppose its quality assurance framework plans because they believe that it will increase bureaucracy.

- Only 31.3% of all U.K. institutions perform benchmarking, of which 53.8% are new universities. New universities need to adopt best practices in order to promote their image as institutions of high standards. Only 4 old universities benchmark their activities and this reflects their state of self-fulfilment and complacency.

- For quality motivation, a higher proportion of Malaysian HEIs provides economic rewards to employees compared to U.S. HEIs: job promotion = 46.4% (U.S. = 5.7%); bonus = 42.9% (U.S. = 8%); vacation = 17.9% (U.S. = 0%). American HEIs tend to provide

sociological and psychological rewards (recognition = 77.4%; organisational support = 52.8%; quality award to employees = 32.1%) indicating a typical cultural difference between the two countries. U.K. institutions use various kinds of rewards for quality motivation such as job promotion, award, organisational support, recognition, and others. However, TQM-institutions only use psychological rewards, i.e., support and recognition, indicating a typical cultural difference between TQM and non-TQM institutions.

Reasons for Quality Management

- Altogether, there are 54 reasons for implementing Quality management that can help respondents to improve quality (Table 4.1).

- An examination of these reasons reveals that there is a set of unique reasons for U.S., U.K., and Malaysian HEIs.

Unique reasons for U.S. HEIs:

1. To satisfy industry requirements;
2. To upgrade student performance;
3. To increase revenue and ensure self-reliance;
4. To improve communication;
5. To capitalise on employee talents and innovativeness;
6. To benchmark against best practices;
7. To improve decision making;
8. To improve planning;
9. To promote team and individual empowerment.;
10. To improve student recruitment and retention.

Unique reasons for U.K. HEIs:

1. Academic standards;
2. Quality and equality of student experience;
3. External pressures;

1. To be competitive
2. Customer/student satisfaction
3. Government influence
4. Foreign partner's expectation
5. Improve staff morale
6. Image building
7. Increase efficiency & productivity (including processes & academic programmes)
8. Continuous improvement
9. Increase market share
10. Encourage teamwork
11. Minimise costs
12. Increase number of meaningful programmes
13. Satisfy industry requirements
14. Upgrade student performance
15. Increase revenue and ensure self-reliance; improve financial position (including assets)
16. Create value driven employees
17. For high level of service to internal and external customers
18. To meet future plans
19. Warrants continuity
20. Improve effectiveness (including processes)
21. Better utilisation of resources
22. Keep abreast in field
23. Resolve current problems and overcome weaknesses
24. Accountability to public
25. Compete for funds
26. Inculcating positive culture (e.g. corporatisation & positive work ethics)
27. To manage change (includes processes)
28. Prevention
29. Had satisfactory experience using the approach
30. Survival
31. To improve management
32. Obtain feedback on actions to guide future decisions
33. Improve communication
34. Capitalise on employee talents and innovativeness
35. To develop and provide opportunities to entire institution's community
36. Benchmark against best practice
37. Improve work environment
38. Improve decision making
39. Improve planning
40. To satisfy accreditation requirements
41. Failure of present system
42. Promote interest of lead faculty and individuals
43. Encouragement from management
44. Team and individual empowerment
45. Improving the organisation and its processes
46. To develop new ideas
47. Improve student recruitment and retention process
48. Core business of HEIs
49. Academic standards
50. Quality and equality of student experience
51. External pressures
52. Equality and value for money
53. Raise teaching profile
54. Ability to demonstrate that we provide service

Table 4.1: Reasons for Quality Management.

4. Equality and value for money;
5. Raise teaching profile;
6. Ability to demonstrate that we provide service.

Unique reasons for Malaysian HEIs:

1. To meet foreign partners expectation;
2. To compete for funds;
3. To pursue as core business of HEIs.

- The following conclusions are made about the differences in unique reasons among U.S., U.K., and Malaysian HEIs:

1. U.S. institutions are mature by way of their assessment of unique causal factors which relate to strategic development processes.
2. The presence of many reasons that relate to quality improvement in U.S. institutions indicates their commitment towards developing their quality culture.
3. Institutions in Malaysia give more emphasis on financial aspects of quality in order to develop the organisations' quality culture. Here, quality culture refers to the unified approach through which everybody in the organisation thinks, acts and feels in quality sense for most of the time (Kanji & Asher, 1993). Kanji and Yui (1997) introduced a universal total quality culture model (Figure 4.1) where TQM process is described as a never ending improvement of all people and management systems. In this context, quality culture has been described by the authors as shown in Figure 4.2 which can be easily customised for individual organisations.
4. U.S. institutions are concerned about process as well as results.
5. U.S. and U.K. institutions are more customer oriented in their TQM process than Malaysian institutions.

6. Institutions in Malaysia operate at a narrower front, i.e., short term activities;
7. U.S. institutions operate at a broad level, i.e., long-term strategy.
8. U.K. institutions have hardly been involved in TQM and lack interest in adopting it in the future. They are more concerned with the funding councils' assessment procedure that covers the areas of curriculum design, content and organisation; teaching learning and assessment; student progression and

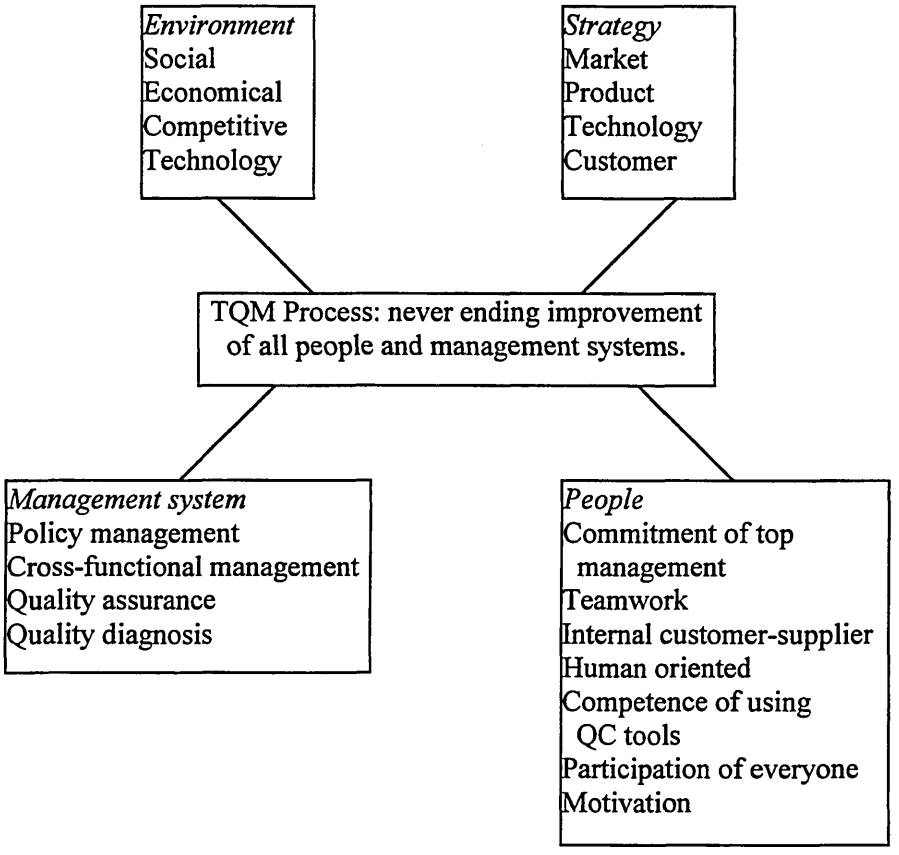


Figure 4.1. A Model of TQC (Kanji & Yui, 1997).

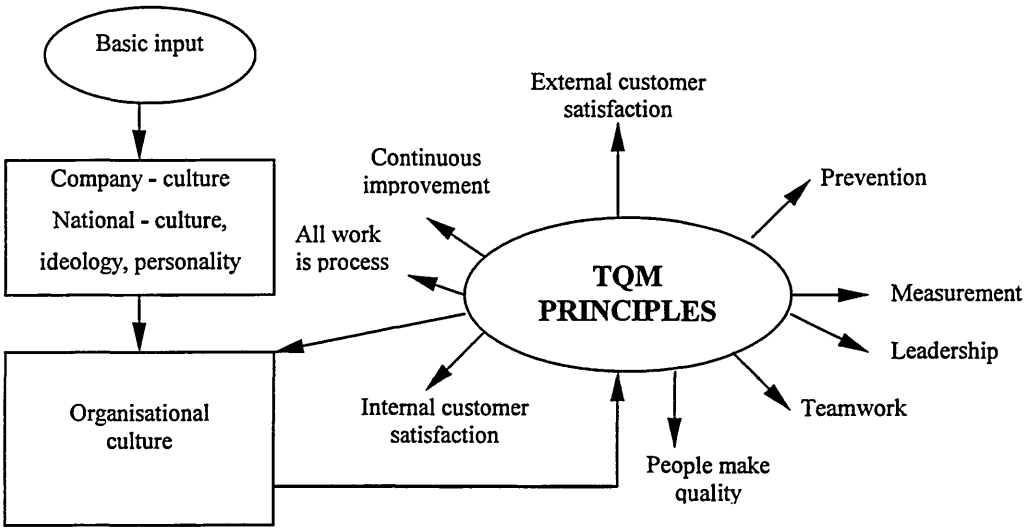


Figure 4.2: Creating Quality Culture (Kanji & Yui, 1997).

achievement; student support and guidance; learning resources; and quality assurance and enhancement.

Table 4.2 lists reasons for implementing Quality management by colleges, old universities, and new universities in the U.K..

- There are 32 reasons for Quality management that can help respondents improve quality.
- An examination of the reasons reveals that there is a set of unique reasons for the implementation of Quality management for the three different institutions.
- There is one unique reason for colleges, i.e., resolve current problems and overcome weaknesses.

Unique reasons for universities are

1. Image building*;
2. Increase market share;
3. Encourage teamwork*;
4. Upgrade student performance*;

Table 4.2: Reasons for Quality Management for Colleges, Old Universities, and New Universities.

	Reasons for Quality Management	No. of cases						Total cases
		College		Old Univ.		New Univ.		
1	To be competitive	x	1	x	1(1)*	x	1	4
2	Customer/student satisfaction	x	5	x	2	x	1	8
3	Government influence	x	8(1)	x	1	x	5(1)	16
4	Image building	.....	.....	.....	.....	x	1	1
5	Increase efficiency & productivity (incld processes & academic programmes)	x	2(1)	.....	.....	x	1	4
6	Continuous improvement	x	1	x	(1)	x	2(1)	5
7	Increase market share	.....	.....	x	(1)	.....	.....	1
8	Encourage teamwork	.....	.....	.....	.....	x	1	1
9	Upgrade student performance	.....	.....	.....	.....	x	1	1
10	Create value driven employees	.....	.....	.....	.....	x	1	1
11	For high level of service to internal and external customers	x	6	x	2	x	1	9
12	To meet future plans	.....	.....	x	1	.....	.....	1
13	Improve effectiveness (incld processes)	.....	.....	.....	.....	x	2	2
14	Better utilisation of resources	.....	.....	.....	.....	x	(1)	1
15	Keep abreast in field	.....	.....	.....	.....	x	(1)	1
16	Resolve current problems & overcome weaknesses	x	1	.....	.....	.....	.....	1
17	Accountability to public	.....	.....	x	1	x	2	3
18	Inculcating positive culture (e.g. corporatisation & positive work ethics)	x	1	.....	1	x	2	4
19	To manage change (incld processes)	.....	.....	x	1	x	1(1)	3
20	Prevention	.....	.....	.....	.....	x	2	2
21	Obtain feedback on actions to guide future decisions	.....	.....	.....	.....	x	1	1
22	To develop and provide opportunities to entire institution's community	x	3	.....	.....	x	1	4
23	To satisfy accreditation requirements	.....	.....	x	2	x	1	3
24	Team and individual empowerment	x	1	.....	.....	.....	.....	1
25	Improving the organisation and its processes	x	5	.....	.....	x	3	8
26	Core business of HEIs	.....	.....	.....	.....	x	1	1
27	Academic standards	x	2	.....	.....	x	1	3
28	Quality and equality of students' experience	.....	.....	.....	.....	x	1	1
29	External pressures	.....	.....	x	1(1)	.....	.....	2
30	Equality and value for money	.....	.....	x	(1)	.....	.....	1
31	Raise teaching profile	x	1	x	(1)	.....	.....	2
32	Ability ro demonstrate we provide service	.....	.....	x	1(1)	.....	.....	2

5. Create value driven employees;
6. To meet future plans**;
7. Improve effectiveness (includes processes)*;
8. Better utilisation of resources*;
9. Keep abreast in field*;
10. To manage change;
11. Prevention*;
12. Compete for funds;
13. Obtain feedback on actions to guide future decisions;
14. To satisfy accreditation requirements;
15. Core business of HEIs*;
16. Quality and equality of students' experience;

The above factors are marked "**" if they are unique for old universities only and "*" if they are unique for new universities.

- The following conclusions are made about the differences in unique reasons among the different kinds of institutions.

1. Colleges are concerned about overcoming their immediate problems and weaknesses, and are unique by way of specific niches they serve.
2. The presence of many unique reasons for quality improvement in universities indicates their wide scope of functions.
3. Old universities make strategic plans.
4. In addition to their concern for a multitude of Quality objectives, new universities are concerned with building their image.

There were six Quality Directors who did not complete the questionnaire and gave reasons for not taking part. Five directors said that their institutions' quality approaches are not consistent with the approach described in the survey. The Quality Director of an institution said that the institution does not have a Quality management process. Another said that there is no single form of Quality management that can accurately describe his or her institution's arrangement.

Critical success factor	U.S.	U.K.	Malaysia
Leadership	1	2	1
Continuous improvement	3	1	2
Prevention	9	9	9
Measurement of resources	8	8	8
Process improvement	5	6	5
Internal customer satisfaction	4	7	7
External customer satisfaction	2	3	6
People management	7	4	3
Teamwork	6	5	4

Table 4.3: Ranking of Critical Success Factors.

Two Quality directors said that their institutions' quality assurance activities are not related to the theme of the survey.

Approach to Critical Success Factors (CSFs)

For the three countries, it is found that there are nine TQM CSFs that influence the performance and business excellence of HEIs. Table 4.3 shows rankings of CSFs based on a scale of 1 (most critical) and 9 (least critical) for the three countries. These rankings were obtained by, first, converting respondent's factor rankings of CSFs to factor ratings based on a scale of 1 for least critical and 10 for most critical. Then, the factor ratings were converted to ranks as tabled by using the above nine-point scale.

- From the ranking of CSFs, leadership is the highest ranked TQM critical success factor for U.S. and Malaysian HEIs which provides motivation and strategic management.

- It has been found that in the U.K., continuous improvement is the highest ranked critical success factor. Leadership is rated second in degree of criticality. This is strategically wrong because the most important factor in implementing quality management is full leadership commitment. Thus, the leaders in U.K. HEIs need training and education in quality management process. This supports the general findings on U.K. institutions that although their leaders help promote and make decisions on quality management

activities in their institutions, they do not provide the full commitment for the implementation of TQM.

- The survey also indicates that the role of leadership is less demanding during TQM implementation activities. For U.S. and Malaysia, the importance weights of leadership, i.e., 9.5 and 8.7, respectively, are larger than its weights during implementation, i.e., 8.3 and 8.5, respectively. This indicates some lack of understanding about the importance of leadership in quality management. For U.K., the weights are about the same, i.e., 8.00 and 8.05, respectively.

- In the U.K., continuous improvement is the most important critical success factor and is given greatest emphasis during implementation. However, in order to determine whether all improvement activities have gained favourable results, data on their progress are required. This can be achieved by having an effective measurement system. However, the importance weight of measurement function and its weight during implementation are low., i.e., 4.74 and 6.38, respectively.

- In U.S. and Malaysia, there exists moderate to strong correlation between importance of CSFs and emphasis given to them during TQM implementation. In U.K., the correlation is sowewhat weak (Spearman correlation: U.S. = 0.8061; U.K. = 0.4333; Malaysia = 0.8833).

- Most respondents in U.S. and Malaysia believe that the ranking of CSFs changes over time (U.S. = 76.9%; Malaysia = 85.2%).

TQM and Institutional Performance

- Most private institutions (especially in U.S.) use financial measures as part of organisational performance (U.S. = 81.0%; U.K. =60.8%;

Malaysia = 56.3%). This is because the survival of private institutions depends on their financial performance.

It is believed that institutions can improve business excellence, which includes financial achievement, by creating customer satisfaction. Another widely used measure in the U.K. is institutional competitiveness (39.2%). This may explain why U.K. institutions embarked on new academic programmes to attract large number of students such as modular programmes, distance learning, collaborations with other institutions (including overseas institutions) , and wide choice of courses and programmes.

- There is larger proportion of colleges in the U.K. that uses financial measures, competitive measures, and market share compared to other types of institutions. For example, the proportion of colleges that uses financial measures and market share is 75% and 70%, respectively. The proportions for old universities are 57.9% and 42.1%, respectively.

- U.K. HEIs use various measures to assess their overall quality of education. These are performance indicators, goal achievement, how well processes are moving, and others. Performance indicators are more widely used in U.S. institutions than in Malaysia (U.S. = 69.6%; Malaysia = 46.4%). However, many researchers have criticised the use of performance indicators because they merely serve as indicators rather than provide accurate measures of quality characteristics.

- In the three countries, most institutions have reported that, overall, they enjoy good to excellent organisational performance (U.S. = 86.1%; U.K.= 85.7%; Malaysia = 83.3%). They have achieved good to excellent Quality performance as well (U.S. = 92.9%; U.K. = 91.6%; Malaysia = 81.6%). Most U.K. colleges and new universities have very good organisational performance (65 and 46.2%, respectively) compared to old universities that have more

institutions with very good Quality performance (38.9%). Most U.K. colleges and old universities have very good Quality performance (50 and 44.4%, respectively) compared to most new universities (23.1%). Nevertheless, most institutions from the three groups have Quality and organisational performances ranging from good to excellent, i.e., 91.8% and 85.7%, respectively.

- In general, the survey indicates that in U.S. and Malaysia, TQM institutions outperform non-TQM institutions in quality and organisational performance. For excellent Quality performance, the proportions of excellent TQM and non-TQM institutions, respectively are: U.S. = 15.4 and 12.1%; Malaysia 13.3 and 8.9%, respectively. The proportions of TQM and non-TQM institutions that have good to excellent organisational performance are: U.S. = 92.3% and 78.8% respectively; Malaysia = 93.3% and 80%, respectively.

- In the three countries, especially in the U.S. and the U.K., good Quality performance is associated with good organisational performance (Spearman rank correlation: U.S. = 0.7263; U.K. = 0.7609; Malaysia = 0.5534).

- In Malaysia, there is moderate interest to implement TQM indicated by non-TQM institutions (43.1%). The proportion of U.S. institutions that plans to implement TQM is very small (12.3%) because most of them (70.9%) have already implementated TQM. In U.S., there are also some interests within the institutions to expand TQM to cover wider Quality activities (45.6%) compared to Malaysia (15.5%). Despite the lack of involvement in TQM among U.K. institutions, only one institution surveyed has future plans to implement TQM. Two TQM institutions would expand TQM to cover wider areas of organisation. Many institutions plans to use other methods to improve education quality (college = 25%; old universities = 52.6%; and new universities = 75%).

- There is a small number of cases of QCC implementations among the institutions surveyed, i.e., 9 in U.S., 3 in the U.K., and 14 in Malaysia. However, some interesting findings among the QCC practitioners are discussed below. Note that a discussion on QCC efforts at U.K. higher education institutions are not performed because of lack of data.

- There is no evidence to suggest that institutions that implement QCC programmes will also practice TQM.

- The most frequent reasons for success of individual QCCs (U.S. and Malaysian data combined) are knowledge of quality; persistent support by department head; commitment; and teamwork. These factors are also part of the TQM philosophy and principles.

- Many QCC programmes are still operating after several years of implementation. The proportion of QCC programmes that still exists after five years of implementation is 37.5% for U.S. 50.0% for Malaysia. However, QCCs provide three of the TQM critical success factors --- leadership, teamwork, and management by fact.

- Lack of commitment is a threat to QCC programmes which is also a barrier to TQM (reported by 3 out of the 5 respondents in both countries that had suspended QCC).

- A QCC programme does work for many U.S. and Malaysian HEIs. Many respondents believe that it has improved performance or has the potential of improving performance (U.S. = 7 institutions or 77.8%; Malaysia = 10 institutions or 71.4%).

- Teamwork is the most frequently reported factor for success of QCC programmes which is an important concept for TQM (U.S. = 7 institutions or 77.8%; Malaysia =10 institutions or 71.4%).

4.3 CONCLUSIONS

It is clear that, higher education institutions need to practice TQM in order to achieve business excellence. The critical success factors, which contribute to business excellence, can be achieved by developing a quality culture using Kanji's (1996) Pyramid Model. According to Kanji (1998), an organisation has to be guided through TQM principles and core concepts by top management leadership in order to achieve business excellence (see Figure 2.3). These principles and concepts can influence quality culture, which can be developed by adopting a universal total quality culture model of Kanji and Yui (1997) (see Figure 4.1). This model can be used in conjunction with a model of quality culture (Kanji & Yui, 1997) that can be customised for individual institutions (see Figure 4.2).

The findings from the survey show that total quality management is suitable for all higher education institutions regardless of age, size, and type of control, i.e., public or private. Higher education institutions are organisations that strive to meet customers' expectations in quality of service. To achieve this, the institutions must identify the presence of various groups of internal and external customers. However, it is found from the survey that most institutions lack customer awareness. In addition, the institutions also lack knowledge in total quality management and provide insufficient quality training to employees. Thus, quality consultants and other experts could be engaged to provide training, education, and development of quality culture.

It has been reported in the literature that U.K. higher education institutions have hardly been involved in TQM. The findings from the present survey indicate that they lack interest in adopting it in the future. They are more concerned with traditional approaches to promote excellence in education such as degrees, professional experience, authorship, and research activities. Although these activities are vital in the development of any institution, however, the environment within which the institution operates changes and gives impact to its performance.

An institution's external environment is made of actors and forces (stakeholders) such as students, government, employers, public, other institutions, and parents. The institutions and stakeholders create impacts and receive impacts from one another. These impacts are in the form of student's need for better facilities in the institutions, reduced government funding, decline in quality of graduates, decline in student performance, spiralling tuition, and increased competition for outstanding students and faculty. The Business Excellence Model (Kanji, 1998) can be used to meet the demands of stakeholders by way of a structural analysis involving critical success factors of education quality. The analysis will give an indication of an institution's business excellence, and provide recommendations on how the institution can achieve continuous improvement.

There are many reasons (i.e., 54) for introducing quality management in higher education institutions, which require them to improve their education quality. Among the reasons, ten are unique for U.S. institutions, six for U.K., and three for Malaysian institutions. The differences in the reasons contributing to the implementation of TQM in the three countries are influenced by their cultural differences. Based on the reasons, it can be said that U.S. institutions are more concerned with strategic development by way of making long-term plans and strive to perpetuate an organisational culture that influences customer satisfaction, and thus business excellence. U.S. institutions give equal importance to organisational processes as well as results. Contrary to the practice in U.S. institutions, Malaysian institutions are more concerned with making short-term plans. They place more importance to results and less on processes.

U.K. institutions are more concerned with the country's funding agency's quality assessment areas that cover curriculum design, content and organisation; teaching, learning and assessment; student progression and achievement; student support and guidance learning resources; and quality assurance and enhancement. This is because most of the institutions are funded based on the results of an assessment according to those areas. The implication of this is that U.K. institutions are not open to new approaches to

quality improvement. This is supported by the reasons given by respondents that had refused to participate in the survey.

There are differences in Quality culture among the three kinds of U.K. institutions surveyed. There are more reasons for implementing Quality Management reported by universities over those of colleges reflecting their wider functional scope. Colleges are concerned about overcoming their immediate problems and weaknesses, and are unique by way of specific niches they serve. Old universities make longer range plans compared to other kinds of institutions. New universities are concerned with building their image, which is consistent with their new status as universities. There is very limited benchmarking activity conducted by all institutions especially among old universities.

It is possible that due to self-fulfilment and complacency, old universities have been doing very little investigation and examination on best practices of others. In addition, by and large, old universities have not been committed to a total quality culture and therefore have not responded to the TQM movement. This shows that their top management and leaders lack enthusiasm to adopt new ways of Quality improvement and Quality culture, which is a barrier to TQM.

Although, there is high a regard for continuous improvement for quality enhancement in U.K. HEIs, any improvement from the institutions, however, should result in a favourable experience to the users of education, who are the stakeholders. The Quality Assurance Agency, the custodion of U.K.'s quality of public higher education, is concerned about stakeholders' demand from the higher education sector and has introduced a quality assurance framework plan in 1998 to assess education quality. The framework involves a mixture of internal review and external review of course programme and subject group provisions of institutions. Among other things, the plan will produce a subject benchmark information and threshold standard. The QAA believes that by using the framework, it could achieve several purposes: to ensure that the

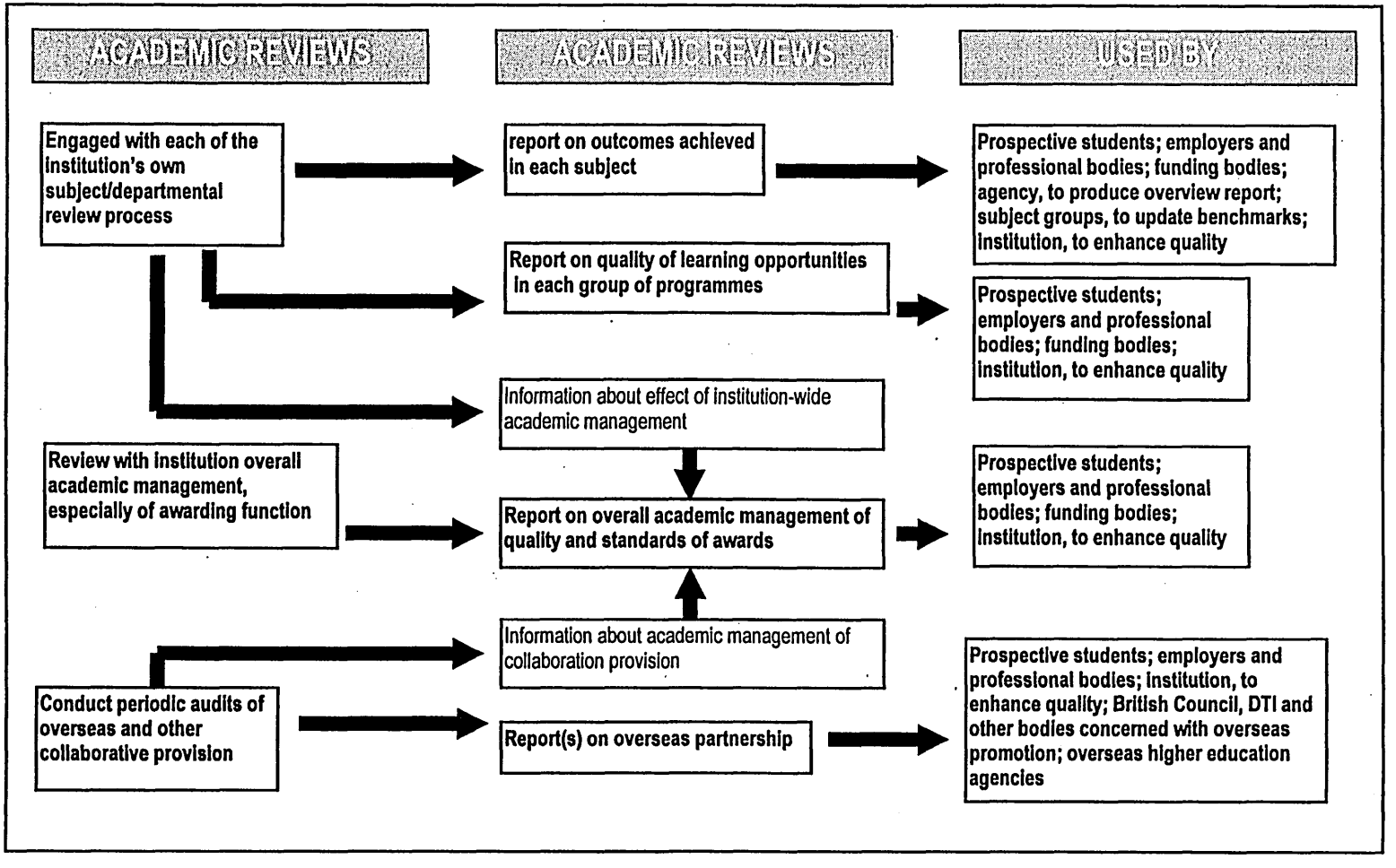
public funding provided is supporting education of an acceptable quality; to provide public information on education through the publication of reports; and to provide information and insights to encourage improvements in education.

It appears that the developments in QAA's strategy are moving closer to the realms of TQM by way of focusing on stakeholders' needs and requirements, programme/subjects group benchmarking, and quality improvement. TQM goes a step further to quality assurance, i.e., application of quality management principles to all aspects of the business, including customers and suppliers.

The academics have long been aggressively opposed to external interference on the institution and the introduction of new management techniques. Experiences have shown that they have been successful in rejecting pressures exerted by popes and states, and other interferences such as performance indicators, management by objectives, social unrest, and political correctness (Kells, 1995). The QAA has reported resistance to its new Quality framework among what it described as "rebel institutions", which in this case are some of the old universities. This is because, the institutions believe that the framework will introduce a potential increase in bureaucracy. They are also sceptical about the feasibility of a national curriculum for higher education institutions. Similarly, in this respect, TQM has also been criticised for being associated with increasing bureaucracy and reducing autonomy of the faculty. The arguments against TQM are unfounded because its novelty is in its use as a process for assisting top management achieve continuous improvement and business excellence for the institution by applying certain principles and concepts.

It is believed that, as a methodology, the quality assurance framework can be fitted to the business excellence model approach, which can be used to compare critical success factor performance and business excellence and hence, financial performance. It is anticipated that the business excellence model could be incorporated in the QAA quality assurance framework (Figure 4.3) to review programme/subject group, overall academic management, and

Figure 4.3: QAA's New Quality Assurance Framework Plan 1998 (Baty, 1998)



overseas and collaborative provision by using measurement instruments and statistical methods that will generate critical success factor and overall business excellence indices (Figure 4.4). These indices can be used by model users for various purposes, including internal assessment, quality enhancement and achieving business excellence for the institution.

There are nine critical success factors for higher education institutions compiled in the research. These factors are critical because if they are executed properly, the institutions will achieve business excellence. These factors are useful because they can be used by managers to create missions, policies, and make decisions. The highest ranked critical success factor for U.S. and Malaysian higher education institutions indicated in the survey (i.e., leadership) is the prime in Kanji's TQM model. It serves as the driving force to move an institution toward its goals. In the process of reaching those goals, the institution may encounter difficult barriers. However, many barriers originate from the institution's organisational members themselves in the form of resistance to change, lack of commitment, and fear of failure. If quality can be nurtured into the senses of all people in the institution then organisational members will engage in the co-operation and commitment required of them.

For U.K. HEIs, the factor that has the highest degree of criticality is continuous improvement followed by leadership, external customer satisfaction, process improvement, teamwork, internal customer satisfaction, people management, measurement of resources, and prevention, in descending order. It is surprising that leadership is not regarded as most critical by U.K. higher education institutions (only 30.6%) unlike in U.S. (78.8%) and in Malaysia (59.3%). Reports on successful Quality management applications in higher education have shown that the leader plays an influential role in leading, planning, organising, and controlling all organisational resources to achieve the desired Quality goals (Spanbauer, 1989; DeCosmo, Parker & Heverly; 1991; Coate, 1993; Doherty, 1993; Seymour, 1993; Bukhalter, 1996). Kanji's Business Excellence model suggests that leadership is a prime that guides other Quality management activities in order to achieve business excellence.

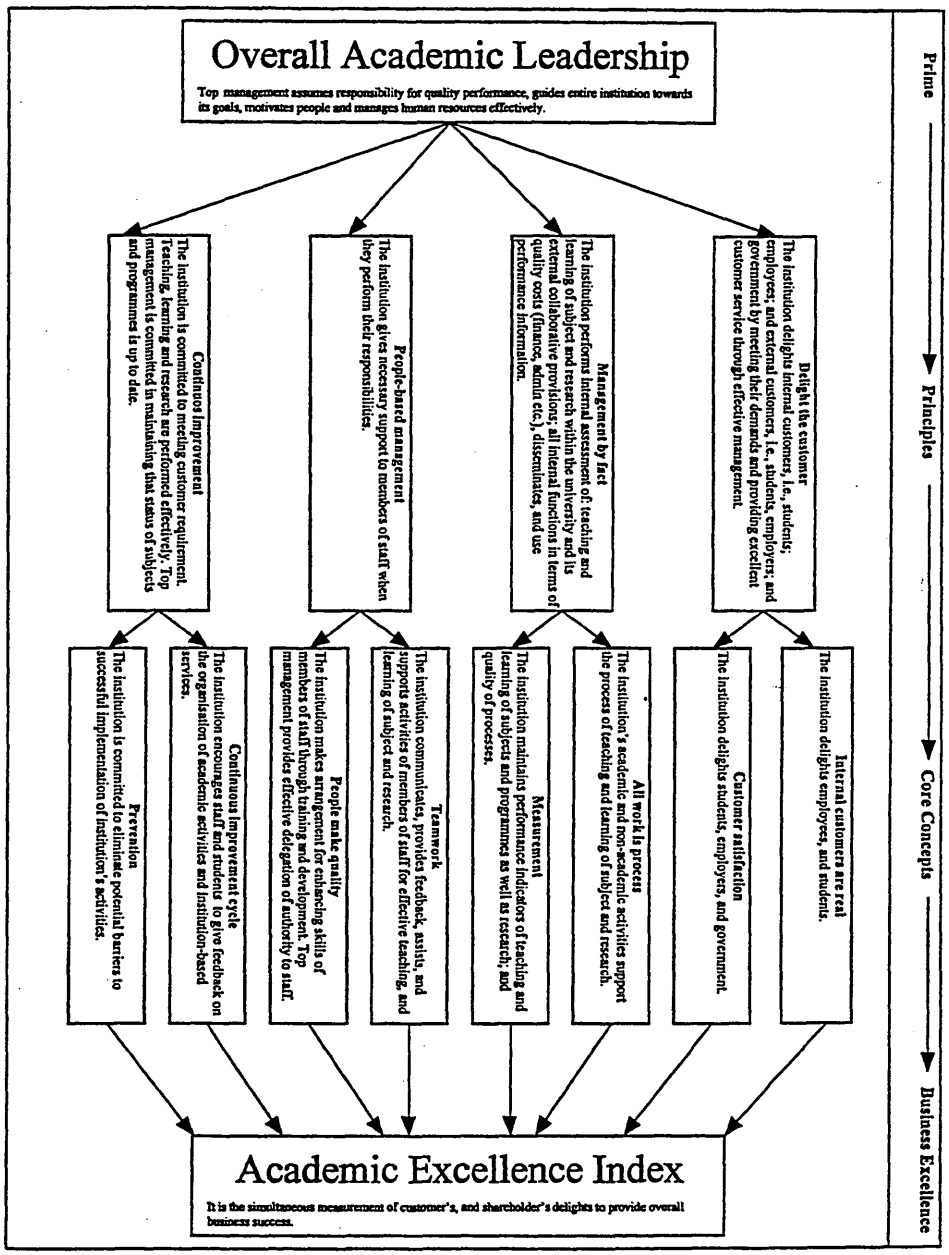


Figure 4.4: Measuring Academic Excellence Index.

Level of performance	Institutions' quality performance				Institutions' organisational performance			
	U.S. HEIs %		Malaysia HEIs %		U.S. HEIs %		Malaysia HEIs %	
	TQM	Non-TQM	TQM	Non-TQM	TQM	Non-TQM	TQM	Non-TQM
Excellent	15.4	12.1	13.3	8.9	10.3	12.1	13.3	2.2
Very good	35.9	30.3	33.3	20.0	33.3	27.3	20.0	26.7
Good	41.0	51.5	53.3	46.7	48.7	39.4	60.0	51.1
Fair/Poor	7.7	6.1	0	24.4	7.7	21.2	6.7	20.0

Table 4.4: Quality and Organisational Performance of TQM and Non-TQM Institutions in the U.K.

The present research has shown that TQM institutions in the U.S. and Malaysia outperform non-TQM institutions in organisational performance (see Table 4.4). There is a higher proportion of TQM institutions that have good to excellent organisational performance and lower proportion with fair to poor organisational performance. This result is consistent with previous research works carried out in various sectors of the economy (Terziovski, Sohal & Samson, 1996; Kanji & Yui, 1997).

The survey findings have shown that the same is true for U.K. HEIs where there is a moderate positive correlation between quality and performance. Table 4.5 shows a summary of quality and organisational performance of colleges, old universities, and new universities in the U.K. From the table it can be seen that colleges and old universities have less proportion of fair and poor quality performance (5 and 5.6%, respectively) and therefore less fair and poor organisational performance (5 and 11.1%, respectively) compared to other types of institutions. Among new universities, there is a larger proportion of fair and poor quality performance (15.4%) that corresponds to a larger proportion of fair and poor organisational performance (30.8%).

Level of performance	Institutions' Quality performance			Institutions' organisational performance		
	Colleges %	Old Univ. %	New Univ. %	Colleges %	Old Univ. %	New Univ. %
Excellent	15	16.7	0	10	16.7	0
Very good	50	44.4	23.1	20	38.9	23.1
Good	30	22.2	61.5	65	22.2	46.2
Fair/Poor	5	5.6	15.4	5	11.1	30.8
Non-response	0	11.1	0	0	11.1	0

Table 4.5: Quality and Organisational Performance of TQM and Non-TQM Institutions.

Performance indicators are widely used for evaluating performance of organisations in U.S. and Europe. The Malcolm Baldridge Quality Award and the European Quality Award systems apply performance indicators to assess quality. However, many authors believe that performance indicators do not provide an accurate evaluation of the quality characteristics being measured. Performance indicators are relevant in as much as if they are being used to provide a general indication of the quality of a system in place. However, customer satisfaction as one measure of performance is a key feature of TQM because it contributes to business excellence. This agrees with Astin (1986) and Schmitz (1993) that the continuing institutional self-examination should focus on the institution's contribution to students' intellectual and personal development. With the help of this survey, our findings indicate that the student is one of the key customers in higher education along with other stakeholders such as the industry, public, parents, and government. To produce a TQM model in higher education institutions, it will be necessary to incorporate all the customers as indicated above.

CHAPTER 5

BUSINESS EXCELLENCE MODEL FOR HIGHER EDUCATION INSTITUTIONS

5.1 INTRODUCTION

The result of the preliminary survey indicates that the critical success factors of Kanji's Pyramid Model are relevant to higher education institutions in the U.S., U.K., and Malaysia. Although many institutions did not claim to be implementing TQM, however, the critical success factors are being adopted by a large proportion of non-TQM institutions. Furthermore, many institutions that implement some form of quality management, which include TQM, quality assurance, and internal assessment, adopt the critical success factors. A small number of institutions surveyed had added to the list of critical success factors given in the questionnaire. However, the additional factors, such as motivation and strategic management, do not represent new categories but are associated with leadership. Thus, it is concluded that the nine factors represent a comprehensive group of critical success factors for organisational success. Since the factors are consistent with the philosophical and systems dimensions of TQM that were discussed in Chapter 3, they can tentatively be regarded as TQM critical success factors. These factors would have to be empirically tested and statistical validated before they can be applied with confidence in a continuous improvement scheme.

According to the Pyramid Model, individual and collective performance of critical success factors influence organisational performance, which is termed Business Excellence. As described in Chapter 3, there are four modes of theory construction that can be used on the Pyramid Model. They are model base, deductive, functional, and inductive theory modes, which are arranged on a continuum according to their relative dependency on conceptually versus empirically based methods of enquiry as proffered by Marx (1965) (Figure 5.1).

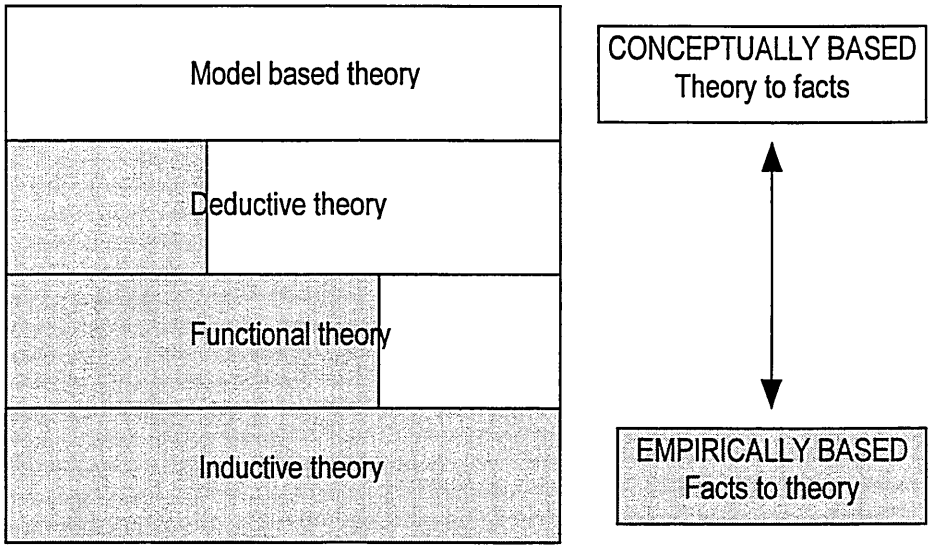


Figure 5.1: Four Modes of Theory Construction (Adapted from Marx, 1965).

In this research, a deductive mode of theory construction is used, which is presented as one that is casually related to reality in its formulation, but is stated precisely conceptually, then subsequently tested and modified.

In this research, a suitably condensed form of Kanji's Business Excellence model is used and subsequently subjected to a substantive validation. In the condensed model, the pairs of core concepts are combined so that each principle operates on only one core concept (Figure 5.2).

There are several reasons why the condensed model is developed:

- it is more efficient to understand and work with a simpler model;
- data is scarce;
- the model is adequate for a higher education system.

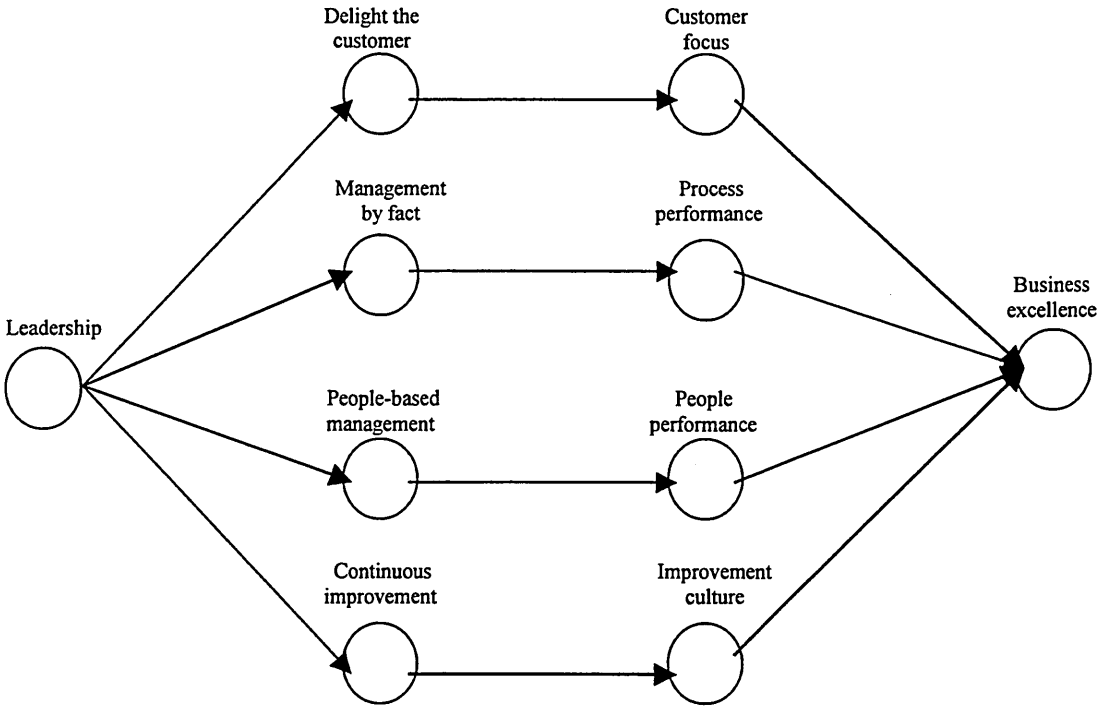


Figure 5.2: Condensed Business Excellence Model.

Each model component, i.e., prime, principle, core concepts and, business excellence is defined as a construct whose empirical content needed to be determined. A construct cannot be observed directly but its empirical content is inferred from scores of measurement items. By condensing the Business Excellence Model, the amount of information handled is not compromised but is exactly the same as if the full model is being analysed. This is because the measurement instrument used was originally developed for the full model and every measurement item has been taken into account and regrouped to fit the condensed model.

In the descriptive study, financial and non-financial performance that constitutes business excellence, has been measured subjectively using several questionnaire items. This is a widely used approach in many organisational researches (Lawrence & Lorsch; 1967, Dess, 1987, Powell; 1992; 1995; Owlia, 1995), and is adopted in this research because of the potential differences among subjects being studied in terms of size, capital structures, organisational goals and activities. Furthermore, it was expected

that many subjects would not have provided confidential information as a matter of policy.

Because business excellence has been specified in the model as being causally connected to critical success factors, an analysis of the influence of TQM factors on business excellence is contemplated in the research. Hackman and Wageman (1995) caution researchers concerning a straightforward evaluation research method such as this. According to them, it is difficult to detect statistically the direct effects of TQM on global measures of organisational outcomes because of

- serious measurement problems associated with organisational performance;
- exogenous disturbances;
- temporal issues.

Measurement problems are associated with what and how to measure attributes related to organisational performance. The "what" aspect is satisfied by having measures that have content and construct validity. The "how" aspect concerns the determination of method of study, i.e., type of research designs adopted and the design configuration. Exogenous disturbances are factors other than those specified in the model that influence organisational outcomes. Temporal issues relate to the confounding of other factors on research results due to the amount of time allowed before analysing outcome measures. While the present research does not have the same scientific rigour unlike researches in the area of physical sciences, where all variables being studied are controllable, nevertheless various important factors that affect the value of the present has been seriously considered and dealt with. These are:

- statistical reliability and validity of measurement instrument;
- statistical validity of the model;
- errors in research design process.

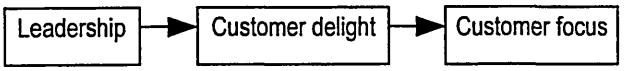
Statistical validity of the measurement instrument relates to whether an instrument does what it is supposed to do and what it is supposed to measure (Nunnaly, 1978). If the instrument is not valid, then it is of little use to the researcher because it implies that it is not measuring or doing what it is supposed to do. Statistical validity of the model concerns whether the model has a good fit with the data, which means the relationships specified in the model is confirmed based on empirical evidence. Errors in research design are those potential disturbances that may affect the results of the present research. The errors can be produced during planning stage (e.g. misrepresentation of research problem), when collecting data (e.g. poor quality of measurement procedures), at data analysis stage (e.g. inappropriate application of analytical techniques), and on reporting of research results (e.g. incorrect interpretation of research results).

From the discussions provided in Chapter 3, it has been deduced that the Pyramid Model is consistent with the philosophical and system dimensions of TQM. However, the Business Excellence model has an added feature --- a structure that specifies causal connection among critical success factors. Many researches in TQM conducted in the eighties were focused on establishing principles of TQM but did not explicitly consider causal connections among them (Saraph, Schroeder & Benson, 1989; Caruana & Pitt, 1997; Owlia,1996; Yang, 1996; Parasuraman, Zeithaml & Berry, 1985; Powell, 1992;1995). Thus it was adequate for the researchers to perform factor analysis on their proposed groups of quality dimensions. However, in the present research, the examination of quality dimensions takes a further step, that of causal analysis. By performing causal analysis, it would be possible to confirm whether the structure of the business excellence model is correct and the strength of causal connections between independent and dependent variables of the model can be determined.

One of the conditions associated with causal analysis is that the causal connections in any proposed structure must have theoretical rationale (James, Mulaik & Brett, 1982). This means the causal hypotheses describe processes through which causes act on effects. The literature provides a good account on the causal connections specified in the Business Excellence Model.

5.2 EXPLORING THE CONCEPTUAL NETWORK OF THE BUSINESS EXCELLENCE MODEL

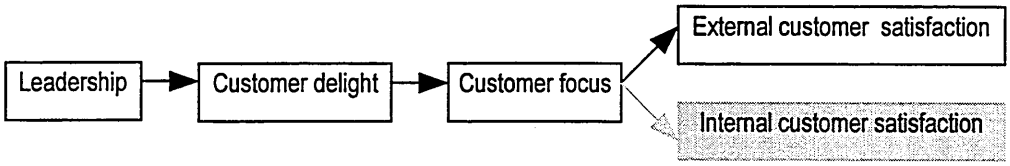
Leadership - Customer Delight



Here leadership is concerned with formal leaders of teams who perform various leadership roles that affect the behaviour of other team members as well as people outside an organisation such as customers, suppliers, government officials, and general public. Customers are of two types --- internal and external --- depending on whether they are located within or outside an organisation (Kanji & Tambi, 1999a). Internal customers are those within an organisation who form customer-supplier relationships in connection with all processes (input, conversion, output, and control) that take place in the organisation. External customers are those individuals or groups outside the organisation that are affected directly or indirectly by an organisation's products or services such as buyers, users, hirers, clients, society, government, and other organisations. Many of these customers are synonymous to stakeholders whom Reavill (1998) have described.

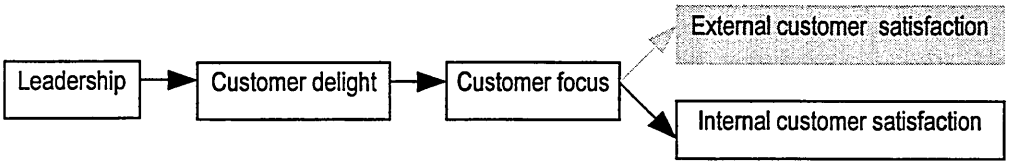
Juran (1974) had observed that many early attempts to improve quality systematically failed precisely because managers (formal leaders) became enamoured of the tools of quality. If customer needs are not the starting point, though, using the tools of quality may result in products and services that no one wants to buy. Juran defined quality as "fitness for use" -- the ability of a product or service to satisfy a customer's real needs. By focusing on real needs, Juran believes managers and workers can concentrate their efforts where it really matters.

Customer Delight - External Customer Satisfaction



Delighting the customer operates on external customer satisfaction. External customer's perception with a purchase depends on the product's performance relative to buyer's expectations. A customer might experience various degrees of satisfaction. If the product's performance falls short of expectations, the customer is satisfied. If performance exceeds expectations, the customer is highly satisfied or delighted. Many companies aim higher because they know that customers who are *only* satisfied will still find it easy to switch suppliers when a better offer comes along such as experienced at AT&T. Toyota, on the other hand showed that 75% of Toyota buyers were highly satisfied and about 75% said they intended to buy Toyota again (Whitely, 1993). Thus customer delight creates and emotional affinity for a product or service, not just rational preference, and this creates high customer loyalty.

Customer Delight - Internal Customer Satisfaction

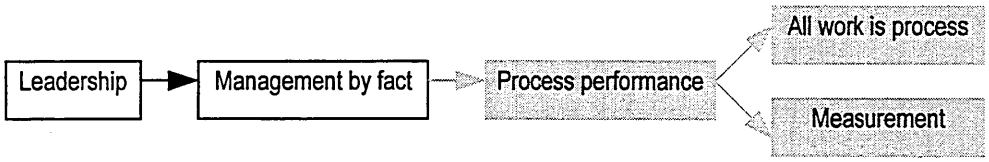


Delighting the customer operates on internal customer satisfaction. Under TQM, a manager's priorities are reordered; his decision making and control functions contract while his role as coach expands. As the distinction between "those who think" and "those that do" is blurred, the job itself becomes less specialised both horizontally and vertically. For instance, shop`-floor teams become involved with teams from other departments and units in communication and co-ordination of work. Researchers have found that even the best quality programmes are bound to fail if employees are not involved fully (Kroeger, & Overholt, 1994; Lengnick-Hall *et al.*, 1993).

Blake and Mouton (1991) argue strongly that the most effective leadership style is "team or democratic management", which results in improved performance, low absenteeism and turnover, and high employee satisfaction. The Ohio studies (Berkley, 1971) has revealed that employee turnover rates were lowest and employee satisfaction highest under leaders who were rated high in "consideration". The Michigan studies (Vroom, 1983) found that the most productive work groups tend to have leaders who were "employee-centred" rather than "production-centred". They also found that the most effective leaders had supportive relationships with their employees, tended to depend on group rather than individual decision making, and encourage employees to set and achieve high performance goals.

Juran (1974) derive the term internal customers for organisational employees who form "customer-supplier" relationships among themselves. Each upstream customer had specifications that needed to be met by downstream suppliers and all these internal customers were working towards external customer satisfaction. Process analysis would therefore help to satisfy external customers by making the internal organisation more effective.

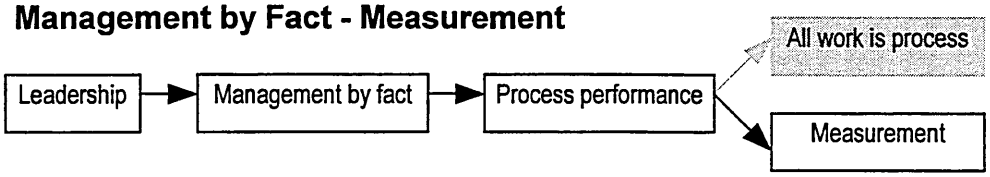
Leadership - Management by Fact



Facts are those things or phenomena that are believed to be true. Facts are generally consensual in nature in that others who have observed the same phenomena agree to their existence (Murdic, 1969). Data are raw, unanalysed numbers and facts about events. Information results when data are organised or analysed in some meaningful way. All the managerial functions --- planning, organising, leading, and controlling --- rely on a steady stream of information about what is happening at, and beyond, an organisation. Only with accurate and timely information can managers monitor progress toward their goals and turn their plans into reality.

Henry Mintzberg (1973) has identified a group of informational roles that managers need to perform effectively. Here, the manager performs the roles of monitoring information (monitor role), disseminating it (disseminator role), and announcing information about the organisation to people outside the organisation (spokesperson role). More and more managers view information itself as a valuable asset --- one that needs to be carefully managed and protected (Tom, 1987). The more accurate the information, the higher its quality and the more securely managers can rely on it in making decisions.

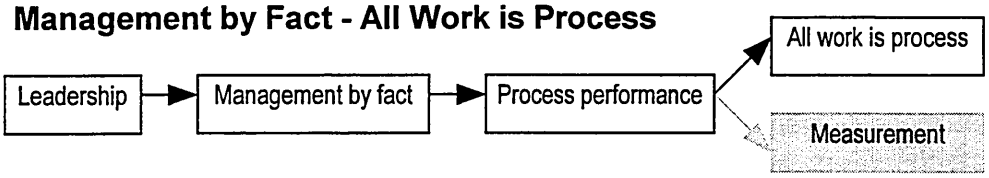
Management by Fact - Measurement



Management by fact operates on Quality measurement. According to Crosby (1979), the meaning of Quality measurement is generating data about current and potential non-conformities and developing corrective action. The idea behind Crosby's conformance to requirements is that, once the requirements have been defined, the production process will exhibit quality, if the product or service resulting from that process conforms to those requirements.

All processes contain inherent variability and one approach to quality improvement is to progressively reduce variation: first, by removing variation due to special causes; second, by driving down common cause variation, thus bringing the process under control and then improving its capability. Various statistical methods (e.g. histogram, Pareto analysis, control charts, scatter diagram) are widely used by quality managers and others for process improvement purposes (see Kanji & Asher, 1993).

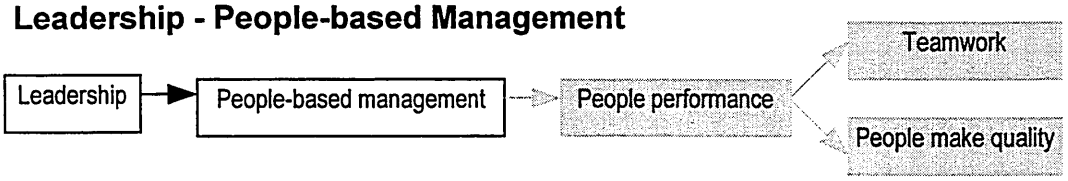
Management by Fact - All Work is Process



Management by fact operates on all processes in a productive system. The term process means any relationship, such as billing customers or issuing credit notes, that has input, steps to follow, and output. A process is a combination of methods, materials, manpower, machinery, etc., which taken together produce a product or service. Deming (1986) believes that improvement follows from studying the process itself, not the defects, and that process improvement is the responsibility of management.

Managers are faced with the challenge of deciding what and how often progress needs to be measured. An analysis that identifies key performance areas (or critical success factors) and strategic control points can help in making this decision.

Leadership - People-based Management

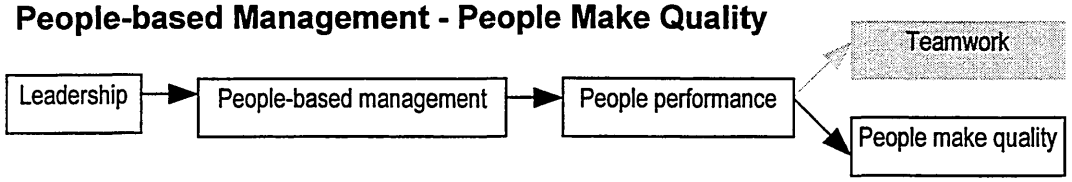


People have a central position in the management of organisations. The definition of management itself encapsulates the importance of people in organisations --- management is the process undertaken by one or more individuals to co-ordinate the activities of others to achieve results not achievable by one individual acting alone (Donelly, Gibson & Ivancevich, 1995).

Knowing what to do, how to do it, and getting feedback on performance are all part of encouraging people to take responsibility for the quality of their own work. Investment and commitment to customer satisfaction are ways of generating this. The third principle of TQM recognises that systems, standards themselves will not mean quality. Therefore the role of people is vital (Kanji & Asher, 1993).

One of Deming's points --- institute leadership --- relates to "self-leadership" , where work groups are set up in the organisation to work on quality problems --- seemingly independent of top management (Deming, 1986). Leaders begin with the assumption that workers aim to do the best job they can, and endeavour to help workers reach their full potential. For lower level managers, this entails coaching and arranging for training. Top managers must, in turn, help design and implement a strategic vision that grounds a TQM culture, and make sure their own behaviour exhibits the values that support such culture.

People-based Management - People Make Quality

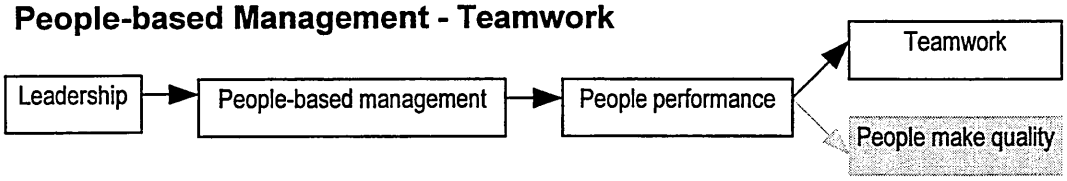


People-based management operates on people make quality. Kanji and Asher (1993) believe that people need to be equipped with the knowledge and skills for the job, and informed about how well they are doing so that they become encouraged and responsible with their jobs. People will become committed with their jobs if they are involved and committed to customer satisfaction. The principle of TQM recognises that systems, standards, and technology themselves will not mean quality, therefore the role of people is vital. Employee involvement is an important element in successful TQM programmes (Lawler III, 1994). That quality is everyone's job is one of the rules of TQM proffered by Brough (1992).

Having the support and attention of senior management remains a necessary condition for making TQM work in an organisation, but without empowered employees it won't go very far. Empowerment stands for a substantial change that businesses are implementing. It means letting employees make decisions at all levels of an organisation without asking approval from managers. The idea is quite simple: the people who actually do a job, whether it is running a complex machine or providing a simple service, are in the best position to learn how to do that job the best way. Therefore, when there is a chance to improve the job or the systems of which a job is a

part, people should make those improvements without asking for permission (Stoner, Freeman & Gilbert Junior, 1995).

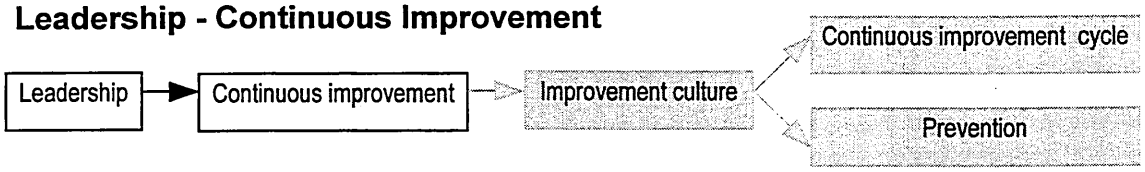
People-based Management - Teamwork



People-based management operates on teamwork. A team is a small group of people with complementary skills who work together to achieve a common purpose for which they hold themselves collectively accountable (Smith, 1993). Many of the creative developments applied to the use of groups in organisations belong to the category of employee involvement groups. This term applies to a wide variety of settings in which groups of workers meet regularly for the purpose of collectively addressing important workplace issues. The goals of employee involvement groups often relate to total quality concepts and the quest for continuous improvement in all operations. One special type of employee involvement group is the quality circle (QC) (Ohmae, 1982). This is a small group of persons who meet regularly to discuss and develop solutions for problems relating to product or process quality. The use of QCs is a popular way to further total quality and continuous improvement agendas in workplaces.

Schultz and Vollum (1992) have identified several teams that assume specific responsibilities in a TQM effort, namely the executive steering committee, local steering committees, and quality leadership teams. The executive steering committee, which is represented by the CEO, leads and supports the transformation for the entire organisation. The committee is equivalent to quality council termed by Crosby (1979). Local steering committees lead the transformation and improvement efforts in their individual business units. Quality leadership teams (Crosby's quality improvement teams) study organisational barriers to TQM and identify areas that need to be addressed.

Leadership - Continuous Improvement



Juran (1964) developed a six-phase problem solving process that is cyclical in nature and reflect the continuous spiral of quality development in an organisation (Figure 5.3). The role of leadership occurs in the first and second phase of the process where leaders are involved in identifying and establishing projects.

According to Deming (1986), management obligation to seek out methods for quality improvement is never-ending. He believes that improvement follows from studying the process itself, not defects, and that process improvement is the responsibility of management. The notion of continuous improvement is incorporated in Deming's first and fifth Quality points: "continuous improvement of products and services and "continuous improvement of system of production and service", respectively (Dahlgard, Kristensen & Kanji, 1998). Here, Deming argues that management must maintain an unwavering commitment to quality and shift its focus from the short term to the long term. He believes that improvement follows from studying the process itself, not the defects, and that process improvement is the responsibility of management. In this respect (Dahlgaard, Kristensen & Kanji, 1998) introduced the PDCA leadership model that incorporates the two Quality points.

Hackman and Wageman (1995) say that quality improvement must begin with management's own commitment to total quality. Employees' work effectiveness is viewed as a direct function of the quality systems that managers create (Juran, 1974; Ishikawa, 1985; Deming, 1986).

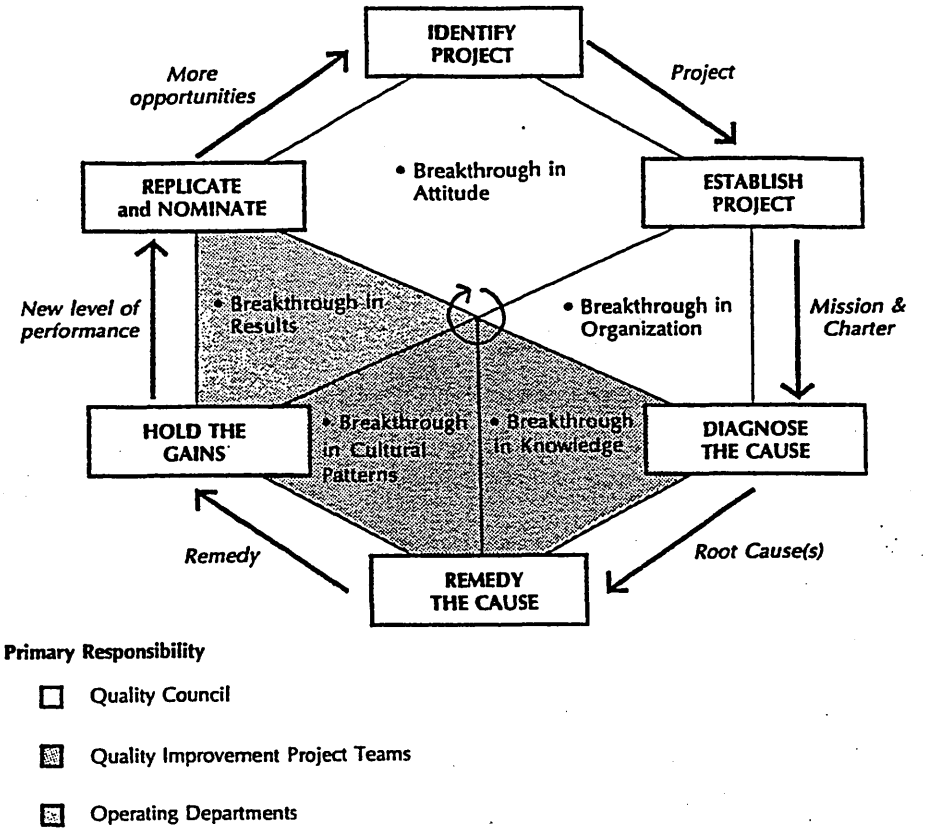
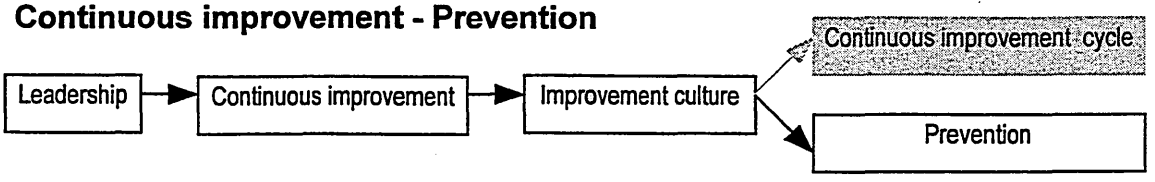


Figure 5.3: The Six Major Steps of Problem Solving (Juran, 1964).

Continuous improvement - Prevention



Continuous improvement operates on prevention. Kanji and Asher (1993) say that the core concept of prevention is central to TQM and one way to move towards continuous improvement. Prevention means causing problems not to happen. The continual process of driving possible failure out of the system can breed a culture of continuous improvement over time. There are two distinct ways to approach this. The first is to concentrate on the design of the product itself; the second is to work on the production process. However, the most important aspect of prevention is quality by design that can be performed through statistical reasoning.

Systems for improving and managing quality have evolved rapidly in recent years. This has occurred in a progression of four discrete stages: inspection, quality control, quality assurance, and total quality management (Kanji and Asher 1993). The first two stages are based on detection and the latter two on prevention. The four levels in the evolution of quality management is sumarised in Figure 5.4. The diagram illustrates that TQM is the highest level of quality management that involves the application of quality management principles to all aspects of the business, including customers and suppliers.

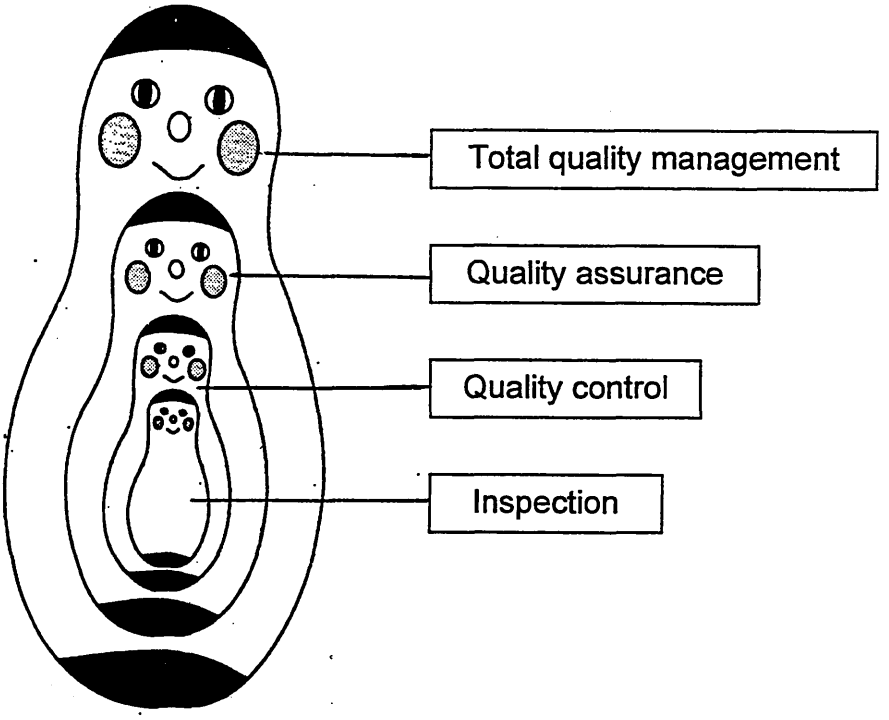
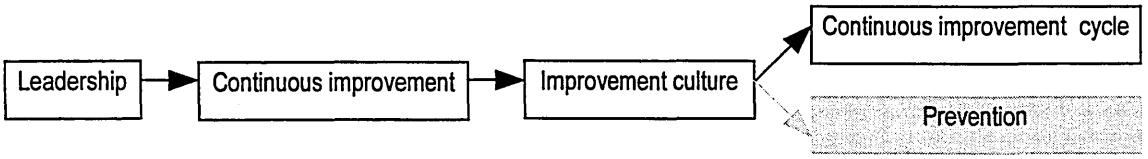


Figure 5.4: The Four Levels in The Evolution of Quality Management (Kanji & Asher,1993).

Continuous Improvement - Continuous Improvement Cycle



Kanji and Asher (1993) state that continuous improvement operates on continuous improvement cycle. The continuous improvement cycle of establishing customer requirements, meeting those requirements, measuring success and keeping on improving can be used to fuel the engine of continuous improvement. By continually checking customer requirements, a company can find areas in which improvements can be made. This continual supply of opportunity can be used to keep improvement plans up to date and reinforce the idea that total quality journey is never ending. In order to practice the continuous improvement cycle, it is necessary to obtain information about customers' requirements continuously by market research. However, proficiency in statistical techniques is necessary to perform market analysis via market research.

The concept of continuous improvement cycle can be described by Shewart cycle, which consists of four steps --- plan, do, check, and act --- as illustrated in Figure 5.5. When each step has been completed, the cycle is either standardised or adjusted as a result of outcome appraisal (Seymour, 1993). This cyclical process allows problems and solutions to be focused on the system rather than on individuals that results in improvement to state of the system.

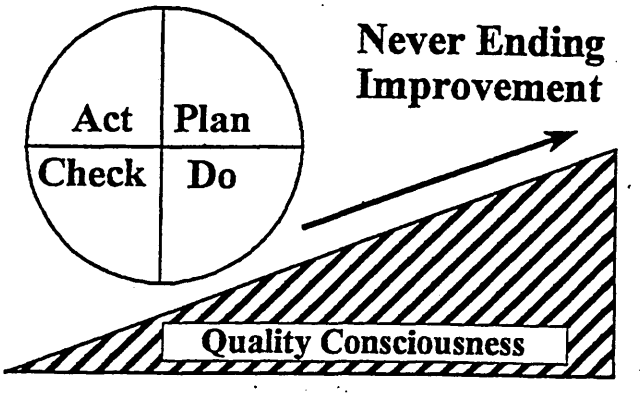


Figure 5.5: The Shewart Plan - Do - Check - Act. (Seymour, 1993).

Critical Success Factors - Business Excellence

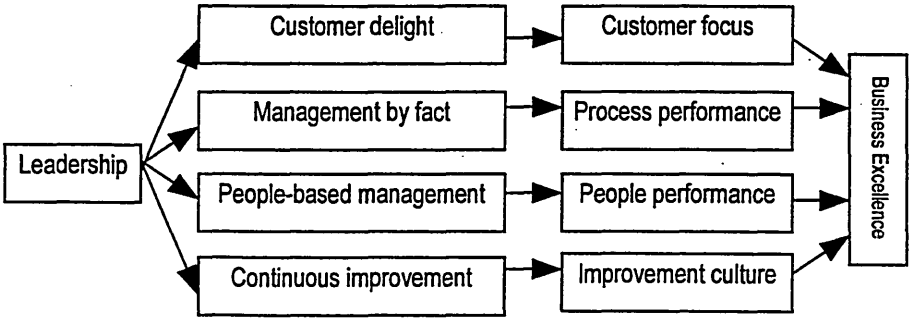


Figure 5.6: Condensed Business Excellence Model.

Kanji (1998b) describes business excellence in terms of an index measure, i.e., Business Excellence Index, which is a means of measuring customers', employers', and shareholders' (stakeholder's) satisfaction simultaneously within an organisation in order to obtain a comprehensive evaluation of the organisational performance (Figure 5.6).

The European foundation for Quality Management (EFQM, 1999) defines Excellence as

"Outstanding practice in managing the organisation and achieving results based on fundamental concepts which will include: results orientation, customer focus, leadership and constancy of purpose, processes and facts, involvement of people,

continuous improvement and innovation, mutually beneficial partnerships, public responsibility."

EFQM (1999)

However as pointed out earlier, some downsides of the award models such as MBNQA and EFQM Excellence models are that the TQM categories are to an extent expert opinion and have not been subjected to rigorous empirical tests (Finn & Porter, 1994). The importance weightings of categories have also been arbitrarily assigned, although they do represent the consensus of some important "experts". The award models have been represented as a structure of conceptual network, which have not been substantially validated.

On the other hand, the Business Excellence Model was shown to be congruent with the philosophical and system dimensions of TQM and is consistent with the models proposed by major TQM contributors. The theoretical rationale regarding symmetrical relationships of the model is evident from previous research findings reported in the literature. An initial work on the model performed by Kanji (1998b) on European manufacturing and service company data demonstrated that the model has a good prospect of being applied to a variety of organisations, including higher education.

According to the Business Excellence model structure, business excellence has the core concepts as antecedents, not the principles nor the prime. However, the model has eight paths going through it (four paths in the condensed model) and all paths are defined by precedence relationships of model constructs. By using path coefficients, which are the unit increase in independent variables per unit increase independent variables, it would be possible to determine the contribution of each critical success factor to business excellence.

5.3 CONCLUSIONS

The structure of the Business Excellence model has been shown to be consistent with the perceptions of many writers in general management and Quality concerning symmetrical relationships between variables as specified

in the model. Relationships other than those specified in the model have not been explicitly reported in the literature. These include those that exclusively involve principles or core concepts only as well as others that link prime or principles to business excellence.

Clearly, leadership does not directly operate on business excellence but its relationship with business excellence is intervened by proceeding principles and core concepts. The existence of functional relationships involving the principles, core concepts and business excellence have been described in detail in this chapter. Principles and core concepts are distinct constructs. Past research literature does not indicate the existence of precedence relationships that only involved principles or core concepts.

The influence of factors in an organisation's external environment is not explicitly portrayed in the model but is accounted for by "measurement" concept. Measurement of process variability, customer needs, and other factors in the external environment should be sufficient in providing an appropriate input for determining business excellence.

The Business Excellence Model, like a number of other Quality management models (e.g. MBNQA and European Excellence model), has a structure of conceptual network made up of key organisational areas that affect organisational excellence. Though many existing TQM models have been claimed to contribute to organisational excellence, however, the models have not been empirically tested and substantively validated. In the present research, the outcome of the study on various European companies using the Business Excellence Model (Kanji, 1998b) provides an indication of the model's potential for use as a tool for measuring and improving organisational performance. The research also deals with evaluating the model's performance in terms of the reliability of the measurement instrument used with the model and how well the model fits with the data. These areas were not explicitly described in the European study.

The notable qualities of the business Excellence Model are

1. It has an uncomplicated structure of reasonably few variables and relationships; and
2. It is generic, which implies that it can be adapted in various organisational settings.

CHAPTER 6

MEASURING BUSINESS EXCELLENCE IN HIGHER EDUCATION

6.1 METHODOLOGY

The descriptive study on higher education institutions in the U.S., U.K., and Malaysia is partly concerned with two important aspects:

1. Whether the top management of higher education institutions in the three countries are concerned with the prime, principles and core concepts of TQM according to Kanji's (1996) pyramid model in the quality management of their institutions.
2. Whether the prime, principles and concepts are critical in achieving the goals of their institutions.

Although the Pyramid Model is made up of a prime, four principles, eight core concepts, and business excellence, the actual survey, however, contained questions pertaining to core concepts only. This is because, questions concerning critical success factors are ranking type questions (see Appendix B) and by keeping the number of items low, respondents are able to rank the items without difficulty. Furthermore, in the Business Excellence Model, principles operate on core concepts, and therefore rankings of core concepts reflect rankings of principles themselves.

The descriptive study has revealed that almost all TQM institutions and about half of the number of non-TQM institutions indicated that the critical success factors influence organisational success. This result serves as a premise for an empirical study, which has the following objectives

1. To develop a reliable measurement instrument that measures the model's critical success factors and business excellence;
2. To validate the causal connections in the structural model;
3. To determine the strengths of causal connections or path coefficients among latent variables;

4. To use the model to provide measures of organisational performance in terms of critical success factors and business excellence;
5. To devise a mechanism for achieving a business excellence target level by increasing the performance of an optimal mix of critical success factors.

In the empirical analysis, a condensed version of the business excellence model (Figure 6.1) was used. The difference between the condensed model and the full model is that each pair of core concepts in the full model are combined so that there are only four core concepts left in the resultant transformed model, one each for every principle. The revised concepts are termed customer focus, process performance, people performance, and improvement culture. The concepts are combined due to several reasons:

1. To make the business excellence model simpler to analyse without losing any information;
2. Data are limited --- the measurement instrument used is sensitive to quirks in the data, therefore an analysis of the more complicated original model would render the instrument unreliable.

Because critical success factors and business excellence cannot be observed directly, they are measured by way of a measurement instrument that contains measurement scales pertaining to evey critical success factor and business excellence. The instrument is distributed to respondents by mail.

The reliability of the measurement instrument is determined by using Cronbach-Alpha (Cronbach, 1951). In essence, this technique computes the mean reliability coefficient estimates for all possible ways of splitting measurement items in half to give a good estimate of reliability.

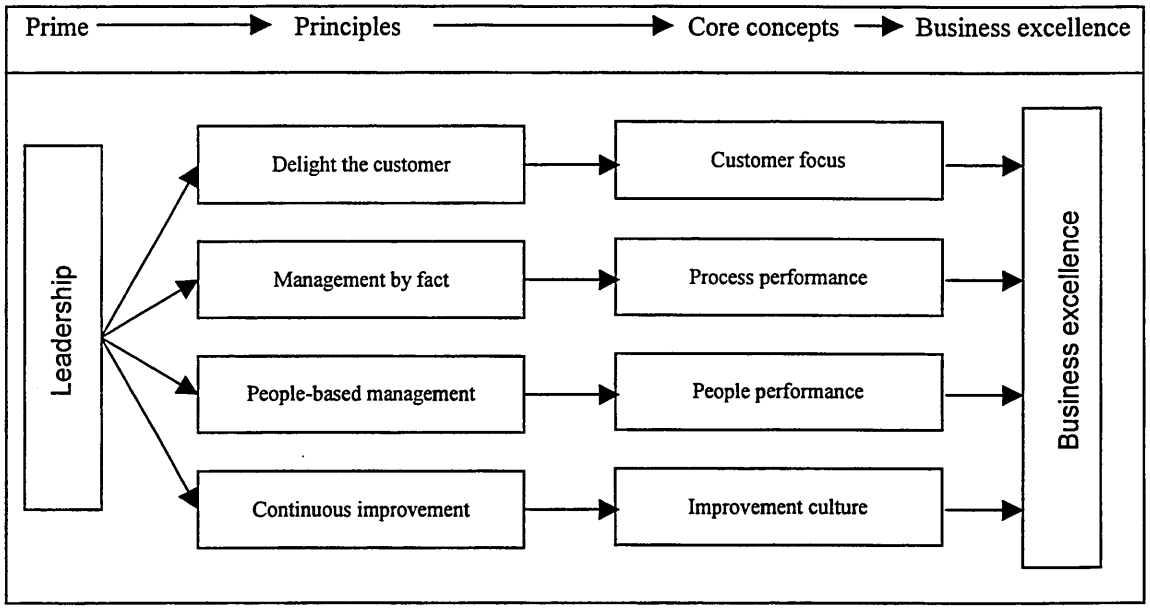


Figure 6.1: The Condensed Business Excellence Model.

Several key variables were developed and their values determined in the course of the present analysis:

1. item mean scores;
2. alpha values;
3. item-to scale correlation;
4. correlation matrix of manifest variables;
5. correlation matrix of model dimensions;
6. coefficient of determination of model dimensions;
7. structural parameters of indicator-latent variable relationships usually called outer path coefficients;
8. structural parameters of causal connections among latent variables usually called inner path coefficients;
9. values of residuals of the measured variables to indicate accuracy of model;
10. chi-square statistics and other measures that show the difference between sample measurements and hypothetical measurements to validate model.

The Statistical Package for Social Sciences Version 6.0 was used for initial data entry, checking data for missing values, and provide descriptive statistics such as mean values of measurement scores. Estimates of path coefficients was determined by using the generalised least squares method (Wold, 1980) with PLS.SAS software. The software, which runs on SAS platform, also computes inner and outer coefficients, correlation matrix of model dimensions, coefficient of determination, and reliability of empirical measurements. EQS software (Bentler & Wu, 1995) was used to detemine the accuracy and confirm the validity of the model. Model accuracy is represented by values of residuals and model validity is represented by values of chi-square statistics (including probability value) and several indices. The EQS software can read SPSS data sets directly and convert it to EQS data sets. The PLS software cannot run on SPSS files but can work on EXCEL files, so file conversions were performed accordingly.

Data were analysed in the entirety as well by country to examine whether different data sets influence research results. The U.S. higher education institutions are represented by old institutions averaging about 76 years and are mostly public institutions. Here, an accreditation system is practised to ensure that institutions adhere to specified quality standards (Hogan, 1992). The U.K. sample is also represented by old public institutions, averaging about fifty-three years. The U.K. higher education system is recognisably different from U.S. institutions where a quality assurance system that relies on a review of various areas of institutions is adopted (Baty, 1998). Malaysian higher education institutions are made up of new institutions averaging twelve years. The education system adopted in Malaysia is a mixed system of external examiners, internal management and government control (Shakor, 1994). The aims of the present research, is partly to observe the effect of differently chracterised data sets on the behaviour of the model.

After the model has been validated, it was used as a measurement instrument to evaluate organisational performance. For each data set, critical success factor and business excellence indices were computed by using a formula that took into account outer path coefficients and mean scores of corresponding manifest variables. These indices were used as performance

ratings of critical success factors and business excellence for the particular data set. Theoretically, path coefficients cannot be compared across different populations, or in comparing causal effects for the same population over time. This is because path coefficients are derived from standardised manifest variables. The critical success factor and business excellence indices, however, can be used in either situation.

Index scores that exceed seventy five percent are considered excellent. Conversely, those that are less than seventy-five percent are considered poor scores and hence factors that corresponded to these scores should be improved. For every critical success factor and business excellence, their index scores are a function of mean scores of corresponding manifest variables such that higher mean scores give higher index scores. The mean scores reflect performance level of activities that are being measured. Therefore, to increase an index will mean increasing the performance level of activities equivalent to the required increase in mean scores.

The Measurement Instrument

The measurement instrument consists of fifty-nine questions in ten dimensions that correspond to nine critical success factors and business excellence (Appendix D). Each question uses a ten-point scale on which respondents rate their institutions with respect to a specific quality attribute. The measurement instrument can be used on all types of higher education institutions because it is concerned with common key areas. The institutions are represented by their Quality Directors who are believed to have expert knowledge on their institutions' Quality activities.

When designing the measurement instrument, a thorough literature review had been conducted and expert opinions consulted to ensure that the instrument adequately covers the domain of concepts under study and measures what it is purported to measure. In addition, the instrument was pre-tested and subsequently revised to improve its clarity so that it would help respondents provide good responses.

Sample Size

Sample size decision is a very important aspect of the present research. A large sample is required to test the validity of the model with χ^2 likelyhood ratio test (James, Mulaik & Brett, 1982). Sample size decision is also dictated by the structural equation model used. In this research, χ^2 test was performed using EQS approach. Although, the EQS manual does not discuss on the issue of sample size, Byrne (1994) acknowledges the known fact of its influence on the results of χ^2- test. To achieve a reliable results with χ^2 test, a very large sample size is required. For this reason, Bentler (1990) has introduced the Comparative Fit Index (CFI) that is capable of indicating model validity for small samples as well.

The respondents in the previous survey for each country is taken for the sample size of the present survey. The response rates by country are n = 35 (38%) for U.S., n = 20 (39.2%) for U.K., and n=35 (58.3%) for Malaysia, that give a combined sample size of ninety (49.2%).

Variable Development

Variable development is the specification of variable of interest subsumed in the data. In the business excellence model, variables are developed for constructs (latent variable) and their indicators (manifest variables). Other variables (e.g., path coefficients, performance indices, and correlation) are the results of mathematical transformations and planned analytic or statistical procedures performed on the data sets. The variable list is given in Table 6.1.

Dimension	Label	Variable
1. Leadership (ξ_1)	y_{63}	Top management involvement
	y_{64}	Manager's involvement
	y_{65}	Institution's goal definition
	y_{66}	Institution's quality values
	y_{67}	Everyday leadership
	y_{68}	People management
2. Delight the customer (η_1)	y_{10}	Customer requirements
	y_{11}	Customer loyalty
	y_{12}	Customer services
3. Customer focus (η_2)	y_{13}	Service obligation
	y_{14}	Handling customer complaints
	y_{15}	Customer perceived quality
	y_{16}	Customer perceived value
	y_{17}	Customer satisfaction
	y_{18}	Competitors' customer satisfaction
	y_{19}	Customer-supplier relationship
	y_{20}	Task co-ordination
	y_{21}	External customer focus
	y_{22}	Employee job requirements
4. Management by fact (η_3)	y_{23}	Performance measurement
	y_{24}	Measurement information
	y_{25}	Service improvement
5. Process performance (η_4)	y_{26}	'Quality' process design
	y_{27}	Process assessment
	y_{28}	Student admission process
	y_{29}	Student learning outcome
	y_{30}	Staff recruitment process
	y_{31}	Staff maintenance process
	y_{32}	Performance indicators
	y_{33}	Quality assessment methodology
5. People-based management (η_5)	y_{34}	Performance feedback
	y_{35}	Human resource management
	y_{36}	Employee quality involvement
7. People performance (η_6)	y_{37}	Employee interaction
	y_{38}	Cross-function teamwork
	y_{39}	Individual group teamwork
	y_{40}	Managerial training
	y_{41}	Employee training
	y_{42}	Training resources
	y_{43}	Quality improvement barriers
	y_{44}	Institutional pride
	y_{45}	Empowerment
8. Continuous improvement (η_7)	y_{46}	Customer feedback
	y_{47}	Quality improvement methods
	y_{48}	Service competitiveness
9. Improvement culture (η_8)	y_{49}	Quality culture
	y_{50}	Employee suggestion
	y_{51}	Failure removal
	y_{52}	Problem-free process design
10. Business excellence (η_9)	y_{53}	Organisational performance
	y_{54}	World leader's performance
	y_{55}	Financial performance
	y_{56}	Customer demand
	y_{57}	Goal achievement
	y_{58}	Student admission
	y_{59}	Student learning outcomes
	y_{60}	Staff recruitment
	y_{61}	Staff maintenance
	y_{62}	Supplier assessment criteria

Table 6.1: Variable List.

Grouping of Data

As stated earlier, four samples are created for comparative analysis. They are

1. Combined sample consisting of all institutions in the survey (n = 90);
2. U.S. sample (n = 35);
3. U.K. sample (n = 20);
4. Malaysian sample (n = 35).

Again, the reason for grouping the data in this manner is to compare the effects of differently characterised samples on the behaviour of the business excellence model. Specifically, the grouping of data permits an examination of the model's behaviour in each country by observing differences concerning the following:

1. mean scores;
2. outer and inner path coefficients;
3. relative importance of critical success factors;
4. validity of the model;
5. performance indices of critical success factors and business excellence.

Reliability of Measurement Scales

Reliability refers to the consistency and stability of a score from a measurement scale. An observed score is made up of a true score and error score. The true score is never known but is estimated to be the mean score of repeated measurements from the same respondent. A reliable scale should account for a very high degree of systematic variance (true variance) of a score relative to error variance. If the error variance were large relative to true variance than the observed variance would be highly suspect, or unreliable.

There are several general methods of determining reliability of measurement scale. In this research the Cronbach-Alpha is used as a method for assessing the homogeneity of items that belong to the same dimension in the measurement instrument (Cronbach, 1951). Computationally, alpha is evaluated by the following formula:

$$\alpha = \left(\frac{K}{K-1} \right) 1 - \left(\frac{\sum_{i=1}^{K} \sigma_I^2}{\sum_{i=1}^{K} \sigma_I^2 + \sum_{i}^{j} \sum_{i=1}^{K} \sigma_{Ij}^2} \right)$$

where

K = the number of parts (items) in the scale;

σ_i^2 = variance of item i; and

σ_{ij} = covariance of the items.

According to Nunally (1967) a coefficient value of more than 0.7 adequately indicates the reliability of a measurement scale. Kenny (1979) suggests that in multivariate cases, the bias due to measurement error may be negligible if reliabilities of measurement scales are high.

Validity of Empirical Measurements

A valid measurement scale is one that does what it is supposed to do and measures that it is supposed to measure (Nunnally, 1978). There are several kinds of validity measures, however, three types are of concerned to the present research: content validity, construct validity, and criterion-related validity. Content validity is concerned with the degree to which scale items represent the domain of concepts under study. Construct validity deals with the degree to which the scales represent and act like the concepts being measured. The criterion-related validity sometimes called predictive validity or external validity is concerned with the extent to which the measurement instrument is related to an independent measure of a relevant criterion (Bohrnstedt, 1970).

Content Validity. The assessment of content validity is not a simple matter for complex concepts because it is difficult, if not impossible, to enumerate all dimensions that compare the essence of concepts being studied. The problem is to find a procedure that taps critical dimensions of variables being measured.

The procedure used in this research is:

1. Carrying out an exhaustive literature for all possible items to be included in the scale.

   An extensive study of models that deal with quality in higher education institutions, including relevant TQM models and other quality-related models was performed to compile a list of quality dimensions that are applicable to higher education institutions. Many measurement instruments that have been developed by organisations for use as internal assessment devices were examined to learn about key quality-related issues that have been encountered by the organisations. These issues were considered for inclusion in the measurement instrument of the present research.

2. Soliciting expert opinions on the inclusion of items.

   Various experts, such as academic staff, quality assessors, and quality consultants, have been consulted to give their views and comments about items in the questionnaire. Their comments were found to be largely concerned with questionnaire design, i.e., questionnaire content, scaling, and question wording. Feedback received from these experts was taken into account to review the measurement instrument and make necessary changes to it.

3. Subject draft instrument to a pre-test.

   Respondents similar to the population, i.e., Quality Directors of several higher education institutions in Malaysia, had participated in the pilot run. Debriefings were held in the pilot run to ascertain that

all weaknesses in the instrument were identified and dealt with. Examples of weaknesses found in the first draft of the instrument were questions that were difficult to understand and questions that did not sufficiently cover the subject of interest.

4. Based on the feedback obtained in the pilot run, the instrument was modified accordingly to ascertain that important content has been adequately sampled and casted in the form of test items.

Although the procedure would not completely guarantee content validity, it does give a reasonable degree of confidence as to its existence.

Construct validity. There are essentially two aspects involved in the assessment of construct validity. The first aspect is primarily theoretical in nature and the second primarily statistical.

Theoretically, it is known that the constructs used in the business excellence model have been used fruitfully in various forms in other TQM models, including award models such as Malcolm Baldridge National Quality Award Model (Hogan, 1992), measurement models such as SERVQUAL (Parasuraman, Berry & Zeithaml, 1988), and models that were developed and applied at higher education institutions (e.g. Spanbauer, 1989; Coate, 1991; DeCosmo, Parker & Heverly, 1991; Geddes, 1993). These applications and others provide support to the theoretical foundation of the variables under study.

Statistically, there are two types of construct validity --- convergent validity and discriminant validity (Campbell & Fiske, 1959).

Convergent validity. Convergent validity is commonly defined as the degree of association between two maximally different measurements that purport to measure essentially the same concepts. If the measurement scales developed for the model's principles and core concepts are correlated, then the two "constructs" are said to exhibit convergent validity and, thus, some degree of construct validity.

Discriminant validity. Discriminant validity is largely the opossite of convergent validity in that it can be defined as the degree to which the measurement scale may be differentiated from other scales purporting to measure maximally different concepts. Because discriminant validity provide the same information as convergent validity, it is not performed in the present research.

Criterion Related Validity

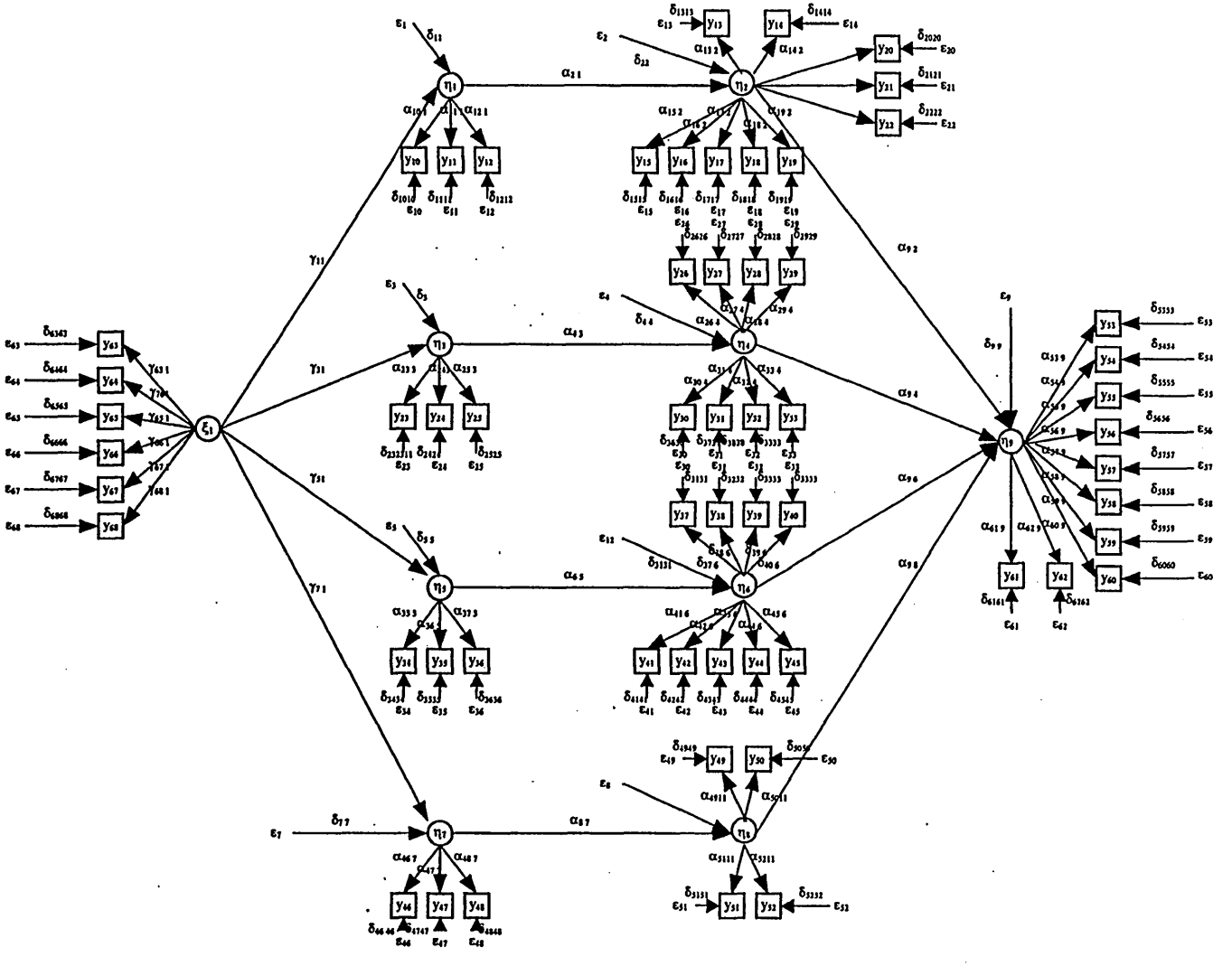
The criterion-related validity sometimes called predictive validity or external validity is concerned with the extent to which a measurement instrument is related to an independent measure of the relevant criterion. The nine measures of quality management (critical success factors) have criterion-related validity if these measures (collectively) are highly and positively correlated with organisational performance.

Structural Equations

The latent variable structural model of the condensed Business Excellence Model is given in Figure 6.2. The model contains a latent exogenous variable (ξ_1), nine latent endogenous variables (η_1 to η_9) and 59 manifest endogenous variables (y_{10} to y_{68}). ξ_1 is operationalised by six manifest indicator variables y_{63}, ..., y_{68}. It is a cause of latent endogenous variables η_1, η_3, η_5, and η_7 as indicated by arrows from ξ_1 to η_1, η_3, η_5, and η_7. Three manifest endogenous variables y_{10}, y_{11}, and y_{12} serve as indicators of η_1 as indicated by arrows from η_1 to these variables. η_1 is also a cause of latent endogenous variable η_2, which in turn serves as a common cause of manifest endogenous indicator variables y_{13}, ..., y_{17}. Other operationalisation of the model's latent variables are made in a similar way. Each endogenous variable is associated with one of the latent disturbance variables ε_1, ..., ε_{68}.

The model in Figure 6.2 can be expressed by a system of simultaneous equations. One equation is developed for each latent or manifest variable, which means that there are altogether 68 equations. Each equation includes

Figure 6.2: Latent Variable Structural Model of Condensed Business Excellence Model.



the latent and/or manifest variables that have a direct effect on the endogenous variable, including disturbance variables. This system of equations are as follows:

$$\eta_2 = \alpha_{21}\eta_1 + \delta_{22}\varepsilon_2$$

$$\eta_3 = \gamma_{31}\xi_1 + \delta_{33}\varepsilon_3$$

$$\eta_4 = \alpha_{87}\eta_7 + \delta_{44}\varepsilon_4$$

$$\eta_5 = \gamma_{51}\xi_1 + \delta_{55}\varepsilon_5$$

$$\eta_6 = \alpha_{65}\eta_5 + \delta_{66}\varepsilon_6$$

$$\eta_7 = \gamma_{71}\xi_1 + \delta_{77}\varepsilon_7$$

$$\eta_8 = \alpha_{87}\eta_7 + \delta_{88}\varepsilon_8$$

$$\eta_9 = \alpha_{92}\eta_2 + \alpha_{94}\eta_4 + \alpha_{96}\eta_6 + \alpha_{98}\eta_8 + \delta_{99}\varepsilon_9$$

$$y_{10} = \alpha_{101}\eta_1 + \delta_{1010}\varepsilon_{10}$$

$$y_{11} = \alpha_{111}\eta_1 + \delta_{1111}\varepsilon_{11}$$

$$y_{12} = \alpha_{121}\eta_1 + \delta_{1212}\varepsilon_{12}$$

$$y_{13} = \alpha_{131}\eta_1 + \delta_{1313}\varepsilon_{13}$$

$$y_{14} = \alpha_{141}\eta_1 + \delta_{1414}\varepsilon_{14}$$

$$\begin{array}{cccccc} \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \end{array}$$

$$y_{64} = \gamma_{641}\eta_1 + \delta_{6464}\varepsilon_{64}$$

$$y_{65} = \gamma_{651}\eta_1 + \delta_{6565}\varepsilon_{65}$$

$$y_{66} = \gamma_{661}\eta_1 + \delta_{6666}\varepsilon_{66}$$

$$y_{67} = \gamma_{671}\eta_1 + \delta_{6767}\varepsilon_{67}$$

$$y_{68} = \gamma_{1681}\eta_1 + \delta_{6868}\varepsilon_{68}$$

where

ξ_1 = Leadership
η_1 = Delight the customer
η_2 = Customer focus
η_3 = Management by fact
η_4 = Process performance
η_5 = People-based management
η_6 = People performance
η_7 = Continuous improvement
η_8 = Prevention
η_9 = Continuous improvement cycle
y_{10} to y_{68} = Manifest variables
ε_1 to ε_{68} = Disturbance variables
α_{21} to α_{98} = Structural parameters relating endogenous variables to endogenous variables (inner coefficients)
δ_{1010} to δ_{6868} = Structural parameters relating disturbance variables to manifest variables (outer coefficients)
$\gamma_{11}, \gamma_{31}, \gamma_{51}, \gamma_{71}$ = Structural parameters relating exogenous variables to endogenous variables (inner coefficients)
γ_{63} to γ_{68} = Structural parameters relating exogenous variables to manifest variables (inner coefficients)

Matrix Equations

An 'expanded' matrix of equations representing the fifty-nine-variable-model is given in Table 6.2. Dependent variables are represented in a random vector $\underline{\eta}^*$ that may be partitioned as $\underline{\eta}^{*'} = [\underline{\eta}', \underline{y}']$, where $\underline{\eta}'$ is a (transposed) random sub-vector of latent variables and $\underline{y}'$ is a (transposed) random sub-vector of manifest dependent variables. The number of latent dependent variables in $\underline{\eta}'$ is indicated by m_1: the number of manifest dependent variables in $\underline{y}'$ is indicated by m_2. The total number of dependent variables is indicated by m, where $m = m_1 + m_2$. The order of $\underline{\eta}^*$ is thus $m \times 1$.

Independent variables are included in a single random vector $\underline{\xi}^*$. This vector may be partitioned to distinguish between manifest and latent exogenous variable and disturbance variables. Thus we may write $\underline{\xi}^* = [\underline{\xi}', \underline{\varepsilon}']$ where $\underline{\xi}'$ stands for a (transposed) sub-vector of latent exogenous variables, and $\underline{\varepsilon}'$ stands for a (transposed) sub-vector of latent disturbance variables. The number of latent exogenous variables included in $\underline{\xi}'$ is n_1: the number of disturbance variables in $\underline{\varepsilon}'$ is equal to m (the number of dependent variables). The number of independent variables in $\underline{\xi}^*$ is thus $n_1 + m = n$, and so the order of $\underline{\xi}^*$ is $n \times 1$.

The path coefficients α_{ij}s that relate pairs of dependent variables are included in a square matrix $\underline{A}$. Each row of $\underline{A}$ corresponds to one of the dependent variables and contains structural parameters corresponding to the variable's connections with independent variables that causes it. The

Table 6.2: An Explicit Rendering of the Matrix Equation for the System of Simultaneous Equations.

$$
\underset{\underline{\eta}^{*}}{\begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \\ \eta_9 \\ y_{10} \\ y_{11} \\ y_{12} \\ y_{13} \\ \cdot \\ \cdot \\ y_{65} \\ y_{66} \\ y_{67} \\ y_{68} \end{bmatrix}}
=
\underset{\underline{A}}{\begin{pmatrix}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\alpha_{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \alpha_{43} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \alpha_{65} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \alpha_{87} & 0 \\
0 & \alpha_{92} & 0 & \alpha_{94} & 0 & \alpha_{96} & 0 & \alpha_{98} \\
\alpha_{101} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\alpha_{111} & 0 & 0 & 0 & 0 & 0. & 0 & 0 \\
\alpha_{121} & 0 & 0 & 0 & 0 & 0. & 0 & 0 \\
0 & \alpha_{132} & 0 & 0 & 0 & 0. & 0 & 0 \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{pmatrix}}
\underset{\underline{\eta}^{*}}{\begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \\ \eta_9 \\ y_{10} \\ y_{11} \\ y_{12} \\ y_{13} \\ \cdot \\ \cdot \\ y_{65} \\ y_{66} \\ y_{67} \\ y_{68} \end{bmatrix}}
+
\underset{\underline{\Gamma}^{*}}{\begin{pmatrix}
\gamma_{11} & \cdot & \gamma_{17} & \delta_{11} & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & \delta_{22} & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & \delta_{33} & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & \delta_{77} & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & \delta_{88} & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & \delta_{99} & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & \delta_{1010} & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\gamma_{651} & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
\gamma_{661} & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 \\
\gamma_{671} & \cdot & .0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & \delta_{6767} & 0 \\
\gamma_{681} & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 & 0 & \cdot & 0 & \delta_{6868}
\end{pmatrix}}
\underset{\underline{\xi}^{*}}{\begin{bmatrix} \xi_1 \\ \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \\ \varepsilon_5 \\ \varepsilon_6 \\ \varepsilon_7 \\ \varepsilon_8 \\ \varepsilon_9 \\ \varepsilon_{10} \\ \varepsilon_{11} \\ \varepsilon_{12} \\ \cdot \\ \cdot \\ \varepsilon_{65} \\ \varepsilon_{66} \\ \varepsilon_{67} \\ \varepsilon_{68} \end{bmatrix}}
$$

elements of diagonal of $\underline{A}$ are thus ordinarily zero, meaning that a dependent variable does not cause itself.

The path coefficients that relate independent to dependent variables are contained in the matrix $\underline{\Gamma}^*$. The matrix $\underline{\Gamma}^* = [\underline{\Gamma}:\underline{\Delta}]$ is partitioned into $m \times n_1$ matrix $\underline{\Gamma}$ and $m \times m$ matrix $\underline{\Delta}$. The rows of $\underline{\Gamma}$ correspond to the different dependent variables. The columns of $\underline{\Gamma}$ correspond to the only exogenous variable. A zero element of ith row and kth column of $\underline{\Gamma}$ means that the kth exogeneous variable is not a cause of the variable. In the present example, $\underline{\Gamma}$ is a 68×1 sub-matrix. $\underline{\Delta}$ contains structural parameters relating dependent variables to their corresponding disturbance variables. The rows of $\underline{\Delta}$, thus, also correspond to the different dependent variables, which the columns of $\underline{\Delta}$ correspond to different disturbance variables. In the present example $\underline{\Delta}$ is a 68 $\times$ 68 matrix.

A more compact form for the general matrix formulation of the linear structural equation model with latent manifest variables is given by

$$\begin{bmatrix} \underline{\eta} \\ \\ \underline{y} \end{bmatrix} = \underline{A} \begin{bmatrix} \underline{\eta} \\ \\ \underline{y} \end{bmatrix} + [\underline{\Gamma}:\underline{\Delta}] \begin{bmatrix} \underline{\xi} \\ \\ \underline{\varepsilon} \end{bmatrix}$$

or more simply

$$\underline{\eta}^* = \underline{A}\,\underline{\eta}^* + \underline{\Gamma}^*\underline{\xi}^*$$

The goal of structural equation models is to show how relationships among manifest variables (given by either correlation or covariance) can be explained in terms of structural equations relating manifest variables to other (possibly latent) variables of the model. To reach this goal it is required that a certain "selection" equation draws out manifest variables in the sub-vector $\underline{y}$, from the larger vectors $\underline{\eta}^*$ and $\underline{\xi}^*$, of variables. The selection equation is

$$\underline{y} = [\underline{0}:\underline{I}] \begin{pmatrix} \underline{\eta} \\ \underline{y} \end{pmatrix}$$

or $$\underline{y} = \underline{G_y}\underline{\eta_1}^*$$

$\underline{G_y} = [\underline{0}:\underline{I}]$ is a partitioned ($m_2 \times m$) "selection" matrix with $\underline{0}$, an $m_2 \times m_1$ null matrix and $\underline{I}$, an $m_2 \times m_2$ identity matrix. In other words, $\underline{G_y}$ contains zero elements everywhere except for a single element of unity in each row placed in the appropriate column of $\underline{G_y}$ to "select" a corresponding manifest dependent variable for $\underline{\eta}^*$.

The matrix reflecting the variances and covariance among independent variables of the model is

$$\underline{\Phi} = E(\xi^* \xi^{*`})$$

The model requires that exogenous variables are independent of disturbance variables. This requirement is expressed mathematically by the requirement

$$E\ \underline{\varepsilon}[\underline{\xi}`] = 0$$

where E is the expectation operator.

The effect of this requirement appears in the matrix and may be seen in a partitioning of this matrix as

$$\underline{\Phi} = \begin{pmatrix} \underline{\Phi_{\xi\xi}} & 0_{\varepsilon\varepsilon} \\ 0 & \underline{\Phi_{\varepsilon\varepsilon}} \end{pmatrix} \qquad \text{Equation 6.1}$$

where $\underline{\Phi_{\xi\xi}} = E(\xi\ \xi`)$ and $\underline{\Phi_{\varepsilon\varepsilon}} = E(\varepsilon\ \varepsilon`)$

The terms $E(\xi\ \varepsilon)$ and $E(\varepsilon\ \xi) = 0$ in Equation 6.1.

The variance/covariance matrix among manifest variables is given by

$$\underline{\Sigma}_o = \underline{\Sigma}_{yy} \qquad \text{Equation 6.2}$$

where according to the model,

$$\underline{\Sigma}_{yy} = \Sigma(\underline{y}\,\underline{y}') = \underline{G}_y\underline{B}^{-1}\underline{\Gamma}^*\underline{\Phi}\,\underline{\Gamma}^{*'}\,\underline{B}^{-1'}\underline{G}_y' \qquad \text{Equation 6.3}$$

Equation 6.2 and Equation 6.3 implies that a predicted or hypothetical variance/covariance matrix $\underline{\Sigma}_0$ for the set of observed variables in random vector $\underline{y}$ may be derived from the parameter values of a hypothetical structural equation model. Therefore, the degree to which the hypothetical structural equation model reflects reality is given by the degree to which the hypothetical matrix $\underline{\Sigma}_0$ is the same as the empirical variance/covariance matrix $\underline{\Sigma}$ for the same variables (in $\underline{y}$) obtained from measurements of these variables in the world. To make the comparison between the hypothetical matrix $\underline{\Sigma}_0$ and the empirical matrix $\underline{\Sigma}$ is the goal of a confirmatory analysis using structural equation models with latent and manifest variables. In practice, $\underline{\Sigma}_0$ and $\underline{\Sigma}$ are replaced with sample estimates namely, $\underline{\Sigma}_0'$ and $\underline{S}$, respectively.

Path Coefficient

Path coefficients represent the strength of causal connections specified in the model. There are two categories of path coefficients: those associated with relationships linking manifest variables to latent variables, usually called outer coefficients, and others associated with latent to latent variable relationships, usually called inner coefficients. Before the values of path coefficients can be obtained, the structural equation model must be specified in such a way that the model is "identified". Identifying a model involves fixing the values of some coefficients (fixed parameters) and using data to estimate values of other coefficients (free parameters) that would result in a unique hypothetical population covariance matrix of manifest variables (James, Mulaik & Brett, 1982). The least squares estimation method is used to minimise the sum of squared differences between the elements of sample

covariance matrix ($\underline{S}$) and the hypothetical population covariance ($\underline{\Sigma_0}'$) matrix for manifest variables.

Analysis of path coefficients begins with the outer path coefficients. For every relationship, all measurement items with values of path coefficients that are less than 0.1 is removed from the model. This is to ensure that only manifest variables that adequately reflect the empirical content of latent variables are retained for further analysis. Usually PLS has to be run several times to remove all manifest variables that are poorly linked to latent variables. The outer coefficients of remaining manifest variables are then used to compute critical success factor and business excellence indices for the study samples by using a mathematical expression that takes into account item mean scores and number of points in the scales.

Following the analysis of outer coefficients, the research is then concerned with inner coefficients, which represents the amount of change in a dependent variable, expressed as multiples of standard deviation, when the value of its independent variable is changed by one unit.

Standardised inner coefficients cannot be compared across groups of sample nor can those that are produced by the same population over time. However standardisation of data simplifies the computation of path coefficients because correlation matrix of manifest variables are used instead of the covariance matrix. In the PLS method, the values of inner coefficients for causal connections that do not involve a single dependent variable can be easily determined by reading their values directly from the correlation matrix. The values of inner coefficients for causal connections that involve a single dependent variable, however, have to be solved from the following equation (Namboodiri et al., 1975):

$$r_{ij} = \sum_{k} p_{ik} r_{kj}$$

where i = endogenous variable ($i > k,j$);
j = causal variable; and
k begins with i - 1 and ranges down to 1 (i.e., η_1).

Note that all path coefficients in a structural model can be determined using the same equation.

Model Validity

The degree to which a structural equation model reflects reality is assessed by the degree to which $\underline{\Sigma}_0$, the hypothetical variance/covariance matrix generated according to Equation 6.2 and Equation 6.3, is similar to, or has a good fit with, the matrix $\underline{\Sigma}$, which is the unrestricted, empirical variance/covariance matrix for the same manifest variables. In practice $\underline{\Sigma}_0$ and $\underline{\Sigma}$ are replaced by sample estimates, namely $\underline{\Sigma}_0$ and $\underline{S}$ respectively. In EQS, χ^2 goodness-of-fit test, Normed Fit Index (Bentler and Bonett, 1980), and Comparative Fit Index (Bentler, 1998) are used to determine whether the structural equation model has a good fit with the data.

χ^2 Goodness-of-Fit Test

The model χ^2 statistic, which is based on a fit function Q, to be minimised, is used to compare the generated estimated variance/covariance matrix $\underline{\Sigma}_0$ with the sample variance/covariance matrix $\underline{S}$ estimated in the usual way without no restrictions. Specifically the fit function

$$Q = (\underline{S} - \underline{\Sigma}_0(\theta))'\underline{W}(\underline{S} - \underline{\Sigma}_0(\theta))$$

where θ = estimates of free model's parameters; and

$\underline{W}$ = weight matrix such that a constant times a variance of Q in large samples converges to a χ^2 variate, so that the adequacy of the population covariance matrix can be evaluated probabilistically.

The given χ^2 statistic and tabled values of the $\chi^2_{(df)}$ distribution are used to determine the probability of obtaining a χ^2 value as large or larger than the value actually obtained, given that the model is correct. When the null hypothesis is true, the model should fit the data well and this probability should exceed a standard cut-off in the χ^2 distribution (such as 0.05 or 0.01).

Thus, in a very well fitting model, the probability will be large. In a poorly fitting model, the probability will be below the standard cut-off.

Normed-Fit Index

The Normed-Fixed Index (NFI) is computed using the equation

$$NFI = 1 - Q_k/Q_i$$

where Q_k and Q_i are the values of fitting functions for the model of interest and the corresponding independent model (uncorrelated variable-model), respectively. Values of NFI greater than 0.9 are desirable (Bentler, 1995).

Comparative Fit Index

The comparative fit index (CFI) has the advantage of reflecting fit relatively well at all sample sizes, especially, in avoiding the underestimation of fit sometimes found in true models with NFI. CFI is computed as

$$CFI = 1 - \tau_k/\tau_i$$

where τ_k = $\max[nQ_k - d_k, 0]$ based on the model of interest ;
τ_I = $\max[nQ_i - d_i, 0]$;
n = sample size - 1; and
d_i and d_k = degrees of freedom for the null model and substantive model respectively.

A value of more than 0.9 is desirable for CFIs.

Performance Indices

The general form of the critical success factor and business excellence index is as follows:

$$\text{CSF index or B.E.I} = \frac{\sum^{n}[\xi] - Min[\xi]}{Max[\xi] - Min[\xi]} \times 100$$

where *Min*[ ] and *Max*[ ] are the minimum and maximum values of the variable.

The minimum and maximum values are determined by those of the corresponding manifest variables:

$$Min[\xi] = \sum^{n} w_i x_i - \sum^{n} w_i x_i$$

and

$$Max[\xi] = \sum^{n} w_i \, Max[x_i]$$

where x_is are manifest variables, w_is are outer coefficients, and n is the number of manifest variables. The outer coefficients are used to calculate the indices by using the following expression

$$\text{CSF index or B.E.I} = 1 - \left(\frac{\sum^{n} w_i x_i - \sum^{n} w_i}{(n-1)\sum^{n} w_i} \right) \times 100$$

where n = number of points on the scale.

The index value has a range of 0 to 100 percent. Organisations that have business excellence index score of 75 percent or more are considered excellent organisations. Similarly, for critical success factors, scores of 75

Critical Success factor and business excellence	Overall	United States	U. Kingdom	Malaysia
Leadership	6.48	5.86	6.38	7.02
Delight the Customer	6.75	6.22	6.42	7.00
Customer focus	6.26	6.43	6.53	7.02
Management by fact	5.89	5.23	6.70	7.05
Process performance	6.52	6.08	6.55	7.10
People-based management	5.91	5.63	6.23	7.05
People performance	6.14	6.04	6.15	6.85
Continuous improvement	5.98	5.68	6.07	6.70
Imprrovement culture	5.75	5.74	6.67	6.51
Business Excellence	6.19	6.36	6.73	6.45

Table 6.3: Mean Values of Critical Success Factors and Business Excellence.

percent or more indicate that the factors have been excellently managed. All scores less than 75 percent are associated with poor performance and critical success factors associated with these scores must be improved to achieve better business excellence.

6.2 DETAILED ITEM ANALYSIS

Mean Scores

The mean scores of critical success factors and business excellence for all institutions and for institutions in each country are given in Table 6.3. It can be seen that there is variation in country mean scores for the critical success factors and business excellence. Paired t-tests of country mean scores indicate that there is significance difference (C.L = 95%) between mean scores of Malaysian institutions and those of the other two countries but there is no significant difference between U.S. mean scores and U.K.

The mean scores can be used to represent a gross measure of an institution's performance. This measure can be narrowed down to the scores of individual questionnaire items to obtain a gross assessment of an institution's activities.

Correlation Analysis

A detailed analysis on the association among factor mean scores is done using simple correlation analysis. Appendix E shows the Pearson correlation matrices of factor mean scores for all institutions, U.S., U.K., and Malaysian institutions respectively.

As expected, independent and dependent latent variables are strongly correlated (CL = 95%). Because of the causal connections among latent variables in the Business Excellence model, variables that are not connected are correlated as well.

An examination of the correlation shows that independent and dependent variables for U.S. and Malaysian data are correlated but the same is not always true with U.K. data. The correlation coefficient among all connected variables for U.K. institutions is markedly lower than the other countries. This means that there is lack of integration of critical success factors and business excellence in U.K institutions.

Leadership. For U.S. and Malaysia, the variable, leadership, is correlated with its dependent variables: delight the customer (r = 0.8697 and 0.9177, respectively); management by fact (r = 0.8648; 0.7605); people-based management (r = 0.8836, 0.8131); and continuous improvement (r = 0.8803, 0.8606). Leadership is also correlated with people-based management and continuous improvement (r = 0.7486, 0.6336) for U.K but weakly correlated with delight the customer and management by fact (r = 0.4902811 and 0.4297). Leadership in U.K institutions is seemingly not as effective as U.S. and Malaysian institutions in creating customer delight, managing by fact, managing people, and improving quality continuously.

Delight the customer and customer focus. Delight the customer is correlated with customer focus for all samples (r = 0.8854, 0.6877, 0.7227 for U.S., U.K, and Malaysia, respectively). When an organisation focuses on customer needs in all its efforts then customers are delighted. Delighting the

customers creates customer loyalty, increases customer retention, increases revenues, and reduces total costs (Kotler & Armstrong, 1995).

Management by fact and process performance. Management by fact is correlated with process performance for all samples (r = 0.9168, 0.7837, 0.8888 for U.S., U.K, and Malaysia, respectively). Top management need to know how well their organisation's products are doing in the customers' hands and how well operations and production processes are running so that improvements can be made. The efficiency and effectiveness of processes can be monitored by using various quality tools such as Statistical Process Control. Information about customer delight can be obtained by conducting a customer satisfaction survey (Kristensen *et al.*, 1998).

People-based management and people performance. People-based management is correlated with people-performance (r = 0.9113, 0.7655, and 0.8835 for U.S., U.K., and Malaysia, respectively) . People are primary resources of an organisation and as such need to be well managed. Managing human resource means providing people with the skills and knowledge needed to perform their jobs, appropriate tools, equipment and other production aids, a good working atmosphere, and rewarding them for their contributions to the organisation (Kanji & Asher, 1993). When people are satisfied and highly motivated while working for the organisation, their performance increases.

Continuous improvement and improvement culture. Continuous improvement is correlated with improvement culture (r = 0.9416, 0.7147, and 0.8770 for U.S, U.K., and Malaysia, respectively). An organisation has an improvement culture if everyone thinks and act in the quality sense all the time. The result of this culture is an ever-going improvement for the organisation (Kanji & Asher, 1993).

Business excellence. Business excellence is correlated with customer focus (r = 0.9484, 0.8495, and 0.9220, for U.S., U.K, and Malaysia, respectively), process performance (r = 0.9192, 0.8528, 0.9187), people-based management (r = 0.8634, 0.8182, and 0.8626), and improvement

culture (0.9041, 0.8316, and 0.8539). Business excellence is achieved from revenues created from customer purchased, efficient and effective processes, high performance levels of organisational members, and a culture that encourages high performance in all areas of an organisation. The role of leadership is important in setting the stage for these things to occur (Kanji & Asher, 1993).

Another important measure is the coefficient of determination (r^2), which is the square of correlation coefficient. This measure indicates the amount of variance of a dependent variable that is explained by an independent variable. In addition, the coefficient of determination can also be used to evaluate the accuracy of a structural model. This approach is used in the evaluation of the European model for customer satisfaction (Kristensen, Matrensen & Gronholdt, 1999). In the European model, an r^2-value of at least 0.65 is considered reasonably high to indicate model accuracy. This value has also been adopted in the present research for assessing the Business Excellence Model.

Table 6.4 shows r^2 values for all institutions, U.S., U.K., and Malaysian institutions. The r^2 values for U.S. and Malaysian institutions are all above 0.65. This means that the variations in the model's independent variables explain at least 65% of the variance of dependent variables in both countries. In other words, the business excellence model is a good regression model for U.S. and Malaysia. However, for U.K institutions, seven out of twelve r^2 values are less than 0.65. The lowest value equals 0.24 for "leadership-delight the customer" relationship. This means that, for the U.K, there is poor association between variables in the seven relationships.

A multiple correlation analysis is also done to investigate the association of all critical success factors taken together with business excellence. This analysis is dealt with in a section concerning validity of measurement instrument later in this chapter.

Relationships	r^2			
	Overall	U.S.	U.K	Malaysia
Leadership - delight the customer	0.63	0.80	0.24	0.84
Delight the customer - customer focus	0.66	0.82	0.47	0.52
Leadership - management by fact	0.58	0.76	0.19	0.58
Management by fact - process performance	0.77	0.77	0.61	0.79
Leadership - People-based management	0.71	0.78	0.56	0.66
People - based management - people performance	0.79	0.82	0.59	0.78
Leadership - continuous improvement	0.71	0.79	0.40	0.74
Continuous improvement - improvement culture	0.78	0.82	0.51	0.77
Customer focus - business excellence	0.82	0.91	0.72	0.85
Process performance - business excellence	0.82	0.86	0.72	0.84
People performance - business excellence	0.80	0.89	0.67	0.74
Improvement culture - business excellence	0.78	0.87	0.69	0.73

Table 6.4: Coefficient of Determination of Each Causal Connection in the Business Excellence Model.

Reliability of Measurement Scales

The reliability coefficients of measurement scales for all the study samples are greater than 0.7 (Table 6.5), which means that the scales are reliable.

Validity of Empirical Measurements

The correlation between conceptually related independent and dependent latent variables provide an appropriate indication of convergent validity of corresponding measurement scales (Table 6.6). The high correlation coefficients indicate that measurement scales associated with the latent variables in question have convergent validity.

Critical success factor and business excellence	Overall	United States	U. Kingdom	Malaysia
Leadership	0.8699	0.8712	0.7340	0.9123
Delight the Customer	0.9388	0.8877	0.8371	0.7889
Customer focus	0.8253	0.8896	0.8777	0.7570
Management by fact	0.7872	0.8139	0.8360	0.8100
Process performance	0.8875	0.8816	0.7635	0.8907
People-based management	0.8976	0.8127	0.7155	0.7882
People performance	0.8970	0.7936	0.7314	0.8892
Continuous improvement	07972	0.7447	0.8154	0.7825
Imprrovement culture	0.9353	0.8317	0.9302	0.9515
Business Excellence	0.9245	0.9310	0.8224	0.9319

Table 6.5: Reliability Coefficient - Alpha.

Criterion Related Validity

The criterion-related validity is evaluated by examining multiple correlation coefficient computed for the nine critical success factors taken together and business excellence. The correlation coefficient for combined institutions, U.S., U.K., and Malaysian institutions are 0.8321, 0.9013, 0.7948, and 0.7878, respectively (CI = 95%). The high correlation indicate that the critical success factor measures have a high degree of criterion-related validity when taken together.

Independent variable	Dependent variable	Correlation (from Appendix D)			
		Overall	U.S.	U.K	Malaysia
Delight the customer	Customer focus	0.8818	0.9038	0.6877	0.7227
Management by fact	Process performance	0.8760	0.8784	0.7837	0.8888
People-based management	People performance	0.8862	0.9080	0.7655	0.8835
Continuous improvement	Improvement culture	0.8846	0.9055	0.7147	0.8770

Table 6.6: Correlation Between Conceptually Related Independent and Dependent Variables of the Business Excellence Model.

Relationships	Inner coefficient			
	Overall	U.S.	U.K	Malaysia
Leadership - delight the customer	0.7959	0.8715	0.4903	0.9177
Delight the customer - customer focus	0.8118	0.9038	0.6877	0.7227
Leadership - management by fact	0.7632	0.8690	0.4297	0.7605
Management by fact - process performance	0.8760.	0.8784	0.7837	0.8888
Leadership - People-based management	0.8429	0.8828	0.7486	0.8131
People - based management - people performance	0.8862	0.9080	0.7655	0.8835
Leadership - continuous improvement	0.8395	0.8870	0.6336	0.8606
Continuous improvement - improvement culture	0.8846	0.9055	0.7147	0.8770
Customer focus - business excellence	0.2179	0.2629	0.2055	0.3878
Process performance - business excellence	0.2924	0.2172	0.2884	0.3072
People performance - business excellence	0.2502	0.3098	0.2352	0.1833
Improvement culture - business excellence	0.2272	0.2037	0.2761	0.1148

Table 6.7: Inner Path Coefficients of the Business Excellence Model.

Path Coefficient

Inner coefficients of the business excellence model for all institutions, U.S., U.K., and Malaysia are computed using partial least squares method and PLS.SAS computer programme. Table 6.7 provides the inner coefficients for every data set. The inner coefficients are also shown on the structural diagram of the business excellence model (Figure 6.3, Figure 6.4, Figure 6.5, and Figure 6.6) for combined institutions, U.S., U.K., and Malaysia, respectively.

The following observations are made about inner coefficients of all study samples:

1. The inner coefficients are all non-zero;
2. The values of inner coefficients are much larger for the first eight relationships but are significantly smaller for the last four relationships.

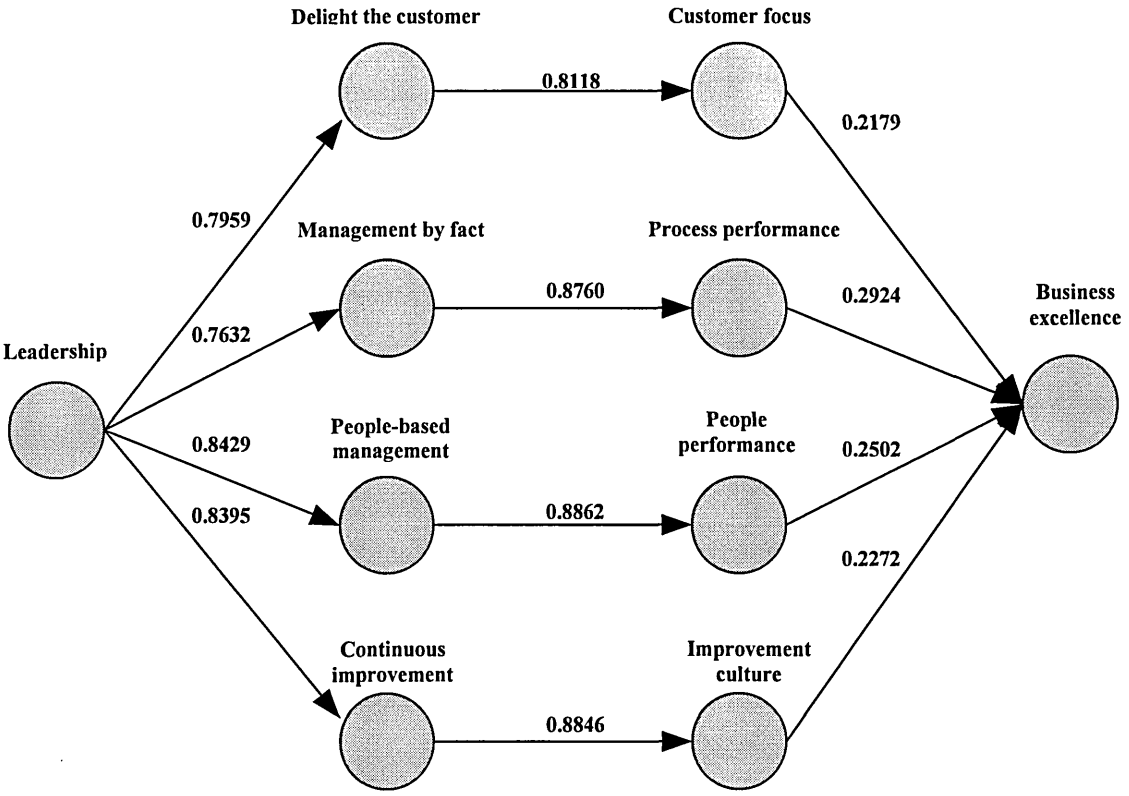


Figure 6.3: Path Coefficients for Combined Institutions.

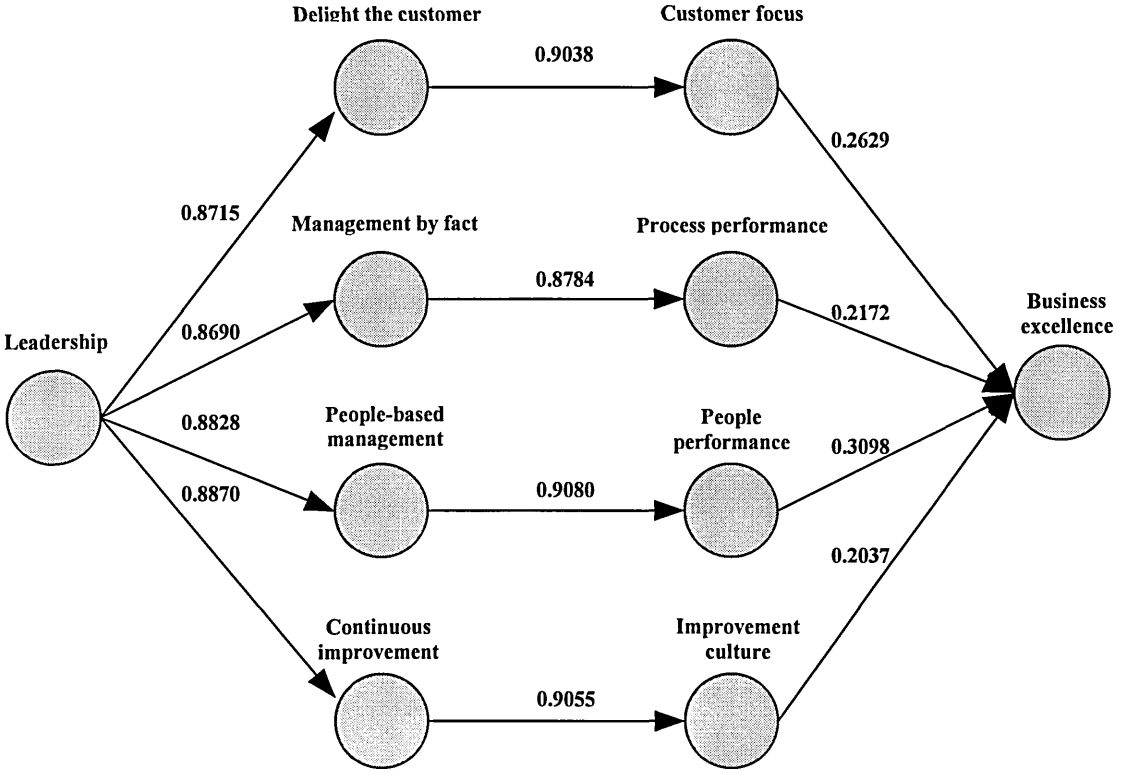


Figure 6.4: Path Coefficients for U.S. Institutions.

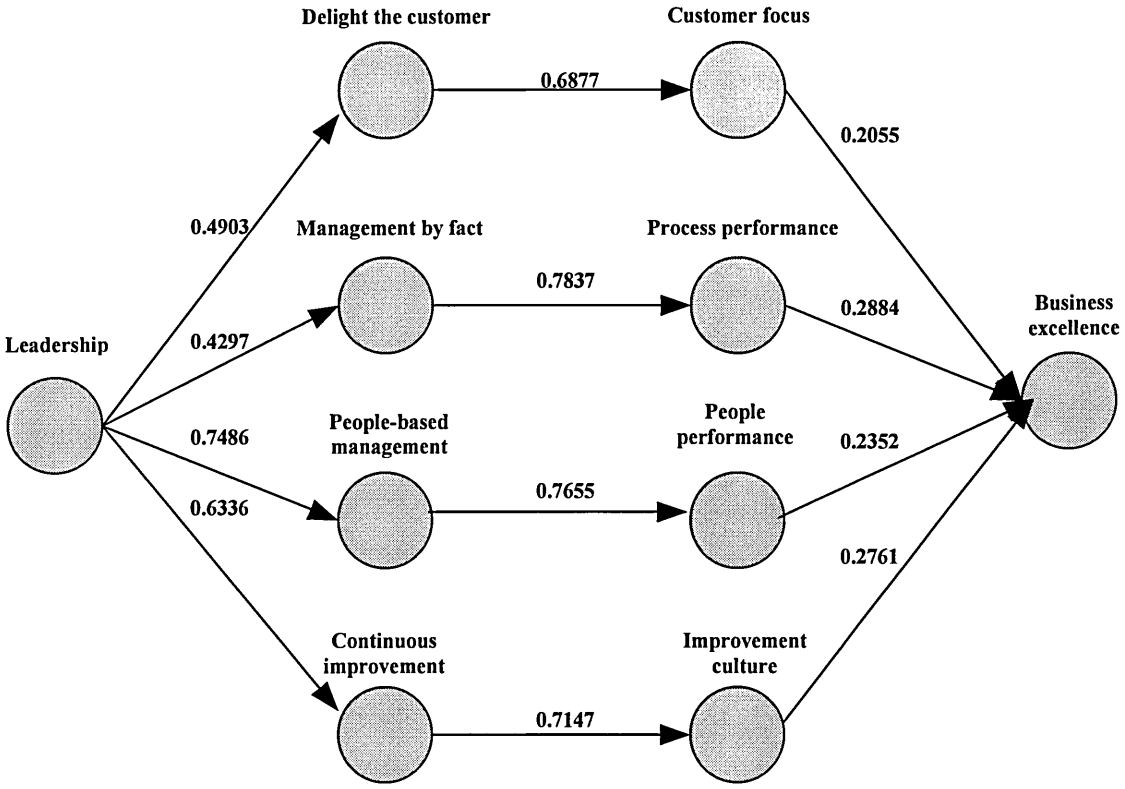


Figure 6.5: Path Coefficients for U.K Institutions.

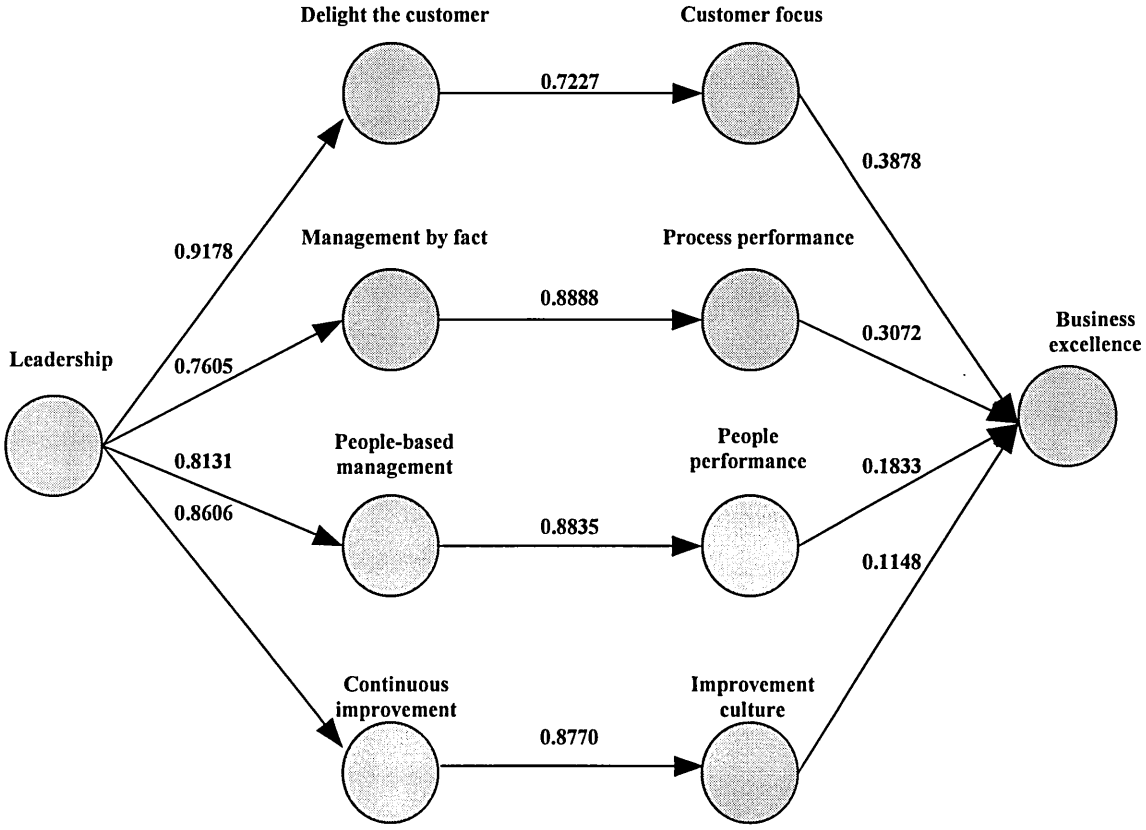


Figure 6.6: Path Coefficients for Malaysian Institutions.

Variants of Measurement Instrument

There is variation in the final measurement instruments for each study sample in terms of types and number of questions. By design, an iterative procedure is used that retained only those items that are common and relevant to individual higher education institutions in each sample. However, by the same token, this procedure may have deleted certain "good" items that are relevant to the institution groups. Tables 6.8, 6.9, 6.10 and 6.11 give the mean scores of variables that are relevant to each sample. The number of items included in the instruments for combined institutions, U.S., U.K., and Malaysian institutions are 42, 34, 30, and 34 respectively.

There are fourteen variables that are relevant to each country:

- institutions goal definition;
- customer requirements;
- customer services;
- task co-ordination;
- service improvement;
- student admissions process;
- human resource management;
- employee Quality involvement;
- customer feedback;
- customer demand;
- goal achievement;
- student admissions;
- staff recruitment;
- staff maintenance.

Variables that are relevant to every country are relevant to combined institution group as well. On the other hand, there are four variables that are irrelevant to all samples:

- customer perceived quality;
- customer satisfaction;
- quality improvement methodology;
- performance feedback.

Dimension	Label	Variable	Mean Score	Number of items removed
1. Leadership (ξ_1)	y_{64}	Manager's involvement	6.8	
	y_{65}	Institution's goal definition	6.5	2
	y_{66}	Institution's quality values	6.4	
	y_{67}	Everyday leadership	6.1	
2. Delight the customer (η_1)	y_{10}	Customer requirements	6.9	
	y_{11}	Customer loyalty	6.6	0
	y_{12}	Customer services	6.8	
3. Customer focus (η_2)	y_{13}	Service obligation	7.0	
	y_{14}	Handling customer complaints	6.8	
	y_{18}	Competitors' customer	5.1	5
	y_{20}	Task co-ordination	6.2	
	y_{21}	External customer focus	6.2	
4. Management by fact (η_3)	y_{23}	Performance measurement	5.9	
	y_{24}	Measurement information	5.8	0
	y_{25}	Service improvement	6.0	
5. Process performance (η_4)	y_{26}	'Quality' process design	5.9	
	y_{27}	Process assessment	5.9	
	y_{28}	Student admission process	7.5	3
	y_{29}	Student learning outcome	7.1	
	y_{31}	Staff maintenance process	6.2	
6. People-based management (η_5)	y_{35}	Human resource	6.0	1
	y_{36}	Employee quality involvement	5.9	
7. People performance (η_6)	y_{38}	Cross-function teamwork	6.5	
	y_{40}	Managerial training	5.8	5
	y_{42}	Training resources	5.9	
	y_{44}	Institutional pride	6.4	
8. Continuous improvement (η_8)	y_{46}	Customer feedback	6.8	
	y_{47}	Quality improvement methods	5.9	0
	y_{48}	Service competitiveness	5.4	
9. Improvement culture (η_9)	y_{50}	Employee suggestion	5.3	
	y_{51}	Failure removal	6.1	0
	y_{52}	Problem-free process design	5.8	
10. Business excellence (η_{10})	y_{53}	Organisational performance	5.7	
	y_{54}	World leader's performance	4.2	
	y_{55}	Financial performance	6.4	
	y_{56}	Customer demand	6.7	0
	y_{57}	Goal achievement	6.7	
	y_{58}	Student admission	7.2	
	y_{59}	Student learning outcomes	7.0	
	y_{60}	Staff recruitment	6.5	
	y_{61}	Staff maintenance	6.5	
	y_{62}	Supplier assessment criteria	5.1	

Table 6.8: Item Mean Scores for Combined Institutions.

Dimension	Label	Variable	Mean Score	Number of items removed
1. Leadership (ξ_1)	y_{63}	Top management	6.1	
	y_{65}	Institution's goal definition	6.1	2
	y_{66}	Institution's quality values	5.9	
	y_{68}	People management	5.3	
2. Delight the customer (η_1)	y_{10}	Customer requirements	6.4	
	y_{11}	Customer loyalty	6.1	0
	y_{12}	Customer services	6.2	
3. Customer focus (η_2)	y_{13}	Service obligation	6.9	
	y_{16}	Customer perceived value	5.9	6
	y_{19}	Customer-supplier	7.0	
	y_{20}	Task co-ordination	6.0	
4. Management by fact (η_3)	y_{23}	Performance measurement	5.2	1
	y_{25}	Service improvement	5.2	
5. Process performance (η_4)	y_{26}	'Quality' process design	5.3	
	y_{28}	Student admission process	7.3	
	y_{29}	Student learning outcome	6.5	3
	y_{30}	Staff recruitment process	5.8	
	y_{32}	Performance indicators	5.4	
6. People-based management (η_5)	y_{35}	Human resource	5.5	1
	y_{36}	Employee quality involvement	5.7	
7. People performance (η_6)	y_{39}	Individual group teamwork	6.7	
	y_{41}	Employee training	6.1	6
	y_{43}	Quality improvement barriers	5.3	
8. Continuous improvement (η_8)	y_{46}	Customer feedback	6.1	1
	y_{47}	Quality improvement methods	5.2	
9. Improvement culture(η_9)	y_{49}	Quality culture	5.8	2
	y_{51}	Failure removal	5.7	
10. Business excellence (η_{10})	y_{55}	Financial performance	6.4	
	y_{56}	Customer demand	6.2	
	y_{57}	Goal achievement	6.5	3
	y_{58}	Student admission	7.0	
	y_{59}	Student learning outcomes	6.3	
	y_{60}	Staff recruitment	6.1	
	y_{61}	Staff maintenance	6.1	

Table 6.9: Item Mean Scores for U.S. Institutions.

Dimension	Label	Variable	Mean Score	Number of items removed
1. Leadership (ξ_1)	y_{64}	Manager's involvement	6.7	
	y_{65}	Institution's goal definition	6.8	3
	y_{67}	Everyday leadership	5.7	
2. Delight the customer (η_1)	y_{10}	Customer requirements	7.0	1
	y_{12}	Customer services	7.0	
3. Customer focus (η_2)	y_{13}	Service obligation	6.2	8
	y_{20}	Task co-ordination	6.4	
4. Management by fact (η_3)	y_{24}	Measurement information	6.2	1
	y_{25}	Service improvement	5.9	
5. Process performance (η_4)	y_{26}	'Quality' process design	6.1	
	y_{28}	Student admission process	8.0	4
	y_{31}	Staff maintenance process	6.1	
	y_{32}	Performance indicators	6.3	
6. People-based management (η_5)	y_{35}	Human resource	5.5	1
	y_{36}	Employee quality involvement	5.0	
7. People performance (η_6)	y_{37}	Employee interaction	6.0	
	y_{38}	Cross-function teamwork	5.9	5
	y_{42}	Training resources	6.5	
	y_{44}	Institutional pride	6.3	
8. Continuous improvement (η_8)	y_{46}	Customer feedback	6.9	1
	y_{47}	Quality improvement methods	5.7	
9. Improvement culture η_9)	y_{50}	Employee suggestion	5.1	2
	y_{52}	Problem-free process design	5.6	
10. Business excellence (η_{10})	y_{54}	World leader's performance	3.4	
	y_{56}	Customer demand	6.3	
	y_{57}	Goal achievement	7.1	3
	y_{58}	Student admission	8.0	
	y_{59}	Student learning outcomes	7.9	
	y_{60}	Staff recruitment	6.6	
	y_{61}	Staff maintenance	6.2	

Table 6.10: Item Mean Scores U.K. Institutions.

Dimension	Label	Variable	Mean Score	Number of items removed
1. Leadership (ξ_1)	y_{63}	Top management	7.5	
	y_{65}	Institution's goal definition	7.1	
	y_{66}	Institution's quality values	7.1	1
	y_{67}	Everyday leadership	6.9	
	y_{68}	People management	6.6	
2. Delight the customer (η_1)	y_{10}	Customer requirements	7.4	
	y_{11}	Customer loyalty	7.2	0
	y_{12}	Customer services	7.2	
3. Customer focus (η_2)	y_{14}	Handling customer	7.1	
	y_{16}	Customer perceived value	6.4	6
	y_{20}	Task co-ordination	6.3	
	y_{22}	Employee job requirements	6.7	
4. Management by fact (η_3)	y_{24}	Measurement information	6.0	1
	y_{25}	Service improvement	6.8	
5. Process performance(η_4)	y_{27}	Process assessment	6.5	
	y_{28}	Student admission process	7.4	4
	y_{29}	Student learning outcome	7.5	
	y_{31}	Staff maintenance process	6.9	
6. People-based management(η_5)	y_{35}	Human resource	6.7	1
	y_{36}	Employee quality involvement	6.5	
7. People performance(η_6)	y_{38}	Cross-function teamwork	7.0	
	y_{40}	Managerial training	6.5	6
	y_{45}	Empowerment	7.1	
8. Continuous improvement (η_8)	y_{46}	Customer feedback	7.1	1
	y_{48}	Service competitiveness	6.9	
9. Improvement culture (η_9)	y_{49}	Quality culture	7.0	2
	y_{51}	Failure removal	6.7	
10. Business excellence (η_{10})	y_{53}	Organisational performance	6.4	
	y_{56}	Customer demand	6.8	
	y_{57}	Goal achievement	6.9	
	y_{58}	Student admission	7.0	3
	y_{60}	Staff recruitment	6.9	
	y_{61}	Staff maintenance	7.0	
	y_{62}	Supplier assessment criteria	6.2	

Table 6.11: Item Mean Scores for Malaysian Institutions.

	Overall	U.S.	U.K	Malaysia
Residuals	0.0430	0.0014	0.0036	0.0027
$\chi^2_{(5\ d.f)}$ statistic	14.217	11.319	3.308	6.012
Probability	0.02731	0.04540	0.65264	0.30500

Table 6.12: Residuals and χ^2 Statistics and their Probabilities for Combined Institutions, U.S., U.K, and Malaysian Institutions.

Model Accuracy Validity

Standardised Residuals. The values of standardised residuals in Table 6.12 are small indicating a well-fit model. The distribution of the variables (not shown) are close to symmetric and centred on zero indicating that the model fits the data.

χ^2 goodness-of-fit test. The χ^2 statistics in each case is low and the probabilities are greater than 0.01 (Table 6.12). Therefore, it is concluded that the Business Excellence Model has a good fit with the data.

Normed-fit Index. The NFIs for combined institutions, U.S., U.K., and Malaysia are 0.989, 0.982, 0.984, and 0.989, respectively. The indices are all greater than 0.9 implying that the model has a good fit with the data.

Comparative fit Index. The CFIs for combined institutions, U.S., U.K., and Malaysia are 0.993, 0.989, 1.000, 0.999, respectively. The CFIs for all study samples are more than 0.9, and hence the model has a good fit with the data.

Business Excellence Index

Table 6.13 gives the indices of critical success factor and business excellence for combine institutions, U.S., U.K., and Malaysia. Figure 6.7 is a bar chart of business excellence indices, and Figure 6.8, Figure 6.9, Figure 6.10, and Figure 6.11 are detailed charts for critical success factor and business excellence indices for the samples.

Code	Critical success factors and business excellence	Index			
		Overall	U.S.	U.K.	Malaysia
C1	Leadership	60.012	53.900	59.400	66.646
C 2	Delight the customer	63.861	57.734	66.812	69.316
C 3	Customer focus	58.702	60.409	59.001	61.314
C 4	Management by fact	54.794	46.667	56.616	58.849
C 5	Process performance	60.483	55.827	65.424	66.384
C 6	People-based management	54.531	51.271	45.913	61.771
C 7	People performance	56.441	54.51	57.343	65.159
C 8	Continuous improvement	57.457	49.603	58.638	66.778
C 9	Improvement culture	53.039	52.596	48.398	64.999
B.E.	Business excellence	58.366	59.669	62.637	64.017

Table 6.13: Critical Success Factor and Business Excellence Indices of Study Samples.

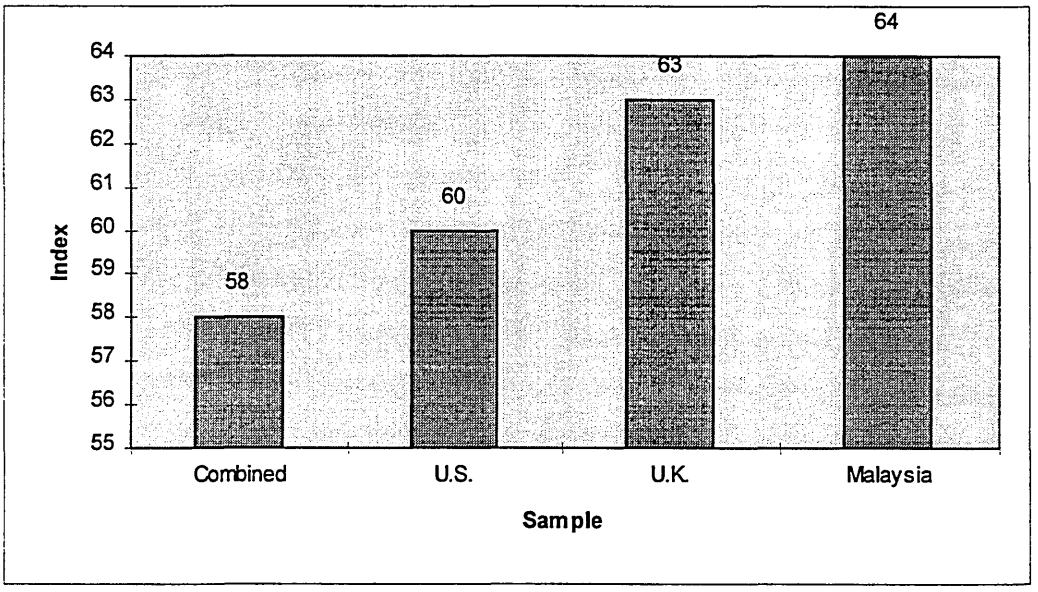


Figure 6.7: Business Excellence for Combined Institutions, U.S., U.K., and Malaysian Higher Education Institutions.

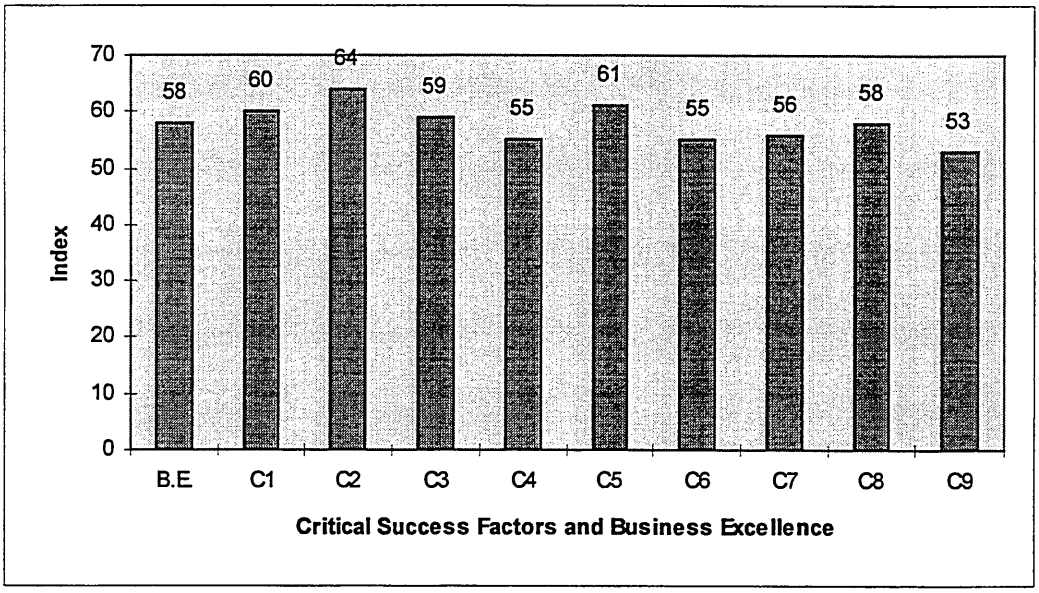


Figure 6.8: Critical Success Factor and Business Excellence Indices of Combined U.S., U.K., and Malaysian Higher Education Institutions.

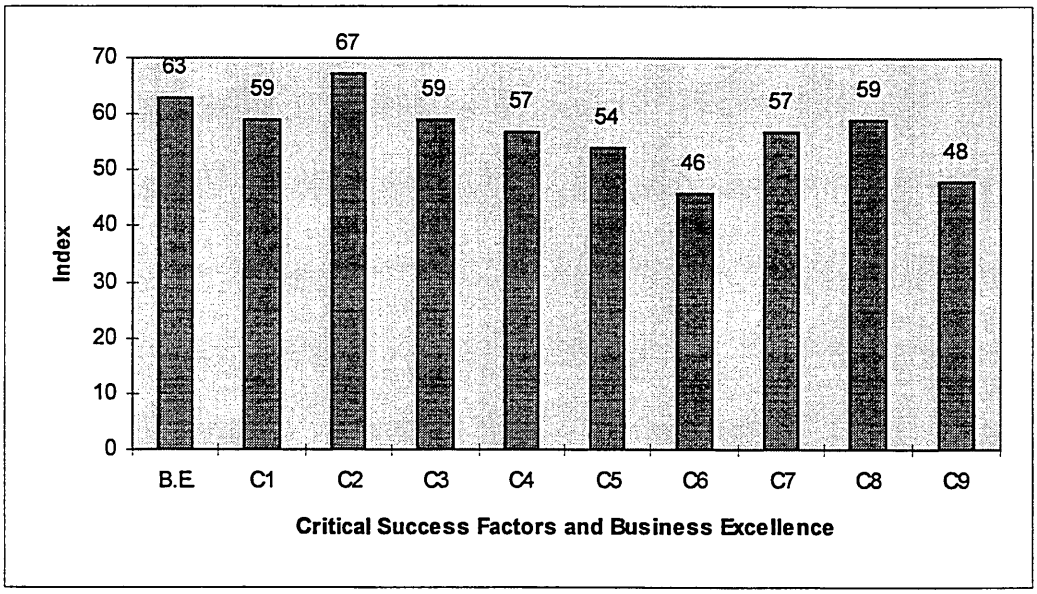


Figure 6.9: Critical Success Factor and Business Excellence Indices of U.S. Higher Education Institutions.

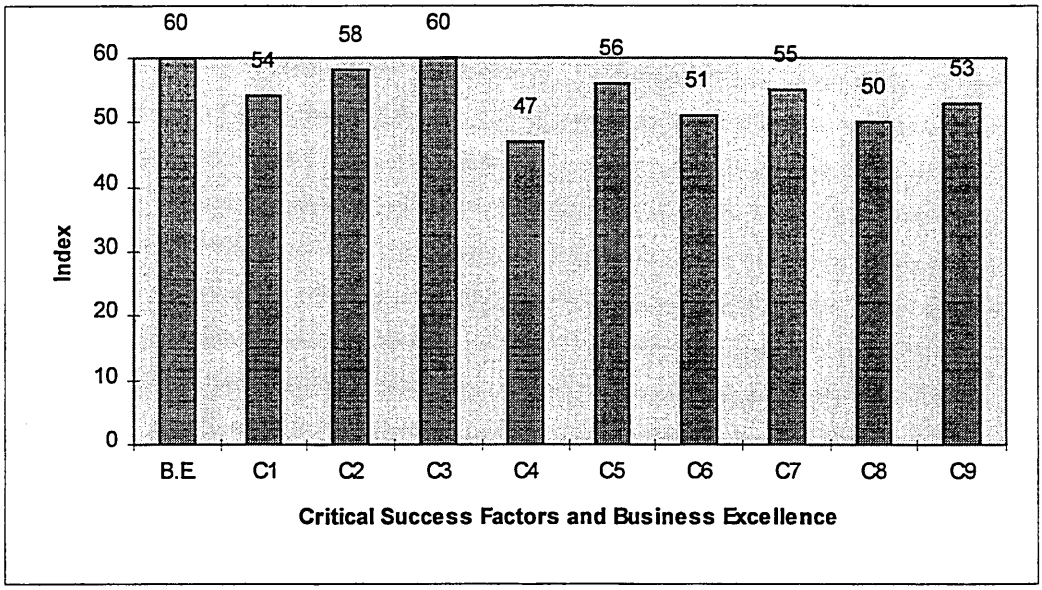


Figure 6.10: Critical Success Factor and Business Excellence Indices of U.K. Higher Education Institutions.

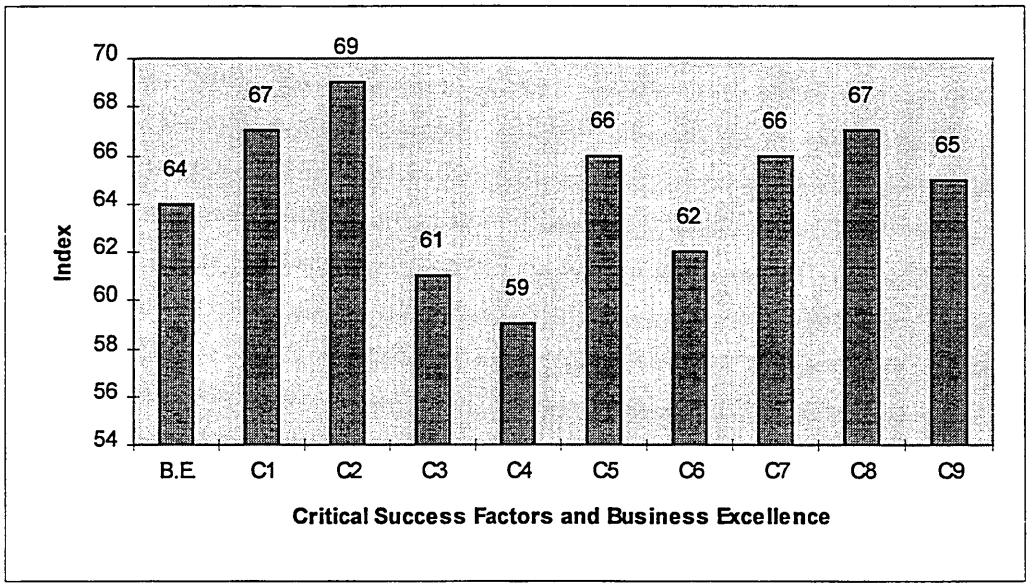


Figure 6.11: Critical Success Factor and Business Excellence Indices of Malaysian Higher Education Institutions.

Several important observations can be made about the indices:

1. The business excellence indices of combined institutions, U.S., U.K., and Malaysian institutions are all below 75%, i.e., 60, 63, and 64%, respectively. Similarly, all scores of critical success factors are below 75 percent.

2. Although the critical success factor and business excellence indices were determined independently by using the index formula, they are all related because the values of inner coefficients from which the indices were derived were computed by simultaneous equations. Thus, the business excellent index score reflects the index score of every critical success factor.

3. The values of outer coefficients associated with any critical success factor or business excellence approximately add up to one. When a manifest variable is removed by the selection process, the values of coefficients of remaining manifest variables increase thereby maintaining the somewhat unit total.

4. Factors that have low index value should be of key importance to decision makers so that necessary actions can be taken to improve the factors. To increase an index, the mean scores associated with that index need to be increased.

5. The choice of which factors to improve and how much improvement is needed can be based on the relative importance of those factors and business excellence target level.

6. Each index list can be exploded into its measurement item list. Mean scores of measurement items are then examined to carry out a detailed assessment of an institution's activities. The institution should also be assessed on items that have been removed because the items are believed to be relevant to all institutions. These removal of items are purely based on statistical grounds because they do not correlate and co-vary with other items that belong to the same quality dimension.

7. The indices can be used to compare the performance of institutions among the three countries with respect to critical success factors and business excellence. It can also be used to compare the performance of the same group of institutions over time.

8. The overall business excellence index is 58%. The business excellence index for Malaysian institutions, i.e., 64%, is higher than U.S. (60%) and U.K (63%). This corresponds to its higher index for leadership of 67% compared to U.S. (54%) and U.K (59%). This suggests that business excellence index increases with leadership index.

6.3 DISCUSSIONS

The data analysis has shown that the Business Excellence Model has a good fit with all the data sets. however, the final measurement instruments for combined institutions, U.S., U.K., and Malaysia are different in terms of their content and number of items (see Tables 6.8 to 6.10). A questionnaire item may have been included in the measurement instrument for one sample but may not be included in another. The number of items in the instruments is 42, 34, 30, and 34 for combined institutions, U.S., U.K., and Malaysia, respectively.

The initial instrument has been refined into its final forms by means of an iterative procedure that selects manifest variables (items) based on how reliable they are in measuring latent variables. Specifically, items that

correspond to sufficiently large values of outer coefficients and as a whole provide a reliable measure of latent variables are selected by the procedure. However, by the same token, this procedure may have deleted certain "good" items that are relevant to those institutions. For example, some items are found by the procedure to be irrelevant to institutions in the U.K. although they are generally thought to be important for the success of higher education institutions. Examples of items that have been removed are

For U.S. institutions

- manager's involvement;
- everyday leadership;
- handling customer complaints;
- customer perceived quality;
- customer satisfaction.

For U.K. institutions

- top management involvement;
- institution's quality values;
- people management;
- customer loyalty;
- handling customer's complaints.

For Malaysian institutions

- manager's involvement;
- service obligation;
- customer perceived quality;
- customer satisfaction;
- competitor's customer satisfaction.

The above factors and many others that had been removed are undoubtedly important concerns for managers in managing the quality of every higher education institution. The above items that were irrelevant to U.K. institutions were found to be relevant to U.S. institutions. The irrelevance of some items (17 items for combined institutions, U.S. = 25, U.K = 29, and Malaysia = 25) does not necessarily mean that they are not important but their exclusion is due to sample effects, small sample sizes, and the way questions have been answered by respondents.

While the business excellence model can be used in its present form to assess and compare institutional quality across a wide variety of institutions, appropriate adaptation of the instrument may be desirable when only a single group of institutions (such as comprehensive institutions, research institutions, liberal arts college, community colleges, and others) are investigated. Specifically, items associated with the nine critical success factors and business excellence can suitably be reworded and augmented to make them more germane to the context in which the instrument is to be used.

Indices are computed in order to make the model useful for evaluating the quality of higher educational institutions. The business excellence and critical success factor indices have been computed for each country. In order to interpret these indices, an arbitrary grading scheme is introduced, i.e., critical success factors and business excellence indices that exceeds 75 percent are regarded as excellent and those with indices less than 75 percent are underachieved.

Critical success factors with low index scores are candidates for improvement. This corresponds to increasing mean scores of measurement items associated with the factors and hence organisational activities associated with them. A means of improving the performance of critical success factors and business excellence is discussed in the following chapter.

The result of the empirical analysis has demonstrated that the Business Excellence Model is applicable to higher education institutions in the U.S., U.K., and Malaysia albeit some variations of the initial measurement

instrument and original Business Excellence Model. The implication of sample and respondent effects on the final form of the measurement instrument presents an opportunity for indulging in two new research areas. One area might be the design of measurement instruments that could accommodate institutions based on the following aspects:

1. Type of institutions such as for community colleges, liberal arts colleges, research institutions, and academic institutions;
2. Type of quality standards in place such as accreditation system in U.S. or QAA in U.K.

Another area is to develop a single concise instrument that would be reliable and meaningful in assessing the quality of a variety of education systems. In other words, the aim would be to produce a global measurement instrument that would have a general applicability. In order to achieve this, a more representative sample such as one that is produced by a stratified or clustered sampling design is desired that would provide an excellent data set for use in model building.

The Business Excellence Model has several notable properties:

- Simple --- in terms of concepts and conceptual network;
- Systematic --- in terms of model parameters and output;
- Generic --- can be applied in different contexts;
- Robust --- it efficiently yields different outputs when its inputs are changed;
- Analytical --- it includes comprehensive critical success factors and utilises a measurement instrument that is flexible in order to arrive at a final solution;
- Objective --- its results are replicable by other researchers if the same study with the same conditions is performed;
- Critical/ logical --- its validity is statistically proven using a deductive logic;

- Predictive --- it empirically measures all critical success factors and contributes toward business excellence by way of a structural approach.

CHAPTER 7

IMPLICATIONS OF THE BUSINESS EXCELLENCE MODEL

7.1 UNIT CONTRIBUTIONS OF CRITICAL SUCCESS FACTORS TOWARD BUSINESS EXCELLENCE

All variables in the Business Excellence model are dependent variables except leadership, which is an independent variable. All dependent variables are directly connected to only one independent variable except business excellence, which is directly connected to four independent variables. In PLS, a functional equation is formulated for every causal connection. This equation takes into account path coefficients and variable mean scores. The equation only describes the relationship between variables that are directly connected.

The business excellence model has four paths going through it, each starting from leadership and ending with business excellence (Figure 7.1). As stated in the previous chapter, path coefficients represent the amount of increase in dependent variables as a result of one unit increase in independent variables. It is possible to determine the contribution of each variable toward business excellence from the value of path coefficients. For variables: customer focus, process performance, people performance, and improvement culture, their unit contributions are equal to the values of path coefficients of their relationships with business excellence, i.e. 0.2179, 0.2924, 0.2502, and 0.2272, respectively, for combined institutions (see Table 6.6).

The unit contributions of other variables are obtained by multiplying path coefficients on the variables' paths that join the variables to business excellence. For example, it can be obtained from Table 6.7 that for every unit change in leadership, the variable management by fact increases by

Path 1:	Ladership	--	delight the customer	--	customer focus	--	business excellence
Path 2:	Leadership	--	management by fact	--	process improvement	--	business excellence
Path 3:	Leadership	--	people--based management	--	people performance	--	business excellence
Path 4 :	Leadership	--	continuous improvement	--	improvement culture	--	business excellence

Figure 7.1: The four Paths Through the Business Excellence Model.

0.7632 unit. Furthermore, management by fact is followed by process performance and finally business excellence (path 2). The increase in process performance would be 0.7632 x 0.8760 = 0.6686 unit and consequently business excellence would have increased by 0.6686 x 0.2924 = 0.1955 unit, which represents the unit contribution of leadership towards business excellence. The unit contribution of leadership can also be calculated from the other three paths of the model. This would yield unit contributions of 0.1408 for path 1, 0.1869 for path 3, and 0.1657 for path 4. The highest of the calculated unit contributions is considered to be the unit contribution for leadership. Similarly, the unit contributions of other critical success factors can be determined using the same approach. Table 7.1 to Table 7.4 show the unit contributions of critical success factors that are listed in descending order for combined institutions, U.S., U.K., and Malaysian institutions, respectively. Higher ranks (importance) correspond to variables with larger unit contributions.

Several findings can be made based on the results:

1. The strengths of causal connections between critical success factors among the three countries are different.
2. Leadership contribution is highest for Malaysian institutions (0.2572), followed by U.S. (0.2483), and U.K. (0.1348).
3. The unit contributions can be used in planning for improving business excellence by allowing resources to be concentrated on factors with highest contributions. However, this would be subjected to availability of resources and cost of allocating them.

4. The last four factors in the model tend to have higher contributions compared to other factors. Factors located earlier on the paths tend to have smaller unit contributions because their influences are watered down when path coefficients are multiplied together.

Knowledge about unit contributions is useful for the continuous development of institutions in all their key areas. For example, since business excellence depends on all critical success factors in varying degrees, larger improvements can be made by improving organisational activities related to

Critical success factor	Rank	Unit contribution
Process performance	1	0.2924
Management by fact	2	0.2561
People performance	3	0.2502
Improvement culture	4	0.2272
People-based management	5	0.2217
Customer focus	6	0.2179
Continuous improvement	7	0.2010
Leadership	8	0.1955
Delight the customer	9	0.1769

Table 7.1: Unit Contribution of Critical Success Factors to Business Excellence for Combined Institutions.

Critical success factor	Rank	Unit contribution
People performance	1	0.3098
People-based management	2	0.2813
Customer focus	3	0.2629
Leadership	4	0.2483
Delight the customer	5	0.2376
Process performance	6	0.2172
Improvement culture	7	0.2037
Management by fact	8	0.1908
Continuous improvement	9	0.1845

Table 7.2: Unit Contribution of Critical Success Factors to Business Excellence for U.S. Institutions.

Critical success factor	Rank	Unit contribution
Process performance	1	0.2884
Improvement culture	2	0.2761
People performance	3	0.2352
Management by fact	4	0.2260
Customer focus	5	0.2055
Continuous improvement	6	0.1973
People-based management	7	0.1801
Leadership	8	0.1348
Delight the customer	9	0.1413

Table 7.3: Unit Contribution of Critical Success Factors to Business Excellence for U.K. Institutions.

Critical success factor	Rank	Unit contribution
Customer focus	1	0.3878
People performance	2	0.3072
Delight the customer	3	0.2803
Management by fact	4	0.2730
Leadership	5	0.2572
Process performance	6	0.1833
People-based management	7	0.1620
Improvement culture	8	0.1148
Continuous improvement	9	0.1018

Table 7.4: Unit Contribution of Critical Success Factors to Business Excellence for Malaysian Institutions.

critical success factors that have higher unit contributions. For example, the highest contributor to business excellence is people performance (0.3098), process performance (0.2884), and customer focus (0.3878), for U.S., U.K., and Malaysian institutions, respectively. For practical reasons, these factors would have to be improved first and then followed by other factors according to their relative importance to achieve higher business excellence.

It seems that a generalisation cannot be made on the significance of leadership towards business excellence by comparing the results of the three countries, though it has been reported to be the most important factor for any TQM process from its inception onwards (Hackman and Wageman, 1995; Kanji, 1994; 1996; 1998b; Kanji & Tambi,1999a; 1999b; 1999c). As far as the values of unit contributions are concerned, they have been influenced by the way the Business Excellence Model has been structured. The model has been specified with eight critical success factors intervening all paths linking

leadership to business excellence. Thus, the influence of leadership on business excellence has to be examined within the context of the intervening variables, which is dealt with in a later section.

7.2 FORCES OF BUSINESS EXCELLENCE

The ranking of critical success factors for business excellence in Table 7.1 to Table 7.4 can help top management in planning for resource allocation to key organisational areas and ultimately achieve improved business excellence. A target level of business excellence can be achieved by improving an optimal mix of critical success factors that have the smallest unit costs per unit contribution to business excellence (marginal contributions). This procedure is called the "Excellence Seeker's Approach", which provides the forces of Business Excellence. However, the selection of factors for improvements will inevitably depend on constraints associated with availability of financial, physical, and human resources, as well as technical requirements.

The Excellence Seeker's Approach

The excellence seeker's approach involves the use of an optimisation algorithm for determining which factor indices to increase and by how much in order to achieve a predermined business excellence target level. The approach has been adapted from a method allied to management sciences discipline, called transportation problem. It consists of several characteristics:

1. There exists only one destination, i.e., business excellence.
2. There exists several suppliers, i.e., critical success factors.
3. A supply is the maximum increase in index value that a critical success factor can contribute to business excellence. It is delimited by the maximum possible index value that the critical success factor can take.
4. A demand is the difference between a target value of business excellence and its present value.
5. Unit transportation cost in the transportation problem is replaced with marginal contribution in the excellence seeker's approach.

business excellence target level without exceeding their upper limits. The result is shown in Table 7.5 to Table 7.8.

Critical Success factor and business excellence	Upper limit	Original index BE = 58	Target business excellence index 65	70	75	80	85	90	95 (0.42)
1. Leadership	75	60	60	60	60	60	60	62	75
2. Delight the Customer	75	64	64	64	64	64	64	64	75
3. Customer focus	75	59	59	59	59	59	70	75	75
4. Management by fact	75	55	64*	75	75	75	75	75	75
5. Process performance	75	61	75	75	75	75	75	75	75
6. People-based management	75	55	55	55	55	63	75	75	75
7. People performance	75	56	56	65	75	75	75	75	75
8. Continuous improvement	75	58	58	58	58	58	75	75	75
9. Improvement culture	75	53	53	53	64	75	75	75	75

Table 7.5 : Revised Indices of Critical Success Factors and Business Excellence for Combined Institutions. *New index for a higher target level; () Number in parentheses represents underachievement.

Critical Success factor and business excellence	Upper limit	Original index BE = 60	Target business excellence index 65	70	75	80	85	90	95
1. Leadership	75	54	54	54	63	75	75	75	75
2. Delight the Customer	75	58	58	58	58	66	75	75	75
3. Customer focus	75	60	60	60	60	60	60	75	75
4. Management by fact	75	47	47	47	47	47	47	47	53
5. Process performance	75	56	56	56	56	56	70	75	75
6. People-based management	75	51	51	65	75	75	75	75	75
7. People performance	75	55	72	75	75	75	75	75	75
8. Continuous improvement	75	50	50	50	50	50	50	50	50
9. Improvement culture	75	53	53	53	53	53	53	53	75

Table 7.6: Revised Indices of Critical Success Factors and Business Excellence for U.S. Institutions.

Critical Success factor and business excellence	Upper limit	Original index BE = 63	Target business excellence index 65	70	75	80	85	90	95 (2.3)
1. Leadership	75	59	59	59	59	59	59	59	75
2. Delight the Customer	75	67	67	67	67	67	67	72	75
3. Customer focus	75	59	59	59	59	73	75	75	75
4. Management by fact	75	57	57	57	66	75	75	75	75
5. Process performance	75	65	74	75	75	75	75	75	75
6. People-based management	75	46	46	46	46	46	52	75	75
7. People performance	75	57	57	63	75	75	75	75	75
8. Continuous improvement	75	57	57	57	57	57	75	75	75
9. Improvement culture	75	48	48	75	75	75	75	75	75

Table 7.7: Revised Indices of Critical Success Factors and Business Excellence for U.K. Institutions.

Critical Success factor and business excellence	Upper limit	Original index BE = 64	Target business excellence index 65	70	75	80	85	90 (4.2)	95 (9.2)
Leadership	75	67	67	67	67	75	75	75	75
Delight the Customer	75	69	69	69	75	75	75	75	75
Customer focus	75	61	64	75	75	75	75	75	75
Management by fact	75	59	59	59	64	75	75	75	75
Process performance	75	66	66	69	75	75	75	75	75
People-based management	75	62	62	62	62	62	75	75	75
People performance	75	65	65	65	65	65	75	75	75
Continuous improvement	75	67	67	67	67	67	67	75	75
Improvement culture	75	65	65	65	65	65	75	75	75

Table 7.8: Revised Indices of Critical Success Factors and Business Excellence for Malaysian Institutions.

Several findings can be made based on the result:

- The above result has been achieved entirely from current performance of the groups of institutions. If the groups' business excellence indices were originally larger, say 75% or more, their critical success factor indices would have been larger as well and the magnitude of improvements required would have been smaller.

- With the excellence seeker's approach, the critical success factor with the largest unit contribution is improved first, followed by a factor with the next largest unit contribution, and so on. The result suggests that, under present leadership conditions, the institutions can develop short, medium, and long-term plans that specify which

critical success factors needed improvements, over a range of target business excellence indices of 65 to 70% for U.S. institutions, 65 to 90% for U.K, and 65 to 75% for Malaysian institutions. Beyond these levels, a change in the present state of leadership is necessary. However, in reality, the role of leadership is a requisite for instituting changes in key areas of organisations. Thus, it would be difficult to increase business excellence without leadership involvement.

- Target business excellence levels below 90% for U.S. and U.K. institutions (95% for Malaysia) could be achieved without the need to improve all critical success factors to their pre-determined upper limits.

- Business excellence is underachieved by 4.2% at 90% target level for Malaysian institutions (Table 7.8). At 95% target level, business excellence is underachieved by 0.42% for combined institutions, 2.3% for U.K. institutions, and 9.2% for Malaysian institutions. The underachievement indicate that business excellence has fallen short of their target values although all critical success factors have reached their predetermined upper limits, i.e., 75%. In order to reach the target levels, the critical success factor upper limits have to be fixed at higher levels.

Based on the information in Table 7.1 to Table 7.4, it is possible to narrow down the improvement process to specific activities. However a target level of business excellence has to be chosen that will specify which critical success factors require improvements. Assuming that a business excellence level of 75% was chosen, then the critical success factors to be increased for combined institutions are

- management by fact;
- process performance;
- people performance; and
- improvement culture.

The subsequent analysis would be to examine the item mean scores of these critical success factors given in Table 6.8. Here, the aim is to increase the mean scores further to achieve target indices for corresponding critical success factors. The new mean scores are determined by using the goal seek macro in EXCEL that applies the business excellence index formula. Table 7.9 gives the results of improving management by fact, process performance, people performance, and improvement culture, respectively for combined institutions to achieve a business excellence target level of 75%. Similarly, improvement results for U.S., U.K., and Malaysian institutions are summarised in Table 7.10.

Management by fact	Old mean	New mean
Performance measurement	5.90	6.29
Use of measurement information for product improvement	5.79	6.07
Service improvement	5.99	7.11
Process performance		
Quality process design	5.90	6.06
Process assessment	5.92	6.14
Student admission process	7.48	7.65
Student learning outcome	7.08	7.22
Staff maintenance process	6.24	6.50
People performance		
Cross-function teamwork	6.45	6.45
Managerial training	5.82	5.82
Training resources	5.91	5.91
Institutional pride	6.39	6.39
Improvement culture		
Employee suggestion	5.32	5.86
Improvement of services to drive out failure	6.10	6.95
Problem-free process design	5.83	6.4

Table 7.9: New Mean Scores that Coincide with Business Excellence of 75% for Combined Institutions.

Item	U.S.		U.K.		Malaysia	
Leadership:						
Top management involvement	6.10	6.49				
Institution's goal definition	6.10	6.28				
Institution's quality goal	5.90	6.36				
People management	5.30	5.60				
People-based management:						
Performance feedback	5.50	7.07				
Employee involvement in quality	5.70	7.80				
People performance:	6.70	7.06				
Individual group teamwork						
Employee training	6.10	7.34				
Quality improvement barriers	5.30	6.05				
Employee interaction			6.00	6.56		
Cross-function teamwork			5.90	7.55		
Training resources			6.50	7.72		
Institutional pride			6.30	7.06		
Management by fact:						
Measurement information			6.20	7.03		
Use of measurement information for service improvement			5.90	6.34		
Measurement information					6.00	6.39
Use of measurement information for service improvement					6.80	7.03
Process performance:						
Quality process design			6.10	6.17		
Student admission process			8.00	8.11		
Staff maintenance process			6.10	6.12		
Use of performance indicators			6.30	6.36		
Process assessment					6.50	6.86
Student admission process					7.40	7.70
Student learning outcome					7.50	7.76
Staff maintenance process					6.90	7.11
Improvement culture:						
Employee suggestion			5.05	6.92		
Problem-free process design			5.29	7.50		
Delight the customer:						
Customer requirements					7.40	7.63
Customer loyalty					7.20	7.92
Customer services					7.20	7.43
Customer focus:						
Handling customer complaints					7.10	7.64
Customer perceived valued					6.40	8.17
Task co-ordination					6.30	6.82
Employee job requirements					6.70	7.18

Table 7.10: Improvement to Means for U.S., U.K., and Malaysian Institutions.
o= Old mean; n New mean

Leadership as a Requisite

Up to this point, the proposed solution for improving the organisation's business excellence was obtained entirely from the analytical procedure, i.e., excellence seeker's approach, without any intervention from the model user. The result is optimal insofar as the business excellence target levels are concerned. However, as discovered earlier, the present leadership indices for all data sets remained unchanged over a wide range of target levels of , i.e., 65 to 85%, 65 to 70%, 65 to 90%, and 65 to 75% for combined institutions,

U.S., U.K., and Malaysian institutions respectively. The indices at the higher ends of those ranges represent significantly high target levels for the institutions. Only at 90, 75, 95, and 80% target levels and higher did it became necessary for increasing the index value of leadership. However, it is believed that, any substantial change in key organisational areas and business excellence requires a change in the functioning of leadership. Therefore, leadership should be improved to a reasonable level in order to achieve a more desirable solution.

Table 7.11 gives the result of using the excellence seeker's approach to improve critical success factors with a fixed leadership level of 75% over a range of business excellence target levels of 65% to 95% for combined institutions. It can be seen in the table that by improving leadership, a better solution for improvement is obtained than if leadership were simply allowed to take up any value up to 75% (Table 7.5). For example, there are three factors other than leadership that required improvement in Table 7.11 at business excellence target level of 75% compared to four factors in Table 7.5. In this solution, people performance is increased to 73%, and management by fact and process performance are increased to their upper limits. In the previous solution, there were three factors that required maximum improvements: management by fact, process performance, and people performance. Another factor, improvement culture, was increased to 64%.

For a target level of 75%, four factors needed to be improved, including leadership. They are

- leadership;
- management by fact;
- process performance; and
- people performance;

It is not necessary to improve improvement culture as in the previous solution. The excellence seeker's approach is used to determine new item mean scores for leadership and people performance that correspond to leadership index value of 75% (Table 7.12). The new item mean scores for management by fact and process performance are the same as in the

Critical Success factor and business excellence	Upper limit	Original index BE = 64	Target business excellence index 65	70	75	80	85	90	95 (1.0)
1. Leadership	75	75	75	75	75	75	75	75	75
2. Delight the Customer	75	64	64	64	64	64	64	64	75
3. Customer focus	75	59	59	59	59	59	70	75	75
4. Management by fact	75	55	55	75	75	75	75	75	75
5. Process performance	75	61	73	75	75	75	75	75	75
6. People-based management	75	55	55	55	55	55	75	75	75
7. People performance	75	56	56	56	73	75	75	75	75
8. Continuous improvement	75	58	58	58	58	58	58	65	75
9. Improvement culture	75	53	53	53	53	73	75	75	75

Table 7.11: Revised Indices of Critical Success Factors and Business Excellence for Combined Institutions with Leadership Fixed at 75%.

Leadership	Old mean	New mean
Manager's involvement	6.78	7.81
Institution's goal definition	6.65	7.86
Institution's quality values	6.39	7.46
Everyday leadership	6.08	7.96
People performance		
Cross-function teamwork	6.45	7.73
Managerial training	5.82	7.35
Training resources	5.91	7.59
Institutional pride	6.39	7.20

Table 7.12: New Mean Scores Associated with Leadership that is Fixed at 75% for Combined Institutions.

previous solution because in both cases the indices of these factors are equal to their upper limits.

Similarly, the new factor index values for U.S. U.K., and Malaysian institutions over the same business excellence target levels and their revised mean scores are given in Appendix F.

7.3 CONCLUSIONS

The Business Excellence model can be used as a self-assessment tool to evaluate the performance of an organisations key areas and business excellence. When current performance is known, it is possible to improve business excellence by improving an optimal mix of critical success factors.

The basis of determining this mix is by using unit contributions of critical success factors. Critical success factors are selected for improvements one at a time in order of their unit contributions from the highest to the lowest. However, increasing the level of activity of critical success factors may mean higher costs to an organisation due to the need to deploy additional resources such as time, human, material, and facility. Thus, a measure that incorporates the cost of increasing business excellence by one unit, called marginal contribution, will be more appropriate for use as a basis for bringing a critical success factor into solution.

The present analysis has made used of three groups of data representing three countries namely, U.S., U.K., and Malaysia. It is found that the measurement instrument used is reliable, and valid for all data groups. The model has a good fit with the data and estimation errors (residuals) are low for the three countries. A valuable extension to the analysis on group data is to apply the same technique on individual institutions.

Improvement in means of critical success factors designates improvement in activities associated with the factors. These activities correspond to manifest variables linked to latent variables of the Business Excellence structural model. The magnitude of increase in level of activities should be equivalent to the proportion increase in means of manifest variables.

There are differences in number and type of items in the measurement instruments of the three countries. The present result suggests that it is sufficient to improve a number of critical success factors and corresponding activities to achieve desired business excellence target levels. The result also suggests that more measurement items needed to be removed when sample size is smaller. Therefore, the model requires a large sample size to create a more comprehensive measurement instrument. Nevertheless, analysis of data of the three countries has verified the presence of nine critical success factors for measuring business excellence.

CHAPTER 8

CONCLUSIONS AND FUTURE WORK

8.1 CONCLUSIONS

The research was partly involved with determining the extent of TQM implementation in higher education institutions in three countries: United States, United Kingdom, and Malaysia. The research result indicates that TQM has been widely practised in the United States (70.9%), moderately in Malaysia (50%), but hardly in the United Kingdom (13.3%). This result is consistent with those reported in the literature (see Coate, 1993; Rubach, 1994, Bukhalter; 1996). The involvement in quality management (general managerial approach to quality improvement) is also strong among U.S. institutions (79.2%), moderate in Malaysia (49.2%) and weak in U.K. (29.4%). Thus, the need for quality improvement is more pronounced among U.S. institutions than the others. U.K. institutions are more concerned with the education standards set up by their education authorities with which they are obliged to comply if they were to receive future funding and approval of academic programmes. Quality management is being implemented by institutions of any age, size, and type of control, i.e., public or private. Quality management can be applied in many areas of an institution, including academic, research, instruction, consultation, and administration.

In any change initiative, including TQM, a leader is involved in introducing, nurturing, and maintaining new ways of carrying out organisational activities (Zelfanne, 1996). This is consistent with case studies at Fox Valley Technical College, Aston University, Oregon State University, Auburn University, and South Bank University. The descriptive study has shown that the role of leadership has been instrumental in introducing Quality management to the institutions (e.g. 44.6% in the U.S.) and making the decision to implement Quality management (in more than 70% in each country). The literature has also reported the direct contribution of leaders

toward the success of TQM implementations in the industrial sector such at Ford and Motorola (see De Carlo, 1991; Garvin, 1991). Dale (1996) says that leadership visible commitment to TQM is vital during launch and establishment phases of an improvement process such that if they are not, the whole process of improvement will crumble. The reason for this is that, TQM involves large budget allocation for training, and sanctioning of an organisational structure for Quality, and people who need the right facilities in doing their jobs. These provisions can only be legitimately authorised by a leader. The leader remains involved in the transformation process, by heading a quality council, which leads and supports the transformation for the entire organisation (Schultz & Vollum, 1992).

The research was also involved in determining the reasons why Quality management was being implemented in HEIs. This is to find out specific reasons for implementing quality management as well as more general ones and observe their relationships with the way Quality management was being implemented. Many individual TQM implementations in HEIs reported in the literature have been concerned with specific reasons such as a focus on improving student performance (Seymour, 1993; Anon, 1994), improving classroom learning and teaching process (Baugher, 1993), cost reduction (Miselis, Lozier & Teeter, 1991, cited in Lozier & Teeter, 1996), which can be summarised into administrative processes, academic processes, or both (see Coate, 1993; Tyler, 1993; Ord, 1993; DeCosmo, Parker & Heverly, 1991; Geddes, 1993, Burkhalter, 1996). Such confined intents and purposes correspond to rather limited and selective use of TQM methods such as customer-supplier chain (Geddes, 1993), problem-solving (Seymour, 1993), Ishikawa diagram (Zadelhoff, 1995), measurement (Lozier & Teeter, 1996), and quality teams (Anon, 1994; Burkhalter, 1996).

Institutions in the three countries surveyed exhibit a number of unique reasons for implementing TQM. U.S. institutions are much concerned with student needs, people aspect of management, and long-term effectiveness. In addition to student needs, U.K. HEIs are especially concerned with quality assurance of those areas (mostly academic) that are subjected to auditing

being imposed by the country's Higher Education Funding Councils. The areas are curriculum design; content and organisation; teaching learning and assessment; student progression and achievement; student support and guidance learning resources; and quality assurance and enhancement. In Malaysian institutions, the bulk of institutions are private companies, and therefore are greatly concerned about financial needs and the ability to stay in business.

Based on the well known accounts on TQM processes at Fox Valley Technical College (Spanbauer, 1993), South Bank University (Geddes, 1993), Delaware Community College (DeCosmo, 1989), Oregon State University (Coate, 1993), and Aston University (Clayton, 1995), institution-wide TQM processes have been found to exhibit a common theme, i.e., continuous improvement. The TQM's continuous improvement agenda has been acknowledged by many writers such as Deming (1986), Kanji and Asher (1993), Lozier & Teeter (1996), and Dale (1996).

Barriers to TQM include insufficient knowledge, complacency, lack of commitment, disbelief in its effectiveness, and resistance to change. Most barriers emanate from people rather than from the TQM process itself. Some of these barriers have been ranked very high in complexity such as staff were pressed with daily work and resistance to change. Deming (1982) has said that, although eighty-five percent of an organisation's problems come from the systems, another 15% come from the workers.

The result of the first survey showed that institutions demonstrating high quality management achieve good to excellent organisational performance. By the same token, there is a very small proportion of high quality institutions that exhibit fair to poor organisational performance. In the U.K., there is larger proportion of old universities that has high quality performance compared to new universities.

The research investigated how well the Pyramid Model compared with essential elements of TQM already established by previous researchers. Here,

only the prime and core concepts were included in the survey due to the following reasons ;

- To reduce the number of questionnaire items subjected to respondents;
- The model's principles directly operate on core concepts. Thus, it was adequate to examine only core concepts which reflect the characteristics of principles themselves.

The prime is represented by leadership, and core concepts are given by continuous improvement, prevention, measurement of resources, process improvement, internal customer satisfaction, external customer satisfaction, people management, and teamwork. It was found that the prime and core concepts of the Pyramid Model compare very well with the critical success factors of TQM established by Saraph, Schroeder and Benson (1989) and Black and Porter (1996) based on their empirical research works conducted in the U.S. and U.K., respectively. The prime and core concepts are also consistent with the philosophy and system dimensions of TQM provided by Kanji, Morris and Haigh (1992) and ideas on TQM proposed by major Quality contributors. Consequently, the prime and core concepts were included in a first-stage survey of the research to determine their relative importance to sampled HEIs.

It is evident from the first survey that Quality Directors of higher education institutions in U.S., U.K., and Malaysia believe that the prime and eight core concepts of the Pyramid Model represent a comprehensive group of critical success factors of higher education institutions. These factors have been ranked according to their relative order of importance and the survey result shows that the three countries differ in ranking of those factors. One main difference is the ranking of leadership, which on average is the most important factor in U.S. and Malaysian higher education institutions but is ranked second in the United Kingdom after continuous improvement. Thus, leadership is not considered a prime in U.K. institutions. The attention to continuous improvement as part of a TQM process has been acknowledged

by many authors as discussed earlier, however, the impact of leadership on every aspect of the process is vital for its continuity, success, and failure (Lozier & Teeter, 1996; Harrington (1999); Zeffane, 1996; Dale & Cooper, 1994; Hammer, 1995; Dale, 1996)

An extension to the first survey was to determine conceptual relationships among the components of the Pyramid Model. The Business Excellence Model has been introduced for this purpose (see Figure 2.3). However, the full Business Excellence Model was condensed by combining pairs of its core concepts resulting in each principle operating on only one core concept (see Figure 6.1). This has made the model less complicated because it contained fewer variables and relationships after the transformation.

The symmetrical relationships in the model were analysed for their theoretical rationale before being subjected to an empirical test and substantively validated. A comparison of the model's structure with perceptions of major Quality and management writers concerning relationships among Quality-related factors shows that the model has a good theoretical rationale. Relationships that are made up of only the model's principles or core concepts were also studied but were not found to be supported by research work or ideas reported in the literature. Direct linking of constructs to other constructs that bypass intervening variables were not examined because intervening variables were believed to further explain all symmetrical relationships in the model. Following this, the research proceeded with a second-stage data collection for testing and validating the model.

A measurement instrument has been developed for the model where each construct were operationalised by a group of manifest variables that correspond to ten-point multi-item measurement scales. This was performed because it was understood that the constructs cannot be directly observed. The mean scores of measurement scales provide the empirical content of the constructs being measured. The design of the measurement instrument represents an important aspect of the research because it involves a synthesis of general TQM concepts with essential elements of higher education system.

By applying appropriate statistical techniques it was shown that the measurement scales were reliable and valid (see Table 6.5).

The data have been analysed by country and overall. By design, an iterative procedure has been used to select only those items that are common and relevant to the higher education institutions in each sample. However, in the process, this procedure may have deleted certain items that are relevant to the institution groups. It was found that the three countries vary in terms of questionnaire items included in their measurement instruments. The number of questions is largest for combined institutions (42 items), followed by U.S. institutions (30 items), Malaysian institutions (34 items), and U.K. institutions (26 items). It is found that the number of questions corresponds with sample size --- the larger the sample size (combined = 90; U.S. =35; U.K. = 20; Malaysia = 35), the larger is the number of questions. Other factors that can affect the number of questions are diffused respondent scores (widely distributed scores for any item may render it irrelevant); respondent-related factors (e.g. background and experience); and institution-related factors (e.g. size and type of control). Thus, in addition to the need for a large sample size, an appropriate adaptation of the measurement instrument is necessary by appropriately rewording and augmenting items to make them more germane to the context in which the instrument is to be used.

From the list of initial measurement items used in the survey (Table 6.1), it can be observed that only four out of the fifty-nine items were specifically related to higher education institutions, they are

- y28 student admission process;
- y29 student learning process;
- y58 effectiveness of student admission process;
- y59 student learning outcome.

Other items constitute important issues applicable not only to higher education institutions but other organisations as well. The word "institution" used in items

that are not HEI-specific can be replaced with a general term such as "organisation" or a term that is appropriate to the context being studied.

The analysis of the Business Excellence Model using Herman Wold's (1980) Partial Least Squares Method provided a measure of strength of causal connections (inner coefficients) between the model's constructs (critical success factors). The values of inner coefficients are found to be positive non-zero, which provided support for causal connections among critical success factors and business excellence. The inner coefficients have been used as a basis for computing unit contributions of critical success factors toward business excellence. The order of importance of critical success factors from highest to lowest corresponds to the value of unit contributions from largest to the smallest (see Table 7.1 to Table 7.4). The order for combined institutions is as follows

- process performance;
- management by fact;
- people performance;
- improvement culture;
- people-based management;
- customer focus;
- continuous improvement;
- leadership;
- delight the customer;

Critical success factor and business excellence indices were computed by using a function that takes into account the strength of causal connections of manifest variables to their corresponding constructs (outer coefficients) and mean scores of manifest variables. Indices representing performance measures of institution groups can be used to make inter-group comparisons and compare past and present performance. A minimum index value of 75% has been arbitrarily chosen as a cut-off point such that, values exceeding the cut-off are associated with excellent critical success factors or business excellence. The business excellence indices for the three institution groups

are all below excellent cut-off, i.e., 60% for U.S., U.K. = 63%, and Malaysia = 64%, which means that on average the HEI groups do not exhibit excellent Quality performance. It is possible to apply the empirical research method to evaluate the business excellence of individual institutions by collecting sufficient data from representative samples of managers of the institutions.

Next, the research was concerned with determining the influence of each critical success factor on business excellence. For this purpose, the unit contribution measure was used. A unit contribution represents the corresponding increase in business excellence index when a factor index is increased by one unit, while keeping other factors constant. By making use of unit contributions Table (7.1 to Table 7.4), it was possible to develop an improvement scheme for critical success factors and business excellence. The improvement scheme makes use of an algorithm, goal seeker's approach, that determines which critical success factor to select for improvement and how much should its index be increased in order to achieve a given business excellence target level (business excellence index).

The survey result has shown that, for each sample, indices of an optimal mix of critical success factors have to be increased to some degree to achieve a desired business excellence target level. Factors are selected for improvement one at a time according to their unit contributions from largest to smallest until the desired business excellence target level is reached. The final critical success factor mix may not necessarily contain all critical success factors, including leadership. However, in every sample, when the leadership index was fixed to a higher value (a value of 75% was used in the research), the business excellence target level was obtained more quickly then if leadership was allowed to take any value. Additionally, the final mix consisted of a smaller number of critical success factors (see tables 7.5 to 7.8, tables 7.11 and 7.12, and Appendix F, tables 1, 3, and 5).

In Chapter 7, it has been shown that the improvements to indices can be translated to improvements in means of manifest variables, which in turn can be translated to improvements in actual activities associated with those

variables. The equivalent increase in a manifest variable for an increase in factor index can be directly computed by working through the business excellence index formula. For ease of computation, this procedure had been performed with the computer using "goalseek" macro in EXCEL (Table 7.9, Table 7.10, 7.12,and Appendix F, Tables 2, 4, and 6).

The Business Excellence Model has also been validated to show whether it has a good fit with the data. This was done using the EQS software by Bentler (1985) that performed the χ^2-goodness-of-fit test and compute fit indices to indicate model validity. It was found that the probabilities associated with χ^2 statistics for all samples are greater than 0.01 (range = 0.02 to 0.65), which indicate that the model has a good fit with the data (Table 6.12). The values of Normed Fit Index, NFI, and Comparative fit index, CFI, are above 0.9, which mean that the model fits the data well. EQS also gives values of residuals and their plots for each sample. The residuals are found to be very small (from 0.0027 to 0.0430) and their plots (not given) are centred to zero indicating that the model is accurate.

As indicated earlier, it can be concluded that the Business Excellence Model has several notable strengths --- simple; systematic; generic; robust; analytical; objective; critical and logical; and predictive.

8.2 FUTURE WORK

The present research has focused on the application of the Business Excellence Model to compare groups of higher education institutions from various countries against a common Business Excellence Index. Future research should include the model's application to individual institutions, which will entail data collection from managers at various levels of the institutions. Comparisons can be made on the performance of individual institutions, on today's performance and the past, as well as on performance of divisions of the same institution.

Because the Business Excellence Model is generic, it can be applied to various situations: a single organisation, a group of organisation with the same

business activity, a group of different organisations. However, in the present research, the model has been tested with higher education data only. Although the present instrument can be used directly on a single higher education institution, it cannot be applied in its present form to other organisations because it contains only four items peculiar to higher education institutions. In order to accommodate other organisations (including a single organisations), the measurement instrument has to be redesigned where the four items are removed and other items reworded and added as required. Then the instrument is tested for reliability and the model is tested and validated with relevant data. Groups of different kinds of organisations can be categorised according to their core organisational activities such as service and manufacturing or other suitable categories such as education, transportation, retailing, public service, finance, telecommunication, information management, and others. For a single organisation, key issues associated to it has to be included in the initial instrument prior to analysis.

It is possible to use the model to accommodate various levels of application --- entire organisation, divisions, departments, and other formal groups at different levels of the same organisation. Hence, a future research should focus on the possibility of the model's multi-level applicability.

In the present research, the business excellence index has incorporated a qualitative measure of financial performance (an item that measures business excellence latent variable) that was found to be relevant for higher education institutions. However, because the bottom line for every business organisation is to make profit, it is important to establish the link between standard financial performance measures to target business excellence target level. Future research should establish that link, which can be used by managers to translate standard financial values to business excellence target levels.

In the present research, the improvement to critical success factors have been translated to improvement in manifest variable mean scores, which in turn can be translated to changes in specific organisational activities.

However, the link between mean scores and actual organisational activities have not been examined in the research. This information is important to every decision maker to develop an effective transformation process for the organisation. A further research concerning this will involve case studies of the model's detailed applications in various organisations.

Uncontrollable outside factors can affect the behaviour of relationships specified in the model. Although an organisation can monitor outside influences by making sure that it has a system for measuring the performance of critical success factors, however the effectiveness of this system is critical in determining the success of the Business Excellence Model. This is because, if the model is fed with the wrong information, it will produce index values that will not portray actual performance. Any improvement scheme that is developed based on these values will be erroneous. A future research should examine the sensitivity of Business Excellence Model to changes in values of external factors and how the model can be modified to accommodate them.

Bibliography

1. Aaker, D. A., Kumar, V. & Day, G. S. (1995) *Marketing Research*, 7th edn, John Wiley & Sons, Inc., New York.
2. Acutt, B.W. (1993) 'The use of metacriteria in the implementation of a quality assurance programme in Australian universities: the new universities', in *Quality and its Applications*, ed J. F. Chan, Penshaw Press, Sunderland.
3. Anon (1994) 'Learning communities: putting the student first, *TQM in Higher Education*, Vol. 3, pp.1-2.
4. ANSI/ISO/ASQC (1994) *Standards Specification*, no. 8402, U.S. American Standards Institute, New York.
5. Anthony, N. R. & Dearden, J. (1980) *Management Control Systems Text and Cases*, Irwin, Homewood, Illinois.
6. Anthony, N. R., & Dearden, J. (1976) *Management Control Systems Text and Cases*, Irwin, Homewood, Illinois.
7. Anthony, R. N., Dearden, J. & Vancil, R. F. (1972) *Key Economic Variables, in Management Control Systems*, Irwin, Homewood, Illinois.
8. Ashworth, A. & Harvey, R.C. (1994) *Assessing Quality in Higher Education,* J.Kingsley, London.
9. Astin, A. W. (1982) 'Why not try some new ways of measuring quality?', *Educational Record*, Vol. 63, No. 2, pp. 10-15.
10. Astin, A.W. (1986) *Measuring the quality of undergraduate education: are traditional approaches adequate?* Unpublished presentation notes to the Texas educational system, 1986, p. 56 (available upon request from C.Schmitz). mimeo.
11. Atuahene-Gima, K. (1996) 'Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia', *Journal of Product Innovation Management*, Vol. 13, pp. 35-52.
12. Bass, B. M. (1985) 'Leadership: good, better, best', *Organisational Dynamics*, Vol. 13, No. 3, pp. 26-40.
13. Baty, P. (1998) 'Quality assurance: a new approach', *Times Higher Education Supplement*, 1 Oct.

14. Baugher, K.H. (1991) 'LEARN: the student quality team process for improving teaching and learning', in *Continuous Quality Improvement: Making the Transition to Education*, ed D.L. Hubbard, Prescott Publishing Co., Maryville, MO.
15. Bendel, T., Kelly, J., Merry, T. & Sims, F. (1993) *Quality: Measuring & Monitoring*, Century Business, London.
16. Bentler, P. M. (1988) 'Comparative fit indexes in structural models', *Psychological Bulettin* (1990), Vol. 107, pp. 238-246.
17. Bentler, P. M. (1995) *EQS Structural Equations Program Manual*, Multivariate Software, Inc. Encino, CA.
18. Bentler, P. M., & Wu, E. C. J. (1995) *EQS for Windows 5.1*, Multivariate Software, Inc. Encino, CA.
19. Bergendahl, S. & Wachtmeister, A. (1993) 'Creating an index', *Managing Service Quality*, May, pp. 19-22.
20. Berkley, G. E. (1971) *The Administrative Revolution*, Prentice Hall, Englewood Cliffs, N.J.
21. Black, S. A., & Porter, L. J. (1996) 'Identification of the critical success factors of TQM', *Decision Sciences*, Vol. 27, pp. 1-21.
22. Blake , R. R. & Mouton, J. S. (1985) *The New Managerial Grid III*, Gulf Publishing, Houston.
23. Boaden, R. J., & Dale, B. D. (1994) 'A generic framework for managing quality improvement: theory and practice', *Quality Management Journal*, July, pp. 11-24.
24. Bohrnstedt, G. W. (1970) 'Reliability and validity assessment in attitude measurement', in *Attitude Measurement*, ed Gene F. Summers, Rand McNally & Company, Chicago.
25. Bolton, A. (1995) 'A rose by any other name: TQM in higher education', *Quality Assurance in Education*, Vol. 3, No. 2, pp. 13-18.
26. Borbely, J. (1981) 'The critical success factors method: its application in a special library environment', *Special Libraries*, Vol. 72, No. 3, pp. 201-208.
27. Boynton, A. C., & Zmud, R.W. (1984) 'An assesment of critical success factors', *Sloan Management Review*, Summer, pp. 17-27.
28. Brough, R. K. (1992) 'Total quality management in state government: the eight rules for producing results', *Journal of State Government*, pp. 4-8.

29. BS 4778 (1991), *Quality Vocabulary, Quality Concepts and Related Definitions*, Part 2, British Standards Institution, London.
30. Burello, L.C. & Zadnik, D.J. (1986) 'Critical success factors of special education administrators', *Journal of Special Education*, Vol. 29, No. 3, pp.367-377.
31. Burkhalter, B.B. (1996) 'How can institutions of higher education achieve quality within the new economy?', *Total Quality Management*, Vol. 7, No.2, pp.153-160.
32. Byrne, B. M. (1994) *Structural Equation Modelling with EQS and EQS/Windows: Basic Concepts, Applications, and Programming*, SAGE Publications Ltd., London.
33. Camp, R. C. (1993) 'A bible for benchmarking, by Xerox', *Financial Executive*, July-April.
34. Campbell., D. T., & Fiske, D. W. (1959) 'Convergent and discriminant validation by the multivariate-multimethod matrix', *Psychological Bulettin*, Vol. 56, pp. 91-98.
35. Caruana, A., Pitt, L. (1997) 'INTQUAL - an internal measure of service quality and the link between service quality and business performance', *European Journal of Marketing*, Vol. 31, No. 8, pp. 604-616.
36. Chadwick, L. (1991) *The Essence of Management Accounting*, Prentice Hall, Hemel Hempstead.
37. Chernay, G. (1990) *Accreditation and the role of the Council on Postsecondary Accreditation*, Council on Post Secondary Accreditation Washington DC. Available: ERIC Document: ED 317148).
38. Clark, A.T. (1991) 'From the top down: a system approach', in *Proceedings of the Second Annual Symposium on the Role of Academia in National Competitiveness and Total Quality Management*, ed W.J. Petak, Los Angeles, California.
39. Clayton, M. (1995) 'Encouraging the *kaizen* approach to quality in a university', *Total Quality Management*, Vol. 6, No. 5&6, pp. 593-601.
40. Clemmer, J. (1990) *Firing on All Cylinders*, Judy Piatkus Publishers Ltd., London.
41. Coate, L. E. (1990) *Implementing Total Quality Management in A University Setting*, Oregon, Oregon State University.

42. Coate, L. E. (1993) 'The introduction of total quality management at Oregon State University', *Higher Education*, Vol. 25, No. 3, pp. 303-320.
43. Cooper, R. (1988) 'The rise of activity based costing', Parts 1- 4 in *The Journal of Cost Management,* Summer 1998, pp. 45-54, Fall 1988, Winter 1989, pp. 34-46, Spring 1989, pp 34-46.
44. Cooper, R. G. & Kleinschmidt, E.J (1995) 'Benchmarking the firm's critical success factors in new product development', *Journal of Product Innovation Management*, Vol. 12, pp. 374-391.
45. Cronbach, L. J. (1951) 'Coefficient alpha and internal structure of tests', *Psychometrika*, Vol. 16, September, pp. 297-334.
46. Crosby, P. (1979) *Quality is Free: The Art of Making Quality Certain*, Penguin Books, New York.
47. Dahlgaard, J. J., Kristensen, K. & Kanji, G.K. (1995) 'Total quality management and education', *Total Quality Management*, Vol. 6, No. 5&6, pp.445-455.
48. Dahlgaard, J. J., Kristensen, K.. & Kanji, G. K. (1998) *Fundamentals of Total Quality Management*, Chapman & Hall, London.
49. Dale, B. G. (1996) 'Sustaining a process of continuous improvement: definition and key factors', *The TQM Magazine* [Electronic}, Vol. 8, No. 2, pp. 45-51, February 2, pp. 49-51, Available: MCB University Press Limited ISSN 0954-478X [2000, February 2].
50. Dale, B. G. and Cooper, C. L. (1994) 'Introducing TQM: the role of senior management', *Management Decisions* [Electronic], Vol. 32, No. 1, pp. 20-26, Available: MCB University Press Limited 0025-1747 [2000, February 2].
51. Dale, B. G., Boeden, R. J., Wilcox, M. and McQuater, R. E. (1997) 'Sustaining total quality management what are the key issues?', *The TQM Magazine*, Vol. 9, Vol 5, pp. 372-380.
52. Daniel, D. R. (1961) 'Management information crisis', *Harvard Business Review*, Vol. 39, No. 5, pp.111-121.
53. Davis, D. & Cosenza, R. M. (1985) *Business Research for Decision Making*, PWS-KENT Publishing Company, Boston, Massachusetts.
54. DeCarlo, T. (1991), 'The gospel according to Deming, *San Francisco Chronicle*', January 6, p. 6.

55. DeCosmo, R. D., Parker, J. S.& Heverly, M. A. (1991) 'Total Quality Management Goes to Community College', in 'Total Quality Management in Higher Education', eds L. A. Sherr & D. J. Teeter, *New Directions for Institutional Research*, Vol. 71, Fall.

56. Deming, W. E. (1982) *Quality, Productivity and Competitive Position*, MIT Center for Advanced Engineering Study, Mass.

57. Deming, W. E. (1986) *Out of The Crisis*, Cambridge University Press, MIT, Mass.

58. Dervisiotis, K. N. (1995) 'The objectives matrix as a facilitating framework for quality assessment and improvement in education', *Total Quality Management*, Vol. 6, No. 5&6, pp. 563-570.

59. Dess, G. (1987) 'Consensus on strategy formulation and organisational performance: competitors in fragmented industry', *Strategic management Journal*, Vol. 8, No. 3, pp. 259-277.

60. Dixon, J. R., Nanni, A. J.and Vollmann, T. E. (1990) *The New Performance Challenge: Measuring Operations for World-Class Competition*, Business One Irwin, Homewood, Illinois.

61. Dobyns, L. & Crawford-Mason (1991) *Quality or Else: The Revolution in World Business*, Houghton Mifflin, Boston.

62. Doherty, G. D. (1993) 'Towards total quality management in higher education: a case study of the University of Wolverhampton', *Higher Education*, Vol. 25, No. 3, pp. 321-339.

63. Doherty, G. D. (1994) 'The concern for quality', in *Developing Quality Systems in Education*, ed G.D. Doherty, Routledge, London.

64. Donelly Jr., J. H., Gibson, J. L. & Ivancevich, J. M. (1995) *Fundamentals of Management*, 9th edn, Irwin, Chicago.

65. Drucker, P. F. (1964) *Managing for Results*, Harper Row, New York.

66. Eccles, R. G. (1991) 'The performance measurement manifesto', *Harvard Business Review*, January-February, pp. 131-137.

67. Eisman, R. (1992) 'Why companies are turning to total quality', *Incentive*, Part 2, Vol. 166, No. 5, pp. 22-26.

68. Elzinga, J., Horak, T, Lee, Chung-Yee & Bruner, C. (1995) 'Business process management: Survey and methodology', *IEEE Transactions on Engineering Management*, Vol. 42, No.2, pp.119-128.

69. European Foundation for Quality Management (1999), *The EFQM Excellence Model: Public Sector*, EFQM, Brussels.
70. Feigenbaum, A. V. (1983) *Total Quality Control*, McGraw-Hill, London.
71. Feigenbaum, A. V. (1991) 'Total Quality Control', 3rd edn, McGraw-Hill, New York.
72. Ferguson, C. R., Dickinson, R. (1982) 'Critical success factors for directors for the eighties', *Business Horizons*, May-June, pp.14-18.
73. Finn , M. & Porter, L. J. (1994) 'TQM self-assessment in the U.K'., *The TQM Magazine*, Vol. 6, No. 4, pp. 56-61.
74. Fornell, C. (1994) 'A national customer satisfaction barometer: the Swedish experience', *Journal of Marketing*, Vol. 56, January, pp. 6-21.
75. Fulop, L. & Rosier, G. (1993) 'Total quality management in universities irresistible force meets immovable object?', in *Quality and its Applications*, ed J. F. L. Chan, Penshaw Press, Sunderland, pp. 289-296.
76. Garvin, D. A. (1988) *Managing Quality: the Strategic and Competitive Edge*, The Free Press, New York.
77. Garvin, D. A. (1991) 'How the Baldridge Really Works", *Harvard Business Review*, November-December.
78. Gass, G. L., Bentson, R. & McMakin, G. (1987) 'White collar productivity', *Management Accounting*, September, pp. 33-38.
79. Gates, E. D. (1991) 'The entering freshmen: key to quality in higher education', in *Proceedings of Second Annual Symposium on the Role of Academia in National Competitiveness and Total Quality Management*, ed W.J. Petak, Los Angeles, California.
80. Geanuracos, J. & Meiklejohn, I. (1993) *Performance Measurement: The New Agenda*, Business Intelligence Ltd.
81. Geddes, T. (1993) 'The total quality initiative at South Bank University', *Higher Education*, Vol. 25, No. 3, pp. 341-361.
82. Gowan, Jr., J. A. & Mathieu, G. R. (1996) 'Critical factors in information system development for a flexible manufacturing system', *Computers in Industry*, Vol. 28, pp. 173-183.
83. Grady, M. W. (1991) 'Performance measurement implementing strategy', *Management Accounting*, June, pp. 49-53.

84. Graves, F. (1987) 'Measuring the quality of health care for decision support', *Quality Progress*, May, pp. 37-38.
85. Green, D. (1993) 'Quality assurance in Western Europe: Trends, practices and issues', *Quality Assurance in Education*, Vol. 1, No. 3, pp. 4-14.
86. Guskin, A. E. (1994) 'Reducing student costs and enhancing student learning', *Change*, Vol. 26, pp. 23-29.
87. Guynes, C. S. & Vanecek, M. T. (1996) 'Critical success factors in data management', *Information and Management*, Vol. 30, pp. 201-109.
88. Hackman, J. R. & Wageman, R. (1995) 'Total quality management: empirical, conceptual, and practical issues', *Administrative Science Quarterly*, Vol. 40, No. 2, pp. 309-342.
89. Hammer, M. (1995), Beating the risks of reengineering, *fortune*, Vol. 131, No. 9, May 15, pp. 105-109.
90. Hardaker, M. & Ward, B. K. (1987) 'Getting things done: how to make a team work', *Harvard Business Review*, November-December, pp. 112-119.
91. Harrington, A. J. (1999) 'New roles of a manager in the twenty-first century', in ' the best on quality: targets, improvements, systems', ed M. N. Sinha, *International Academy for Quality*, Vol 10, IAQ Book Series, Milwaukee, Wisconsin.
92. Harrison, M. J. (1994) 'Quality issues in higher education: a post-modern phenomenon?', in *Developing Quality Systems in Education*, ed G. D. Doherty, Routledge, London.
93. Harvey, L., Burrows, A. & Green, D. (1992) *Criteria for Quality*, The University of Central England, Birmingham.
94. HEFCE (1997) *Report in Quality Assessment 1995-1996*, HEFCE, January, London.
95. HEQC (1997) *Quality Assurance and Enhancement Network Directory for 1997-98,* London,
96. Ho, S. K. & Wearn, K. (1996) 'A TQM model for enabling student learning', *Innovations in Training and Education International*, Vol. 33, No. 3, pp. 178-184.
97. Hofer, W.C. & Schendel, D.E. (1978) *Strategy Formulation Analytical Concepts*, West Publishing Company, St. Paul, Minn.

98. Hogan,T. J. (1992) *The Applicability of the Malcolm Baldridge National Quality Award Criteria to the Evaluation of Quality in Collegiate Administration Services*, Ph.D. Dissertation, College of Education, Athens, Ohio University.

99. Holloway, J. (1994) 'Is there a place for total quality management in higher education?', in *Developing Quality Systems in Education*, ed G. D. Doherty, Routledge, London.

100. Horine, J. E., Hailey, W. A. & Rubach, L. (1993) 'Shaping America's future', *Quality Progress*, Vol. 26, 10, pp.41-51.

101. House, R. J. (1976) 'A 1976 theory of charismatic leadership', in *Leadership: The Cutting Edge*, eds James G. Hunt 7 Lars L. Larson, University Press, Carbondale, Southern Illinois.

102. Howell, R. A. & Soucy, S. R. (1987a) 'Cost accounting in the new manufacturing environment', *Management Accounting*, August, pp. 42-48.

103. Howell, R. A. & Soucy, S. R. (1987b) 'Operating controls in the new manufacturing environment', *Management Accounting*, October, pp. 25-31.

104. Howell, R. A. & Soucy, S. R. (1988), 'Management reporting in the new manufacturing environment', *Management Accounting,* February, pp. 22-29.

105. Hroned, S. M. (1993) *Vital Signs: Using Quality, Time, & Cost Performance Measurements to Chart Your Company's Future*, Amacom, New York.

106. Idrus, N. (1995) 'Empowerment as a manifestation: a study in three countries', *Total Quality Management*, Vol. 6, No. 5&6, pp. 603-612.

107. Imai, M. (1986) *Kaizen -- The Key to Japan's Competitive Success*, The Kaizen Institute Ltd., London.

108. Ishikawa, K. (1984) *Quality Control Circles at Work: Cases from Japan's Manufacturing and Service Sectors*, Asian Productivity Organisation, Tokyo.

109. Ishikawa, K. (1985) *What is Total Quality Control? The Japanese Way*, Prentice Hall, Englewood Cliffs, N.J.

110.ISO (1993) *ISO 9004-4: Quality Management and Quality Systems Elements - Part 4: Guidelines for Quality improvement*, International Organization for Quality, Geneva.

111.ISO (1994) *ISO 9000: Quality Management and Quality Assurance Standards - Part 1: Guidelines for Selection and Use*, International Organization for Quality Geneva.

112.Jacobs, R. (1993) 'TQM: more than a dying fad?', *Fortune*, October 18, p. 68.

113.James, L. R. Mulaik, S. A. & Brett, J. M. (1982), *Causal Analysis Assumptions, Model, and Data,* Sage Publication, Beverly Hills.

114.Jenster, P. V. (1984) *Divisional Monitoring of Critical Success Factors During Strategy Implementation*, Ph.D. Dissertation, University of Pittsburgh.

115.Jenster, P. V. (1987) 'Using critical success factors in planning', *Long Range Planning*, Vol. 20, No. 4, pp.102-109.

116.Johnson, H. T.& Kaplan, R. S. (1987) *Relevance Lost: The Rise and Fall of Management Accounting*, Harvard Business School, Boston, Massachusetts.

117. Juran, J. M. & Gryna, F. M. (1988) *Juran's Quality Control Handbook,* 4th edn, McGraw-Hill, New York.

118.Juran, J. M. (1964) *Managerial Breakthrough*, McGraw-Hill, New York.

119.Juran, J. M. (1969) *Managerial Breakthrough: A New Concept of the Manager's Job*, McGraw-Hill, New York.

120.Juran, J. M. (1974) *Quality Control Handbook*, McGraw-Hill, New York.

121.Juran, J. M. (1986) 'The Quality Trilogy: A universal approach to managing for quality', *Quality Progress*, Vol. 19, No. 8, pp. 19-24.

122.Kanji, G. K . & Asher, M. (1993) *Total Quality Management Process: a Systematic Approach*, Productivity Press, Madras.

123.Kanji, G. K. & Tambi, A. M. A. (1999a) 'Total quality management in UK higher education institutions', *Total Quality Management*, Vol. 10, No. 1, pp. 129-153.

124.Kanji, G. K. & Tambi, A. M. A. (1999b) 'A comparative study of quality practices in higher education institutions in the US and Malaysia', *Total Quality Management*, Vol. 10, No. 3, pp. 357-371.

125.Kanji, G. K. & Tambi, A. M. A. (1999c) 'Quality systems in higher educational institutions, in 'The Best in Quality', *International Academy for Quality*, ed M. N. Sinha, Vol. 10, pp. 21-44.

126.Kanji, G. K. & Yui, H. (1997) 'Total quality culture', *Total Quality Management*, Vol. 8, No. 6, pp. 417-426.

127.Kanji, G. K. (1996) 'Implementation and pitfalls of total quality management', *Total Quality Management*, Vol. 7, No. 3, pp.331-343.

128.Kanji, G. K. (1996) 'Implementation and pitfalls of total quality management', *Total Quality Management*, Vol. 7, No. 3, pp. 331-343.

129.Kanji, G. K. (1998a) 'An innovative approach to make ISO 9000 standards more effective', *Total Quality Management*, Vol. 9, 1, pp. 67-78.

130.Kanji, G. K. (1998b) 'Measurement of business excellence', *Total Quality Management*, Vol. 9, No. 7, pp. 633-643.

131.Kanji, G. K., Morris, D. S. & Haigh, R. H. (1993) 'Philosophical and system dimensions of TQM: a further education case study', *Proceedings of The Advances in Quality Systems for TQM*, The Management College of National Jian Tong University, Taiwan.

132.Kaplan, R. S. & Norton, D. P. (1992) 'The balanced scorecard - measures that drives performance', *Harvard Business Review*, January-February, pp. 71-79.

133.Kaplan, R. S. (1984) 'The evolution of management accounting', *The Accounting Review*, Vol. LIX, No. 3, July, pp. 390-418.

134.Kells, H. R. (1988) *Self-Study Processes: A Guide for Postsecondary and Similar Service-Oriented Institutions and Programs*, Macmillan, New York.

135.Kells, H. R. (1995) 'Creating a culture of evaluation and self-regulation in higher education organisations', *Total Quality Management*, Vol. 6, No. 5&6, pp. 457-467.

136.Kenny, D. A. (1979) *Correlation and Causality*, New York, John Wiley.

137.Klaus, L. A. (1977) 'Quality Progress' 7th Quality Education Listing', *Quality Progress*, September, pp. 31-62.

138.Korpela, J.& Tuominen, M. (1996) 'Benchmarking logistics performance with an application of the analytic hierarchy process', *IEEE Transactions of Engineering Management*, Vol. 43, No. 3, August, pp. 323-333.

139.Kossof, L. (1993) 'Total quality or total chaos?' *HR Magazine*, Vol. 38, No. 34, pp. 131-134.

140.Kotler, P. & Armstrong, G. (1996) *Principles of Marketing*, 7th edn, Prentice-Hall, Inc., Englewood, Cliffs, N.J..

141.Kotter, J. P.& Heskett, J. L. (1992) *Corporate Culture and Performance*, Free Press, New York.

142. Kristensen, K., Dahlgaard, J. J. & Kanji, G. K. (1992) 'On measurement of customer satisfaction', *Total Quality Management*, Vol. 3, No. 2, pp. 123-128.

143.Kristensen, K., Matrensen, A. & Gronholdt, L. (1999) 'Measuring the impact of buying behaviour on customer satisfaction', *Total Quality Management*, Vol. 10, No. 4&5, pp. 602-614.

144.Langevin, R. L. (1977) *Quality Control in Service Industries*, American Management Association, New York.

145.Lawler III, E. E. (1994) 'Total quality management and employee involvement: are they compatible?' *Academy of Management Executive*, Vol. 8, pp. 68-78.

146.Lawrence, P. & Lorsch, J. (1967) *Organization and Environment*, Harvard Business School Press, Boston, MA.

147.Lee, S. M. (1993) *AB:QM: Allyn & Bacon Quantitative Methods 3.0*, Boston: Allyn and Bacon.

148.Leidecker, J. K. & Bruno, A. V. (1984) 'Identifying and using critical success factors', *Long Range Planning*, Vol. 17, No. 1, pp. 23-32.

149.Lengnick-Hall, M. L., Middleton, E. (1993) 'Employee involvement makes TQM work', *Personnel Journal*, October, p. 108.

150.Lowe, J. A. & McBean, G. M. (1989) 'Honesty without fear', in *Proceedings of the 43rd Annual congress of the American Society for Quality Control*, Toronto.

151.Lozier, G.G. & Teeter, D.J. (1996) 'Quality improvement pursuits in American higher education', *Total Quality Management*, Vol. 7, No. 2, pp.189-201.

152.Lynch, R. L. & Cross, K. F (1991) *Measure Up! Yardsticks for Continuous Improvement*, Blackwell Publishers, Cambridge, Massachusetts.

153.Marcus, L. R., Leaone, A. O. & Goldberg, E. D. (1983) *The Path to Excellence: Quality Assurance in Higher Education*, ASHE/ERIC Higher Education Research Report No. 1, Washington D.C.

154.Marshall, J. D. (1993) 'Quality control in New Zealand universities: accountability and autonomy', in *Quality and its Applications*, ed J. F. L. Chan, Penshaw Press, Sunderland, pp. 283-288.

155.Marx, M. H. (1965) 'The general nature of theory construction', in ed Melvin Marx, *Theories in Contemporary Psychology*, Macmillan, New York.

156.McCamus, D. R. (1991) 'Performance & the quality voyage', *CMA Magazine*, Vol. 64, No. 10, pp. 8-12.

157. McDougall, B. (1991) 'The thinking man's assembly line', *Canadian Business*, November, pp. 40-41.

158.McGee, C. (1991) 'Total quality management in the university: creating a laboratory for learning about quality', in *Proceedings of Second Annual Symposium: Role of Academia in National Competitiveness and Total Quality Management*, ed W. J. Petak, Los Angeles, California.

159.McNair, C. J. & Leibfried, K. (1992) *Benchmarking: A Tool for Continuous Improvement*, Harper Business, New York.

160.Melan, E. H. (1998) 'Implementing TQM: a contingency approach to intervention & change', *International Journal of Quality Science*, Vol. 3, No. 2, pp. 126-146.

161.Miller, R. I. (1979) *The Assessment of College Performance*, Jossey-Bass, San Francisco.

162.Ministry of Education (1997) *Directory of Listed Private Higher Education Institutions In Malaysia*, Department of Private Higher Education, Kuala Lumpur, Malaysia.

163.Mintzberg, H. (1973) *The Nature of Managerial Work*, Prentice Hall, Englewood Cliffs, New Jersey,.

164.Miselis, K. L., Lozier, G. G. & Teeter, D. J. (1991) 'Strategic planning and total quality management: a new partnership', Paper presented at the annual meeting of the Society for College and University Planning, Seattle, WA, July.

165.Mukherji, S. P. (1993) 'Quality assurance in an education system', *Proceedings of EEC Seminar in Total Quality in Education*, Denmark.

Table 3: Number of Full Time Equivalent (FTE) Employees.

1 full-time empoyee = 1 FTE. 1 part-time employee = 1/2 FTE.

Class	Number of FTE employees					
	U.S. HEIs	%	**U.K. HEIs**	%	**M'sian HEIs**	%
Small (less then 500)	20	40.0	15	50.0	51	91.1
Medium (500-1000)	14	28.0	4	13.3	0	0.0
Large (more than 1000)	16	32.0	11	36.7	5	8.9
Number of respondents	50	100.0	30	100.0	56	100.0

Table 4: Number of FTE Students.

Most institutions in Malaysia and a large number of institutions in U.S. and U.K. are small in size.

Size of institution	Number of FTE students					
	U.S. HEIs	%	**U.K. HEIs**	%	**M'sian HEIs**	%
Small (less than 5000)	26	49.1	29	60.0	46	88.5
Medium (5000-10000)	10	18.9	6	12.5	1	1.9
Large (more than 10000)	17	32.1	13	27.1	5	9.6
Number of respondents	53	100.0	48	100.0	52	100.0

166.Murdick, R. (1969) *Business Research: Concepts and Practice*, International Textbook Company, Scranton.

167.Namboodiri, N. K., Carter, L. R., Blalock, H. M. (1975) *Applied Multivariate Analysis and Experimental Designs*, New York, McGraw-Hill.

168.National Institute of Standards and Technology (1991) *1991 Application Guidelines: Malcolm Baldridge National Quality Award*, Gaitherburg, MD: U.S.

169.Nelson, R. R. (1991) 'Educational needs as perceived by IS and end-user personnel: a survey of knowledge and skill requirements', *MIS Quarterly*, December, pp. 503-521.

170.Nelson, R. R. (1991) 'Survey of knowledge and skill requirements', *MIS Quarterly*, 15(4), pp. 503-521.

171. Nunnally, J. (1967) *Psychometry Theory*, New York, McGraw-Hill

172.Nunnally, J. C. (1978) *Psychometry Theory*, 2nd edn, McGraw-Hill, New York.

173.Nwabueze, U. (1999) 'Modernising the NHS for the Millenium', *Total Quality Management*, Vol. 10, No. 4&5, pp. 666-672.

174.Oakland, J. S. (1993) *Total Quality Management: the Route to Improving Performance*, 2nd edn, Butterworth-Heinemann, Oxford.

175.Ohmae, K. (1982) 'Quality control circles: they work and don't work', *The Wall Street Journal*, March 29, p. 16.

176.Ord, J. K. (1993) 'Total quality management in the classroom: a personal odyssey', in *Pursuit of Quality in Higher Education: Case Studies in Total Quality management*, eds D. J. Teeter & G. G. Lozier, San Francisco, Jossey-Bass.

177.Ordione, G. S. (1987) 'Measuring the unmeasurable: setting standards for management performance', *Business Horizons*, July/August, pp. 73.

178.Osada, T. (1991) *The 5-S: Five Keys to a Total Quality Environment*, APO Tokyo.

179.Owlia, M. S. (1995) *A Customer -Oriented Approach to the Measurement and Improvement of Quality in Engineering Education*, Ph.D. Dissertation, University of Birmingham.

180. Owlia, M. S., & Aspinwall, E. M. (1997) 'TQM in higher education - a review', *International Journal of Quality & Reliability Management*, Vol. 14, No. 5, pp. 527-543.

181. Parasuraman, A., Berry, I. L. & Zeithaml, V. A. (1988) 'SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality', *Journal of Retailing*, Vol. 64, 1, pp. 23-37.

182. Parasuraman, A., Berry, L. L. & Zeithaml, V. A. (1991) 'Perceived service quality as a customer-based performance measure: an empirical examination of organisational barriers using an extended service quality model', *Human Resource Management*, Vol. 30, 3, pp. 335-364.

183. Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1985) 'A conceptual model of service quality and its implications for future research', *Journal of Marketing,* Vol. 49, pp. 41-50.

184. Parasuraman, A., Zeithaml, V., & Berry, L. (1990) *Delivering Quality Service*, Free Service, U.S.

185. Pellow, A., & Wilson, T. D. (1993) 'The management information requirements of heads of university', *Journal of Information Science*, Vol. 19, No.6, pp. 425-437.

186. Powell, T. (1992) 'Organizational alignment as competitive advantage', *Strategic Management Journal*, Vol. 13, No. 2, pp. 119-134.

187. Powell, T.C. (1995) 'Total quality management as competitive advantage: A review and empirical study', *Strategic Management Journal*, Vol. 16, pp. 15-27.

188. Quality Assurance Agency (1977) Quality Assurance and Enhancement Network Directory, London: U.K., Quality Assurance Agency.

189. Rai , A., Borah, S. & Ramaprasad, A. (1996) 'Critical success factors for strategic alliances in information technology: an empirical study', *Decision Sciences*, Vol. 27, No. 1, Winter, pp. 141-154.

190. Reavill, L. R. P. (1998) 'Quality assessment, total quality management and the stakeholders in the UK higher education system', *Managing Service Quality*, 8(1), pp. 55-63.

191. Reichheld, F. F. & Sasser, W. E. (1990) 'Zero defections: quality comes to services', *Harvard Business Review*, September-October, pp. 301-307.

192.Ridgway, V. F. (1956) 'Dysfunctional consequences of performance measurements', *Administrative Science Quarterly*, September, pp. 240-247.

193.Rockart, J. F. (1979) 'Chief executives define their own data needs', *Harvard Business Review*, Vol. 2, March-April, pp.81-93.

194.Rockart, J. F. (1982) 'The changing role of the information systems executive: A critical success factors perspective', *Sloan Management Review*, Fall, pp. 3-13.

195.Rowlands, K. (1998) 'Total quality management at the Dell Primary School', *Total Quality Management*, Vol. 9, No. 4&5, pp. 2.3-2.9.

196.Rubach, L. (1994) 'Fourth annual quality in education listing', *Quality Progress*, September, pp. 27-79.

197.Sabherwal, R. & Kirs, P. (1994) 'The alignment between organisational critical success factors and information technology capability in academic institutions', *Decision Sciences,* Vol. 25, No. 2, pp. 301-331.

198.Saraph, J. V., Schroeder, R. G. & Benson, P. G. (1989) 'An instrument for measuring critical success factors of quality management', *Decision Sciences*, 20, pp. 810-829.

199.Schmitz, C. C. (1993) 'Assessing the validity of higher education indicators', *Journal of Higher Education*, Vol. 64, No. 5, pp. 503-521.

200.Schneier, C. E., Shaw, D. G. & Beatty, R. W. (1992) 'Performance measurement and management: A tool for strategy execution', *Human Resource Management*, Vol. 30, No. 3, Fall, pp. 279-301.

201.Schultz, L. E., Vollum, J. S. (1992) 'Introduction: the transformation process', in *The TQM Transformation: A Model for Organisational Change*, Quality Resources, ed J. Persico Jr., New York.

202.Sellenheim, M. R. (1991) 'J. I case company: performance measurement', *Management Accounting*, September, pp. 50-53.

203.Senju, S. (1992) *TQC and TPM*, Asian Productivity Organisation, Tokyo.

204.Sergiovanni, T. (1984) Ten principles of quality, *Educational Leadership*, Vol. 35, No. 5, pp. 330-336.

205.Seymour, D. (1993a) 'Quality on campus: three institutions, three beginnings', *Change*, Vol. 25, pp. 14-27.

206.Seymour, D. T. (1993b) *On Q: Causing Quality in Higher Education*, New York, Macmillan.

207.Shakor, M. (1994) *Total Quality Management within the Context of Higher Education: an Evaluation of the Extent to which the Concept of TQM is Applicable in Higher Education*, M.Sc. Thesis, University of Liverpool.

208.Sherr, L. A. & Lozier, G. G. (1991) 'Total quality management in higher education', *New Directions for Institutional Research*, Vol. XVIII, No. 3, pp. 3-11.

209.Sinclair, D. A. C. (1994) *Total Quality Management Within The Context Of Higher Education: An Evaluation To The Extent To Which The Concept Of TQM Is Applicable In Higher Education*, M.Sc. Thesis, Liverpool University.

210.Sink, D. S. (1991a) 'The role of measurement in achieving world class quality and productivity management', *Industrial Engineering*, June, pp. 23-28.

211.Sink, D. S. (1991b) 'TQM: the next frontier or just another bandwagon?', *Productivity*, Vol. 32, No. 3, October-December, pp. 400-414.

212.Smith, D. K. (1993) 'The discipline of teams', *Harvard Business Review*, March-April, pp. 111-120.

213.Smith, M. (1990) 'The rise and rise of the NFI', *Management Accounting*, May, pp. 24-26.

214.Snee, R. D. (1993) 'Creating robust work processes', *Quality Process*, Vol. 26, No. 2, pp. 37-41.

215.Sowards, D. (1992) 'TQM is a journey: so where do we begin?', *Industrial Engineering*, January, pp. 24 - 28.

216.Spanbauer, S. J. (1989), *Measuring and Costing Quality in Education*, Fox Valley Technical College Foundation, Appleton, Wisconsin.

217.Spanbauer, S. J. (1993) 'Using quality systems to re-energise education', *EEC-Seminar in Total Quality Education*, Denmark, 1993.

218.Staff. (1994), 'Varsities may be corporatised', *The Star*, 3 Aug.,

219.Staff. (1995), 'Kementerian awasi konsep TQM', *Utusan Malaysia*, 4 Jan.

220.Staff. (1996) 'Piagam pelanggan dilancar', *Utusan Malaysia*, 4 January.

221.Stoner, A. F., Freeman, R. E. & Gilbert Jr., D. R. (1995) *Management*, 6th edn, Prentice Hall Inc., Englewood Cliffs, N.J.;

222.Taguchi, G. & Elsayed, E. A. (1989) *Quality Engineering in Production Systems*, McGraw-Hill, New York.

223.Taguchi, G. (1986) *Introduction to Quality Engineering: Designing Quality into Products and Processes*, Asian Productivity Organisation, Tokyo.

224.Tawse, E. L. & Keogh, W. (1998) 'Quality in the leisure industry: an investigation', *Total Quality Management*, Vol. 9, No. 4&5, pp. 219-222.

225.Teeter, D. J., & Lozier, G. G. (1991) 'Should institutional researchers and planners adopt TQM?' in 'Total quality management in higher education', eds L. A. Sherr and D. J. Teeter, *New Directions for Institutional Research*, Vol. 71, Fall, Josse-Bass Inc. Publishers, San Francisco.

226.Teeter, D. J., Lozier, G.G. (eds.) *Pursuits of Qualitiy in Higher Education: Case Studies in Total Quality Management*, Jossey-Bass, San Francisco.

227.Terziovski, M., Sohal, A. & Samson, D. (1996) 'Best practice implementation of total quality management: multiple cross-case analysis of manufacturing and service organisations', *Total Quality Management*, Vol. 7, No. 5, pp. 451-481.

228.The Conference Board (1991) *Total quality management*, Research Bulletin No. 963,The Conference Board, New York.

229.The U.S. General Accounting Office (1991) *Management Practices: U.S. Companies Improve Performance Through Quality Efforts,* GAO, Gaithersburg, MD., U.S.

230.Thiagarajan, T. (1995) *An Empirical Study of Total Quality Managemnt (TQM) in Malaysia: A Proposed Framework of Generic Application*, Ph.D. Dissertation, University of Bradford.

231.Tichy, N. M. & David, O. U. (1984) 'The leadership challenge -- a call for the transformational leader', *Sloan Management Review*, Vol. 26, No. 1, pp. 59-68.

232.Tofte, B. (1995) 'A theoretical model for implementation of total quality leadership in education', *Total Quality Management*, Vol. 6, No. 5&6, pp. 469-478.

233.Tom, P. L. (1987) *Managing Information as a Corporate Resource*,: Scott Foresman, Glenview, Ill.

234.Tuckman, B. W. & Johnson, F. C. (1989) *Effective College Management: The Outcome Approach*, Praeger, New York.

235.Tyler, C. (1993) 'Total quality management is *total* at fox Valley Technical College', in *Pursuit of Quality in Higher Education: Case Studies in Higher Education*, eds D. J. Teeter & Lozier, G. G., San Francisco, Jossey-Bass.

236. Udo, G. J. & Ehie, C. I. (1996) 'Critical success factors for advanced manufacturing systems', *Computers and Industrial Engineering*, Vol. 3, No. 1&2, pp. 91-94.

237.Van Der Wiele, A., Dale, B. & Williams, A. R. T. (1997) 'ISO 9000 series registration to total quality management: the transformation journey', *International Journal of Quality Science*, Vol. 2, No. 4, pp. 236-252.

238.Van Der Wiele, T. V. (1995) 'Quality management in teaching organisation', *Total Quality Management*, Vol. 6, No. 5&6, pp. 497-508.

239.Vroom, V. H. (1983) 'Leadership', in *Handbook of Industrial and Organizational Psychology*, ed Marvin D. Dunnette, Wiley, New York.

240.Watkins, E. (1992) 'How Ritz-Carlton won the Baldridge award', *Lodging Hospitality*, November, p.23.

241.Wells, R. (1998) 'E-Quality Leadership', *Total Quality Management*, Vol. 9, 4&5, pp. 230-236.

242.Whitely, R. (1993) 'Do selling and quality mix?' *Sales and Marketing Management*, October, p. 70.

243.Wilkinson, A. & Witcher, B. J. (1991) 'Fitness for use? Barriers to full TQM in the UK', *Management Decisions*, Vol. 29, No. 8, pp. 46-51.

244.Wold, H. (1980) 'Model construction and evaluation when theoretical knowledge is scarce -- theory and application of partial least squares', *Evaluation of Econometric Models*, in eds Jan Kment & James B. Ramsey Academic Press, New York.

245.Yang, Heng-Li (1996), 'Key information management issues in Taiwan and the US', *Information and Management*, Vol. 30, pp. 251-267.

246.Zadelhoff, C. J., de Wet, A. G., Pothas, A. & Pretorius, P. D. (1995), *Total Quality Management*, Vol. 6, No. 5&6, pp. 539-546.

247.Zairi, M. (1992) *TQM-Based Performance Measurement: Practical Guidelines*, Technical Communications Publishing, Letchworth, Hertfordshire.

248.Zairi, M. (1994) *Measuring Performance for Business Results*, Chapman & Hall, London.

249.Zeffane, R. (1996) Dynamics of strategic change: critical issues in fostering positive organisational change, *Leadership & Organisational Development Journal* [Electronic], Vol. 17, No. 7, pp. 36-43, MCB University Press Limited ISSN 0143 7739 [2000, February 2]

250.Zink, K. J. & Schmitz, A. (1995) 'Measuring universities against the European Quality Award criteria', *Total Quality Management*, Vol. 6, No. 5&6, pp. 547-561.

APPENDIX A

TQM MODELS

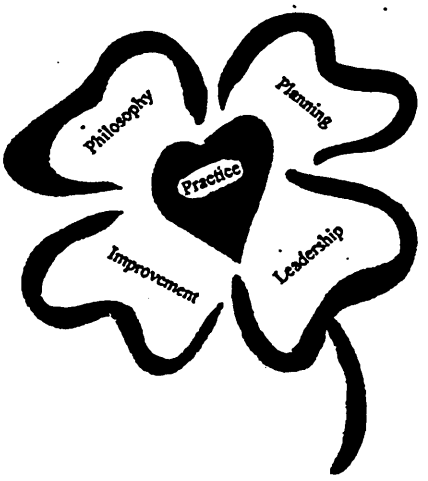


Figure 1: A Model for Total Quality Leadership in Education (Tofte, 1995).

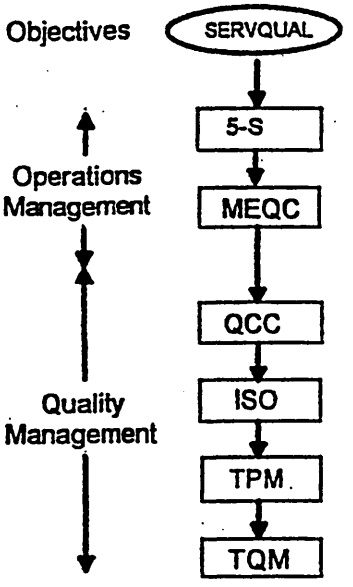


Figure.2: The HETQMEX Model (Ho & Wearn, 1996).

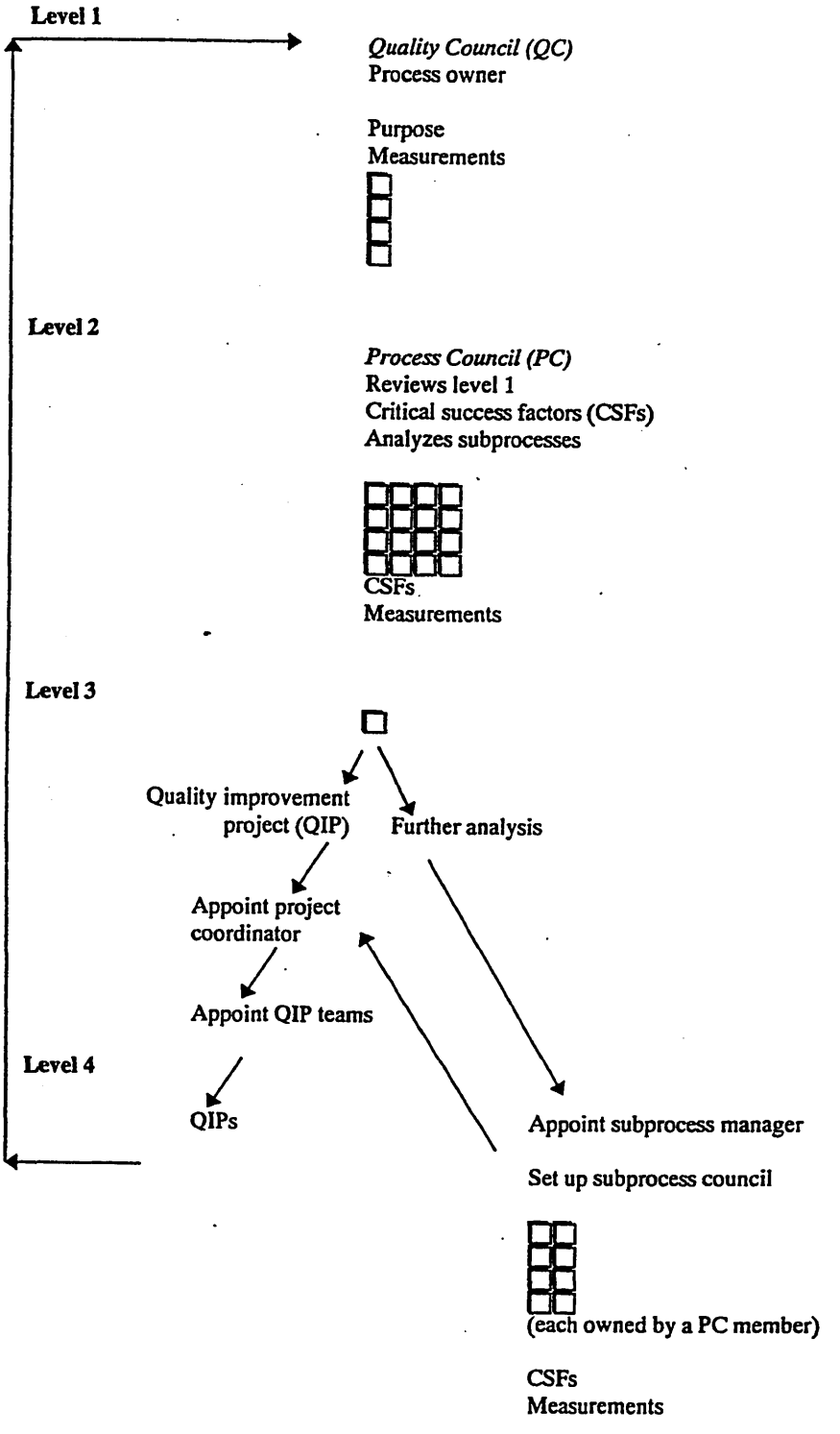


Figure 3: Aston's Total Quality Improvement Structure (Clayton, 1995).

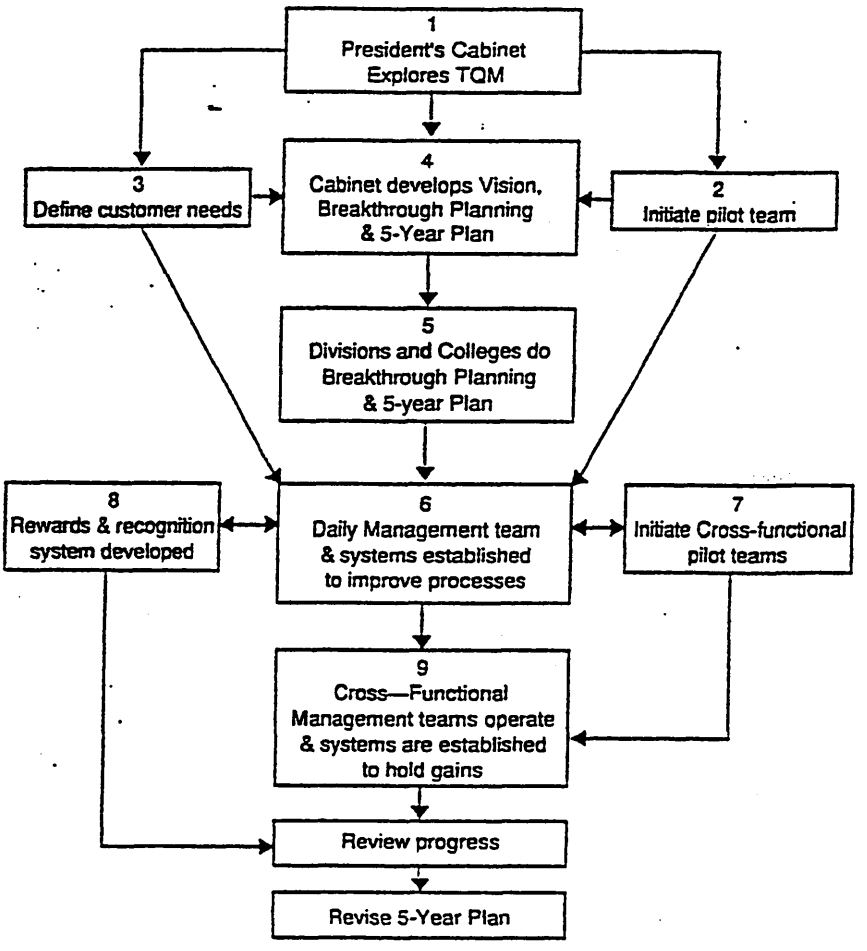


Figure 4: The OSU Total Quality Improvement Model (Seymour, 1992).

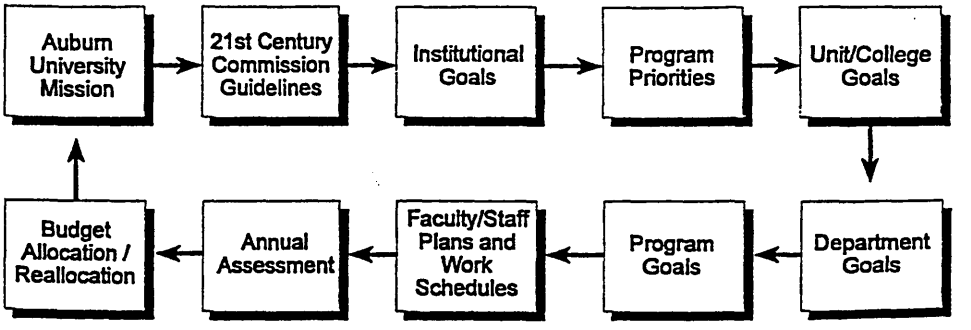


Figure 5: Continuous Quality Improvement Cycle (Burkhalter, 1996).

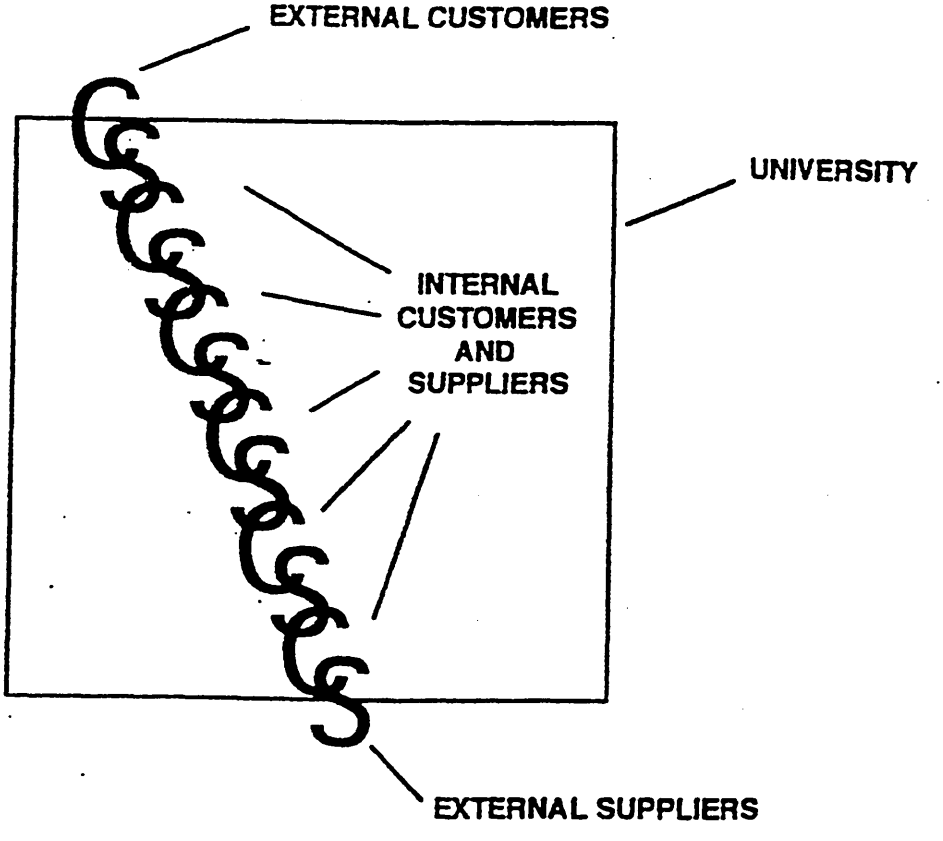


Figure 6: The Quality Chain (Geddes, 1993).

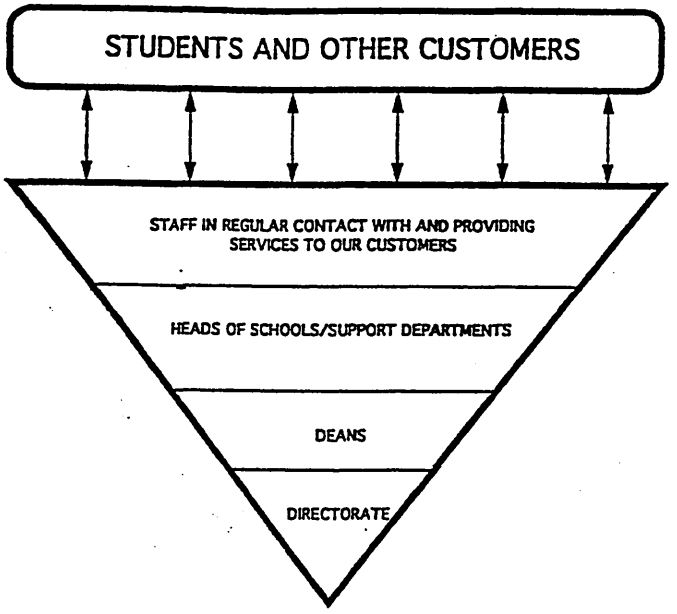


Figure 7: The Inverted Pyramid (Geddes, 1993).

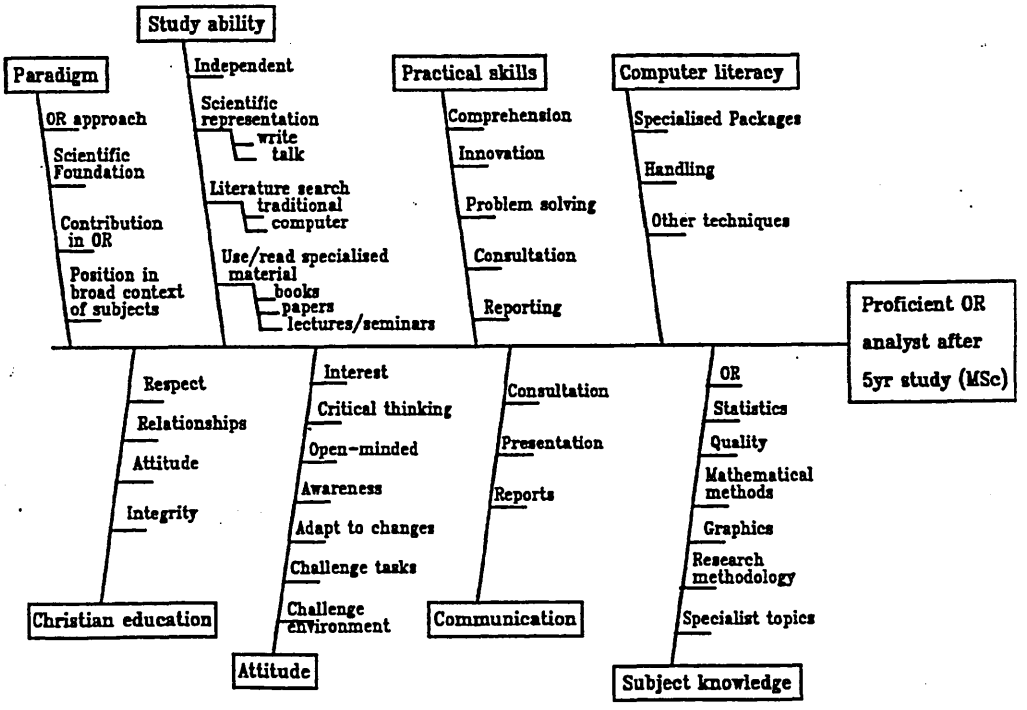


Figure 8: The Early Steps to TQM (Zadelhoff, 1995).

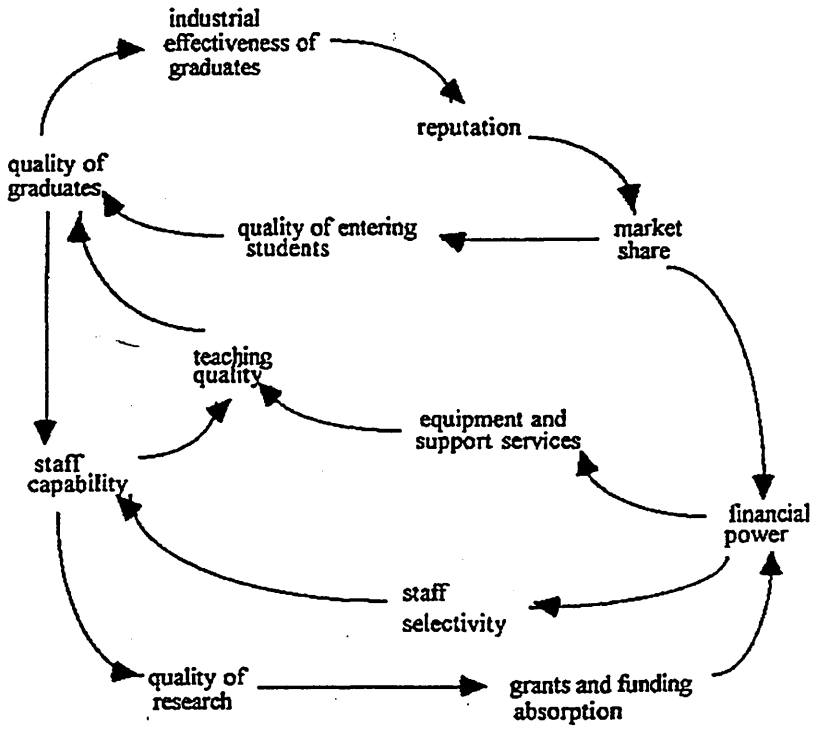


Figure 9: A Causal Diagram for Quality in Higher Education (Owlia, 1995).

APPENDIX B

PRELIMINARY SURVEY

A HIGHER EDUCATION INSTITUTION INTERNATIONAL SURVEY IN QUALITY MANAGEMENT

<Date>

Dear <Title><Name>

I am sure you are a very busy person because you hold a very important position in your organisation. I am a PhD research student at Sheffield Hallam University, UK currently doing a questionnaire survey on quality management for higher education institutions. The present survey is an integral part of my research which will help me to obtain required information in order to develop a Total Quality Management model for higher education institutions.

Your institution has been selected from the personal lists of academic staffs from UK universities. You could significantly contribute to the research by participating in the survey. Consequently, I would be most grateful if you could spare a little of your time to complete the enclosed questionnaire and returning it by 2 February 1998. Please use the stamped addressed envelope provided.

If you have any questions at all, please contact me or Professor Gopal K. Kanji at the university. I respect the confidentiality of information you provide and therefore give assurance of anonymity in the research report. Please cross the box at the end of questionnaire if you wish to have a summary of findings. Thank you for your co-operation.

Abdul Malek bin A.Tambi
Sheffield Hallam University

Professor Dr Gopal K. Kanji
Director Management Science
Research Centre
Sheffield Hallam University

A HIGHER EDUCATION INSTITUTION INTERNATIONAL SURVEY IN QUALITY MANAGEMENT

ALL DATA COLLECTED ON THIS QUESTIONNAIRE WILL BE PROCESSED IN COMPUTER.

DIRECTIONS:
The questionnaire contains 56 questions in 2 sections: A and B. Wherever appropriate:

- Cross, i.e., mark 'X' clearly in the relevant boxes.
- Write your responses on the lines.
- Fill in the boxes with relevant information.

Section A: Quality in Progress
The questions below pertain to the state of quality initiatives carried out in your institution and the situations encountered.

1. **Choose from the following definitions the Quality concepts that closely fit your institution's perception of quality. (Fill in any that apply)**

   ☐ Fitness for use
   ☐ Fitness for purpose
   ☐ Conformance to requirements
   ☐ Meeting customer's expectations
   ☐ Other
   (Please specify: .....
   .....)

2. **Do there exist procedures in place for improving the quality of processes (Quality Management) in the institution?**

   ☐ Yes — Go to next question
   ☐ No — If NO, please skip to question #46

3. **When was Quality Management introduced? (Year)** ☐☐☐☐

4. **What kinds of formalised quality activities has the institution implemented? (Fill in any that apply)**

   ☐ Certified with ISO9000
   ☐ Total Quality Management
   ☐ Quality Control Circles
   ☐ Other
   (Please specify: .....)
   ☐ None

5. **What is the magnitude of Quality Management implementation in your institution in terms of organisational coverage? (Fill in any that apply)**

- ☐ Institution-wide
- ☐ Division-wide
- ☐ Faculty-wide
- ☐ Department-wide
- ☐ Work unit
- ☐ Project
- ☐ Other
- ☐ (Please specify: .....)

6. **Who is the key person or organisation involved in the introduction and promotion of Quality Management? (Fill in any that apply)**

- ☐ Education department
- ☐ The institution's president/vice-chancellor
- ☐ Quality Director
- ☐ Committee
  (Please specify: .....)
- ☐ Faculty member
  (Please state from which faculty: .....)
- ☐ Other institution
- ☐ Customer
- ☐ Other
  (Please specify: .....
  .....)

7. **Who made the decision to adopt Quality Management? (Fill in any that apply)**

- ☐ The university president/vice-chancellor
- ☐ Division Head
- ☐ Faculty dean
- ☐ Quality director
- ☐ Department Head
- ☐ Work unit Head
- ☐ Instructed by the education department
- ☐ Other
  (Please specify: .....
  .....)

8a. State not more than five main reasons for implementing Quality Management.

b. Rank the reasons in terms of their strength. Assign 1 to the most strongest reason, 2 to the next, 3 to the next, etc.

		Rank
Reason 1:	.....	☐
Reason 2:	.....	☐
Reason 3:	.....	☐
Reason 4:	.....	☐
Reason 5:	.....	☐

9. **How long did it take to prepare for Quality Management (in months)?**

☐ Less than 3 ☐ Between 3 to 6 ☐ More than 6

10. **How is Quality Management practised in your institution? (Fill in any that apply)**

☐ In administrative areas
☐ In academic areas
☐ In instruction
☐ In research in Quality
☐ In Quality consulting
☐ In Quality improvement activities

11. **What is the institution's organisational structure for Quality? (Fill in any that apply)**

☐ Councils
☐ Consultant
☐ Committee
☐ Teams
☐ Co-ordinators
☐ Advisors
☐ Other
(Please specify: .....)

12. **Some organisational management factors are critical for the success of higher education institutions. Please rank the factors in terms of their criticality in your institution. Assign 1 to the most critical, 2 to the next, 3 to the next, etc.**

	Rank
Leadership	☐
Continuous improvement	☐
Prevention	☐
Measurement of resources	☐
Process improvement	☐
Internal customer-satisfaction	☐
External customer-satisfaction	☐
People management	☐
Teamwork	☐
Other	☐

(Please specify:.....)

13. **Do this ranking of critical factors change over time?**

☐ Yes ☐ No

14. How did you determine the ranking of the factors given in question #12? (Fill in any that apply)

- ☐ Government's policy
- ☐ Institution's policy
- ☐ Institution's Quality committee's policy
- ☐ Personal preference
- ☐ Other
  (Please specify: .....
  .....)

15a. What barriers are faced in implementing Quality Management? (Fill in any that apply)

b. Rank not more than five main barriers affecting the institution's Quality Management in terms of their difficulty. Assign 1 to the most difficult barrier, 2 to the next, 3 to the next, etc. (Fill in any that apply)

		Rank
Staff were pressed with daily work	☐	☐
Resistance to change	☐	☐
Insufficient knowledge or skill	☐	☐
Insufficient budget	☐	☐
The approach is believed to be short-lived gimmick or fad	☐	☐
Lack of commitment	☐	☐
Disbelief in its effectiveness	☐	☐
Disbelief in its applicability in education and the university	☐	☐
Poor motivation due to the long time needed to realise rewards	☐	☐
The process lacks immediate results	☐	☐
Complacency	☐	☐
Uncertainty of the benefits of the process	☐	☐
Fear of failure	☐	☐
Fear of loosing power	☐	☐
Resistance for using a business model in calling students customers	☐	☐
The barrier of middle management	☐	☐
Barriers of university governance	☐	☐
Other	☐	☐
Please specify:		
.....)		

16. What proportion of employees understand the concept of internal and external customers?

- ☐ Less than one quarter
- ☐ About one quarter
- ☐ About half
- ☐ About three quarters
- ☐ More than three quarters
- ☐ Everybody

17. Do you think the following people control the quality of processes in the organisation by the way they perform their work? (Fill in any that apply)

- ☐ Professors
- ☐ Deans of schools
- ☐ Faculty members
- ☐ Quality director
- ☐ Administrators
- ☐ Other staffs
- ☐ Other (Please specify:.....)

18. Does the institution have the expertise in managing quality improvement processes?

- ☐ The institution has high level of expertise
- ☐ The institution has somewhat reasonable expertise
- ☐ The institution has moderate expertise
- ☐ The institution has somewhat inadequate expertise
- ☐ The institution has no expertise at all

19. Is there sufficient Quality education/training given to organisational members to prepare for the quality initiatives taken in the institution?

- ☐ Sufficient
- ☐ Somewhat sufficient
- ☐ Moderate
- ☐ Insufficient
- ☐ No education at all

20. What forms of motivation are available for people in the organisation for contributing toward a quality cause? (Fill in any that apply)

- ☐ Job promotion
- ☐ Bonus
- ☐ Paid vacation
- ☐ Award
- ☐ Organisational support
- ☐ Special privilege
- ☐ Job rotation
- ☐ Recognition
- ☐ Quality campaign
- ☐ Other (Please specify:.....)

21. Does the institution seek the service of outside consultants to implement Quality Management?

- ☐ Always
- ☐ Often
- ☐ Occasionally
- ☐ Hardly
- ☐ Never

22. Do you think the organisation has a culture for quality?

☐ Absolutely ☐ Fair ☐ Never
☐ Somewhat positive ☐ Hardly

23. Do you think the Quality culture of your organisation has changed positively in recent years?

☐ Yes ☐ No

24. Was there any programme held to transform the organisational culture?

☐ Yes ☐ No

25. Does the institution benchmark its Quality activities (that is it compares its own processes with that of other institutions efficient processes and adopts those 'best practices')?

☐ Yes ☐ No

26a. Which of the following Quality concepts does your organisation use to achieve Quality? (Fill in any that apply)

b. Rank the Quality concepts for your institution's quality improvement activities in terms of importance. Assign 1 to the most important, 2 to the next, 3 to the next, etc.

		Rank
Leadership	☐	☐
Continuous improvement	☐	☐
Prevention	☐	☐
Measurement of resources	☐	☐
Process improvement	☐	☐
Internal customer-satisfaction	☐	☐
External customer-satisfaction	☐	☐
People management	☐	☐
Teamwork	☐	☐
Other	☐	☐

(Please specify:.....
.....)

27. Has your institution organised quality control circles programmes (QCC)?

Yes ☐ Go to next question
No ☐ If NO, please skip to question #45

28. When was QCC introduced? (Year) ☐☐☐☐

29. Give the total number of Quality Circles. (Write number in box) ☐

30. Give the number of successful Quality Circles. (Write number in box).

☐ If you entered '0', please skip to question #33

31a. State not more than five main reasons for the success of individual Quality Circles.

b. Rank the reasons in terms of their strength. Assign 1 to the most strongest reason, 2 to the next, 3 to the next, etc.

		Rank
Reason 1:	.....	☐
Reason 2:	.....	☐
Reason 3:	.....	☐
Reason 4:	.....	☐
Reason 5:	.....	☐

32. Are the success of Quality Circles occurring at a rate that will lead to the entire success of Quality Management?

☐ Yes ☐ Possibly No ☐ Don't No
☐ Possibly Yes ☐ No

33. Give the number of Quality Circles that have failed. (Write number in box)

☐ If you entered '0', please skip to question #37

34. What is the length of time Quality Circles operated before failing, where such failures caused or contributed to QCC programme suspension?

- ☐ Less than 3 months
- ☐ 3 months but less than 6 months
- ☐ 6 months but less than 1 year
- ☐ 1 year but less than 18 months
- ☐ 18 months but less than 2 years
- ☐ 2 years but less than 3 years
- ☐ More than 3 years

35a. State not more than five main reasons for individual Quality Circle failures, where such failures caused or contributed to QCC programme suspension.

b. Rank the reasons in terms of their strength. Assign 1 to the most strongest reason, 2 to the next, 3 to the next, etc.

		Rank
Reason 1:		☐
Reason 2:		☐
Reason 3:		☐
Reason 4:		☐
Reason 5:		☐

36. Are the failures of individual Quality Circles occurring at a rate that will lead to the entire failure of QCC programme?

- ☐ Yes
- ☐ Possibly Yes
- ☐ Possibly No
- ☐ No
- ☐ Don't No

37. Is QCC programme currently operating?

- ☐ Yes — Go to next question
- ☐ No — If NO, please skip to question #39

38. How many Quality Circles are currently operating? (Write number in box) ☐

Please skip to question #42

39. What was the stage at which QCC programme was suspended?

- ☐ At initial discussion stage
- ☐ During pilot programme
- ☐ On completion of the pilot programme
- ☐ After full-scale launch

40. What is the length of time the QCC programme operated before suspension?

- ☐ Less than 3 months
- ☐ 3 months but less than 6 months
- ☐ 6 months but less than 1 year
- ☐ 1 year but less than 18 months
- ☐ 18 months but less than 2 years
- ☐ 2 years but less than 3 years
- ☐ More than 3 years

41a. State not more than five main reasons why the institution suspended its QCC programme.

b. Rank the reasons in terms of their strength. Assign 1 to the most strongest reason, 2 to the next, 3 to the next, etc.

		Rank
Reason 1:		☐
Reason 2:		☐
Reason 3:		☐
Reason 4:		☐
Reason 5:		☐

42. How would you describe the overall outcome of the QCC programme by way of achieving the QCC goals as designed in individual projects?

- ☐ Improved performance
- ☐ Has the potential of improving performance in future
- ☐ No difference in performance
- ☐ Other

(Please specify: .....)

43. What do you think are the major factors that influenced the QCC results? (Fill in any that apply)

- ☐ Teamwork
- ☐ Problem-solving techniques used
- ☐ Delegation of authority
- ☐ Advice given by the consultant
- ☐ Motivation derived from working in group
- ☐ Intrinsic reward realised
- ☐ Support by the management
- ☐ Other

(Please specify: .....
.....)

44. Do you think the performance could be increased if the QCC factors are improved?

☐ Yes ☐ No

45. What measurement is used to evaluate the progress of the institution's Quality Management? (Fill in any that apply)

☐ Use of performance indicators
☐ Based on goal achievement
☐ Based on financial position of the organisation
☐ Based on how well processes are moving
☐ Other
(Please specify: .....
.....)

46. How does the institution evaluate organisational performance? (Fill in any that apply)

☐ Financial condition
☐ Competitiveness
☐ Market share
☐ Superiority of product or service
☐ Goodwill
☐ Other
(Please specify:.....)

47. How would you describe the institution's overall organisational performance?

☐ Excellent ☐ Good ☐ Poor
☐ Very Good ☐ Fair

48. How would you describe the overall quality of your institution?

☐ Excellent ☐ Good ☐ Poor
☐ Very Good ☐ Fair

49. What is the institution's future plan to further improve its quality of education? (Fill in any that apply. Note: If you tick a box it means the institution has not implemented the associated activity).

☐ Obtain ISO9000 certification
☐ Bid for quality award
☐ Implement TQM
☐ Expand TQM to cover wider aspect of the organisation
☐ Other
(Please specify: .....)

Section B: The following items are for statistical information only.

50. What is your institution's name?
(You are reassured of anonymity)

51. Is it a public or private institution?

☐ Public ☐ Private

52. What is the date of establishment of the institution? (Year) ☐☐☐☐

53. What is the type of institution?

☐ University
☐ Institute
☐ College
☐ Polytechnic
☐ Other
(Please specify:.....)

54. How many full-time and part-time employees does the institution have?
(Write number in boxes)

Part-time ☐ Full time ☐

55. How many students? (Write number in box)

Part-time ☐ Full time ☐

56. About you as a contact person. (Fill in particulars)

a. What is your name?
b. What is your position?
c. What is your telephone number?
d. What is your Fax number?

If you would like to make any further comments or suggestions please use the space below:

☐ Please cross here if you would like to receive a summary of findings.
Thank you very much for your co-operation.

Abdul Malek bin A.Tambi School of Computing and Management Sciences Sheffield Hallam University City Campus Pond Street Sheffield S1 1WB ***Tel:*** (0)114 225 3101 ***Fax:*** (0) 114 225 3161 ***Email:*** a.malek@shu.ac.uk

GLOSSARY

Conformance to requirements	A production process will exhibit quality if the product or service resulting from that process conforms to customer requirements.
External customers	Those outside the organisation to whom the institution provides its services, e.g., students, employees, government, parents, businesses, etc.
Fitness for purpose	A predictable degree of uniformity and dependability (of products) at low cost and suited to the market.
Fitness for use	Quality lies with the actual use of product or service. Products that best satisfy customers' preferences are the ones they regard as having the highest perceived quality.
Goals	Organisation's purpose, mission, and objectives.
Internal customers	Employees that require inputs such as information and materials from other employees in order to complete part of the whole job.
Products	Include goods and services.
Quality	The totality features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.
Quality circles	Is a group of between 6 and 12 employees who volunteer to meet regularly to solve work-related problems.
Quality management	A whole range of managerial activities of establishing and achieving the desired quality of outputs.
Total Quality Management (TQM)	A process of continuously satisfying customer requirements at lowest costs, by harnessing the commitment of everyone in the organisation.

Sheffield Hallam University

Computing and Management Sciences School
Sheffield Hallam University
City Campus
Howard Street
Sheffield S1 1WB
Tel: +44 (0)114 2253171 Fax +44 (0)114 2253161

A HIGHER EDUCATION INSTITUTION INTERNATIONAL SURVEY IN QUALITY MANAGEMENT

<Date>

Dear <Title><Name>

I would like to remind you of a request for your participation in a recent international survey on quality management for higher education institutions. As of this time, I am afraid I have not received your institution's completed questionnaire. Data from your institution is very important to be included in this study to develop a TQM model for higher education institutions. In case your institution does not have Quality Management in place, I would be very grateful if you could cross the box against 'NO' of question #2 and continue to question #46 till end of questionnaire.

For your convenience, a questionnaire is attached to this mail under the filename "survey.doc", in case you have misplaced the original. Please let me know if you need a hard copy of the questionnaire so that it could be sent to you. I would be extremely grateful if you could spend a few minutes of your time to complete the questionnaire and return it to me when you can by surface mail or perhaps Email. A glossary of terms (glossary.doc) is also included in case you need explanation on the terms used in the questionnaire. Again, I give assurance that your responses will be confidential and all findings will be reported in the aggregate only. Please use the address at the top of this page to return your questionnaire. If you would like a copy of findings, please cross the box at the end of questionnaire.

Your time and interest are sincerely appreciated. Please ignore this letter if you have already responded to the questionnaire.

Thank you.

Yours sincerely,

Abdul Malek bin A.Tambi
Research Student
Sheffield Hallam University

Professor Gopal K.Kanji
Director of Management
Sciences Research Centre
Sheffield Hallam University

APPENDIX C

RESULTS OF PRELIMINARY STUDY

Table 1. Types of HEI Respondents in Malaysia and United States.

The "other" HEIs category include college, polytechnics, and other institutions that conduct univeristity programmes.
Public = public HEIs; Pvt. = private HEIs.

	United States						Malaysia						Grand	
Higher education institutions	Public	%	Pvt.	%	Total	%	Public	%	Pvt.	%	Total	%	Total	%
University	27	52.0	16	76.2	43	59.7	6	54.5	1	2.0	7	11.7	50	37.9
Other HEIs	24	48.0	5	23.8	29	40.3	5	45.5	48	98.0	53	88.3	82	62.1
Number of respondents	51	100.0	21	100	72	100.0	11	100.0	49	100.0	60	100.0	132	100.0

Table 2: Types of HEI Respondents in United Kingdom.

	United Kingdom					
Higher education institutions	Public	%	Pvt.	%	Total	%
University	29	60.4	1	33.3	30	58.8
Institute	6	12.5	0		6	11.8
College	9	18.8	2	66.7	11	21.6
Polytechnic	0	0	0	0	0	0
Other	4	8.3	0	0	4	7.8
Number of respondents	48	100.0	3	100.0	51	100

Table 3: Number of Full Time Equivalent (FTE) Employees.

1 full-time empoyee = 1 FTE. 1 part-time employee = 1/2 FTE.

Class	Number of FTE employees					
	U.S. HEIs	%	**U.K. HEIs**	%	**M'sian HEIs**	%
Small (less then 500)	20	40.0	15	50.0	51	91.1
Medium (500-1000)	14	28.0	4	13.3	0	0.0
Large (more than 1000)	16	32.0	11	36.7	5	8.9
Number of respondents	50	100.0	30	100.0	56	100.0

Table 4: Number of FTE Students.

Most institutions in Malaysia and a large number of institutions in U.S. and U.K. are small in size.

Size of institution	Number of FTE students					
	U.S. HEIs	%	**U.K. HEIs**	%	**M'sian HEIs**	%
Small (less than 5000)	26	49.1	29	60.0	46	88.5
Medium (5000-10000)	10	18.9	6	12.5	1	1.9
Large (more than 10000)	17	32.1	13	27.1	5	9.6
Number of respondents	53	100.0	48	100.0	52	100.0

Table 5: Number of Years HEIs Have Been Established.

On Average, U.K. HEIs are the oldest; HEIs in U.S. and U.K. are much older than HEIs in Malaysia.

Country	Descriptors					
	Mean	Median	Mode	Min.	Max.	Range
Malaysia (of 55 respondents)	11.7	9.0	3.0	1.0	35.0	34.0
U.S. (of 66 respondents)	75.8	78.0	31.0	12.0	178.0	166.0
U.K. (of 44 respondents)	86.3	60.0	6.0	5.0	789.0	784.0

Table 6: Institutional Definition of Quality.
(Multiple response question: percentages do not add up to 100.0%)
In the U.S. and Malaysia, most institutions give great importance to meeting customer's expectations similar to business organisations. Most U.K. HEIs define quality as fitness for purpose, which is consistent with the definition prescribed by the former Higher Education Quality Council (HEQC).

	U.S. HEIs		U.K. HEIs		M'sian HEIs		Combined	
Definition of quality	Count	%	Count	%	Count	%	Total	%
Fitness for use	13	18.1	8	16	5	8.7	26	14.5
Fitness for purpose	12	16.7	37	74	11	19.3	60	33.5
Conformance to requirements	16	22.2	17	34	30	52.6	63	35.2
Meeting customer's expectations	65	67.7	1	28	39	68.4	105	58.7
Other	10	10.4	10	20	7	12.3	27	15.1
Number of respondents	72		50		57		179	

Table7: Existence of Quality Management in HEIs.
(*The left number under columns "count" and "%" are for TQM institutions and numbers on the right are for non-TQM institutions).
Some institutions practising Quality Management are not necessarily full-fledged TQM institutions, nevertheless, they do have procedures to maintain certain standards of quality.

	U.S. HEIs				U.K. HEIs				M'sian HEIs				Combined			
Does Quality Management exist?	Count		%		Count		%		Count		%		Total		%	
Yes	39*	18	100	54.5	4	32	100	68.1	15	16	100	36.4	58	66	100	53.2
No	0	15	0	45.5	0	15	0	31.9	0	28	0	63.6	0	58	0	46.8
Number of respondents	39	33	100	100	4	47	100	100	15	44	100	100	58	124	100	100

Table 8: Number of Years Quality Management Has Been Introduced.

Most old and new institutions in both countries had adopted Quality management in the last 10 years. Thus, the practice of Quality Management does not depend on age of institutions.

Number of years Quality Management has been introduced	U.S. HEIs		U.K. HEIs		M'sian HEIs		Combined	
	Count	%	Count	%	Count	%	Total	%
0 - 5	23	51.1	1	5.6	17	65.4	41	69.5
6 - 10	20	44.4	15	83.3	5	19.2	40	67.8
11 - 15	1	2.2	0	0.0	3	11.5	4	6.8
16 or more	1	2.2	2	11.1	1	3.9	4	6.8
Number of respondents	45	63.4	18	100.0	26	36.6	59	100.0

Table 9: Implementation of Formalised Quality Activities.

(Multiple response question: percentages do not add up to 100.0%)

The proportion of institutions implementing Quality Management in U.S. institutions is larger than in Malaysia and is the smallest in U.K.

Kinds of formalised Quality activities	U.S. HEIs		U.K. HEIs		Malaysian HEIs		Total	%
	Count	%	Count	%	Count	%		
ISO9000	0	0.0	1	3.3	8	26.7	9	7.8
TQM	39	70.9	4	13.3	15	50.0	58	50.4
QCCs	6	10.9	3	10	11	36.7	20	17.4
Other	26	47.3	18	60	14	46.7	58	50.4
None	0	0.0	7	23.3	1	3.33	8	7
Number of respondents	55		30		30		115	

Table 10. Organisational Coverage for Quality Management.

(Multiple response question: percentages do not add up to 100.0%)

Institutions that implement Quality Management institution-wide include many small institutions partly due to less complication in co-ordinating related activities.

Organisational coverage for quality management	M'sian HEIs		U.S. HEIs		U.K. HEIs		Total	%
	Count	%	Count	%	Count	%		
Institution-wide	23	82.1	39	69.6	30	100	92	80.7
Division-wide	2	7.1	17	30.4	2	6.7	15	13.2
Faculty-wide	1	3.6	8	14.3	5	16.7	14	12.3
Department-wide	6	21.4	13	23.2	5	16.7	24	21.1
Work unit	2	7.1	13	23.2	1	3.3	16	14
Project	2	7.1	13	23.2	0	0	15	13.2
Other	0	0.0	3	5.4	1	3.3	4	3.5
Number of respondents	28		56		30		114	

Table 11: Quality Management Introducers.

(Multiple response question: percentages do not add up to 100.0%)

Who introduced quality in the institution?	United States		U. Kingdom		Malaysia		Combined	
	Count	%	Count	%	Count	%	Total	%
Education department	4	7.1	0	0	9	33.3	13	11.5
President/VC	25	44.6	10	33.3	17	63.0	52	46
Quality director	19	33.9	15	50	9	33.3	43	38.1
Committee	15	26.8	23	76.7	9	33.3	47	41.6
Faculty member	10	17.9	2	6.7	3	11.1	15	13.3
Other institution	0	0.0	0	0.0	0	0.0	0	0.0
Customer	0	0.0	0	0.0	3	11.1	3	2.7
Other	11	19.6	9	30	4	14.8	24	21.2
Number of respondents	56		30		27		113	

Table 12: Quality Management Decision Makers.

(Multiple response question: percentages do not add up to 100.0%)

Table 11 & 12: The role of leadership is the most important factor to promote quality management in most institutions.

Who decided on quality management?	United States		U. Kingdom		Malaysia		Combined	
	Count	%	Count	%	Count	%	Total	%
President/VC	41	77.4	19	73.1	22	75.9	82	75.9
Division head	6	11.3	0	0.0	7	24.1	13	12.0
Faculty dean	6	11.3	0	0.0	4	13.8	10	9.3
Quality director	2	3.8	4	15.4	6	20.7	12	11.1
Department head	1	1.9	0	0.0	4	13.8	5	4.6
Work unit head	1	1.9	0	0.0	2	6.9	3	2.8
Instructed by education department	0	0.0	0	0.0	1	3.4	1	0.9
Other	7	13.2	6	23.1	6	20.7	19	17.6
Number of respondents	53		26		29		108	

Table 13: The Sizes of institutions Implementing Total Quality Management.

Most small institutions in Malaysia and less than half of small U.S. institutions implement total quality management. There are lesser proportions of medium and large sized institutions that implement total quality management.

Institution size	U.S	%	U.K.	%	M'sia	%
Small (Less than 5,000 FTE students)	12	46.2	2	4.2	9	69.2
Medium (5,000 - 10,000)	7	26.9	1	2.1	0	0.0
Large (More than 10,000)	7	26.9	1	2.1	4	30.8
Number of respondents	26	100.0	48		13	100.0

Table 14: Functional Areas Where Quality Management is Implemented.

(Multiple response question: percentages do not add up to 100.0%)

Although there is a large proportion of institutions in the three countries that has adopted quality management in academic areas, there is room for improvement in order to manage change process in all areas of the institutions.

Organisational areas where quality management is implemented	Malaysian HEIs		U.S HEIs		U.K. HEIs		Combined	
	Count	%	Count	%	Count	%	Total	%
In administrative areas	22	64.7	47	87.0	17	65.4	86	78.9
In academic areas	25	86.2	40	74.1	26	100.0	91	83.5
In instruction	17	58.6	30	55.6	5	19.2	52	47.8
In research for quality	11	37.9	14	25.9	4	15.4	29	26.6
In quality consulting	9	31.0	19	35.2	2	7.7	30	27.5
In quality improvement activities	21	72.4	39	71.2	13	50.0	73	67.0
Number of respondents	29		54		26		109	

Table 15: Organisational Structure for Quality Management.

(Multiple response question: percentages do not add up to 100.0%)

There are more Quality Councils and teams in American institutions than in U.K. and Malaysia. Quality consultants are hardly used in the countries, however, consultants and experts are necessary in order to implement quality management properly.

Formal groups for quality management	U.S HEIs		U.K. HEIs		Malaysian HEIs		Combined	
	Count	%	Count	%	Count	%	Total	%
Councils	22	41.5	1	3.7	6	20.7	29	26.6
Consultant	9	17.0	0	0.0	6	20.7	15	13.8
Committees	14	26.4	26	96.3	19	65.5	59	54.1
Teams	45	84.9	12	44.4	18	62.1	75	68.8
Co-ordinators	15	28.3	4	14.8	13	9.5	32	29.4
Advisors	3	5.7	10	37	12	41.4	25	22.9
Other	8	15.1	7	25.9	2	6.9	17	15.6
Number of respondents	53		27		29		109	

Table 16: Average Rank of Barriers to Quality Management Implementations. Range of Values: 1.0 - 5.0.

Most barriers to quality management implementations originate from staff. Sometimes these barriers are more difficult to overcome than other barriers in the institutions.

	Barriers	Malaysian HEIs				Pop.		U.S. HEIs				U.K. HEIs		Grand	
		Public	Cases	Pvt.	Cases	mean	Cases	Public	Cases	Pvt.	Cases	mean	Cases	mean	Cases
1	Staff were pressed with daily work	4.0	3	4.1	13	4.1	16	3.7	23	1.4	11	3.9	34	3.9	50
2	Resistance to change	4.6	5	3.3	13	3.7	18	3.8	27	3.3	11	3.7	38	3.7	56
3	Insufficient knowledge	1.6	5	3.3	13	3.7	18	3.8	27	3.3	11	3.7	38	2.6	34
4	Insufficient budget	2.5	4	4.3	6	3.6	10	2.6	8	3.0	2	2.7	10	3.2	20
5	The approach is believed to be short -lived gimmiick or fad	0.0	0	2.7	3	2.7	3	2.8	9	3.2	6	2.9	15	2.9	18
6	Lack of commitmenrt	4.0	3	3.8	12	3.8	15	3.2	17	3.3	4	3.2	21	3.4	36
7	Disbelief in its effectiveness	3.0	1	3.0	8	3.0	9	2.3	7	2.8	5	2.5	12	2.7	21
8	Disbelief in its applicability in education and the university	0.0	0	3.0	2	3.0	2	3.1	9	3.1	7	3.1	16	3.1	18
9	Poor motivation due to long time needed to realise rewards	0.0	0	3.5	2	3.5	2	4.3	4	0.0	0	4.3	4	4.0	6
10	The process lacks immediate results	2.0	1	2.0	4	2.0	5	4.0	2	1.0	1	3.0	3	2.4	8
11	Complacency	3.3	4	2.1	9	2.5	13	2.5	4	2.5	2	2.5	6	2.5	19
12	Uncertainty of the benefits of process	0.0	0	1.5	6	1.5	6	3.0	6	1.5	4	2.4	10	2.1	16
13	Fear of failure	0.0	0	1.0	1	1.0	1	3.0	1	2.0	1	2.5	2	2.0	3
14	Fear of losing power	2.0	1	1.2	5	1.3	6	2.8	11	3.0	2	2.9	13	2.4	19
15	Resistance for using a business model in calling students customers	1.0	1	1.0	2	1.0	3	0.0	0	0.0	0	0.0	0	1.0	3
16	The barriers of middle management	3.0	1	0.0	0	3.0	1	2.9	13	3.3	4	2.9	17	2.9	18
17	Barriers of university governance	0.0	0	4.0	1	4.0	1	2.0	4	3.0	3	2.4	7	2.6	8
18	Other	0.0	0	0.0	0	0.0	0	3.0	1	1.0	1	2.0	2	2.0	2

Table 17: Proportion of Employees That Understand the Concept of Internal and External Customers.

Lack of customer awareness is a drawback for institutions in order to measure customer's expectations.

Proportion of employees that understands the concept of internal & external customers	U.S. HEIs		U.K. HEIs		M'sian HEIs		Combined	
	Count	%	Count	%	Count	%	Total	%
Less than one quarter	7	13.0	4	17.4	2	7.1	13	12.4
About one quarter	9	16.7	3	13.0	3	10.7	15	14.3
About half	15	27.8	7	30.4	11	39.3	33	31.4
About three quarters	12	22.2	2	8.7	4	14.3	18	17.1
More than three quarters	5	9.3	4	17.4	4	14.3	13	12.4
Everybody	6	11.1	3	13.0	4	14.3	13	12.4
Number of respondents	54	100.0	23	100.0	28	100.0	105	100.0

Table 18: Institution's Expertise in Managing Quality Improvement Processes.

Most institutions in all countries lack high level of expertise.

How capable is the institution in managing quality improvement processes	U.S. HEIs		U.K. HEIs		M'sian HEIs		Combined	
	Count	%	Count	%	Count	%	Total	%
The institution has high level of expertise	14	25.9	6	20.0	5	17.9	25	22.3
The institution has somewhat reasonable expertise	18	33.3	8	26.7	16	57.1	42	37.5
The institution has moderate expertise	21	38.9	14	46.7	4	14.3	39	34.8
The institution has somewhat inadequate expertise	1	1.9	2	6.7	3	10.7	6	5.4
The intitution has no expertise at all	0	0.0	0	0.0	0	0.0	0	0.0
Number of respondents	54	100.0	30	100.0	28	100.0	112	100.0

Table 19: The Use of Consultants in Managing Quality.

Most institutions do not usually engage the service of consultants.

Does the institution engage the service of external consultants ?	U.S HEIs		U.K. HEIs		M'sian HEIs		Combined	
	Count	%	Count	%	Count	%	Total	%
Always	0	0.0	2	6.7	1	3.6	3	2.7
Often	1	1.9	5	16.7	0	0.0	6	5.5
Occasionally	33	63.5	13	43.3	18	64.3	64	58.2
Hardly	10	19.2	2	6.7	3	10.7	15	13.6
Never	8	15.3	8	26.7	6	21.4	22	20
Number of respondents	52	100.0	30	100.0	28	100.0	110	100.0

Table 20: Amount of Training in Quality Management Given to Organisational Members.

Tables 19 - 20: Lack of quality culture that exists among staff in various institutions can be developed by engaging consultants and other experts for training and education purposes.

Amount of training	United State HEIs						United Kingdom HEIs					
	Public	%	Pvt.	%	Total	%	Public	%	Pvt.	%	Total	%
Sufficient	12	32.4	5	29.4	17	31.5	2	7.7	0	0.0	2	5.3
Somewhat sufficient	7	18.9	4	23.5	11	20.4	6	23.1	0	0.0	6	15.8
Moderate	13	35.1	2	11.8	15	27.8	14	53.9	0	0.0	14	36.8
Insufficient	5	13.5	6	35.3	11	20.4	3	11.5	2	100.0	5	13.2
No education at all	0	0.0	0	0.0	0	0.0	1	3.9	0	0.0	1	2.6
Number of respondents	37	100.0	17	100.0	54	100.0	26	100.0	2	100.0	38	100.0

Amount of training	Malaysian HEIs						Grand Total	%
	Public	%	Pvt.	%	Total	%		
Sufficient	1	14.3	7	33.3	8	28.6	27	22.5
Somewhat sufficient	4	57.1	6	28.6	10	35.7	27	22.5
Moderate	2	28.6	2	9.5	4	14.3	33	27.5
Insufficient	0	0.0	6	28.6	6	21.4	22	18.3
No education at all	0	0.0	0	0.0	0	0.0	1	0.8
Number of respondents	7	100.0	21	100.0	28	100.0	120	100.0

Table 21: Types of Motivation for People to Contribute Toward Quality Improvement.

(Multiple response question: percentages do not add up to 100.0%)

Most Malaysian HEIs provide economic rewards whereas most American and British HEIs provide sociological and psychological rewards indicating that Malaysian institutions are culturally different..

Types of motivation	U.S HEIs		U.K. HEIs		M'sian HEIs		Total	%
	Count	%	Count	%	Count	%		
Job promotion	3	5.7	4	15.4	13	46.4	20	18.7
Bonus	2	3.8	0	0.0	12	42.9	14	13.1
Paid vacation	0	0	0	0.0	5	17.9	5	4.7
Award	17	32.1	1	3.9	12	42.9	30	28.0
Organisational support	28	52.8	11	42.3	14	50	53	49.5
Special privilage	3	5.7	0	0.0	5	17.9	8	7.5
Job rotation	4	7.5	0	0.0	4	14.3	8	7.5
Recognition	41	77.4	11	42.3	15	53.6	67	62.6
Quality campaign	6	11.3	0	0.0	9	32.1	15	14.0
Other	11	20.8	11	42.3	1	3.6	23	21.5
Number of respondents	53		26		28		107	

Table 22: Existence of Quality Culture in the Institutions.

Presence of Quality culture	United States						United Kingdom					
	Public	%	Pvt.	%	Total	%	Public	%	Pvt.	%	Total	%
Absolutely	5	13.9	5	29.4	10	18.9	6	21.4	0	0.0	6	20.7
Somewhat positive	8	22.2	7	41.2	15	28.3	10	35.7	2	100.0	12	41.4
Fair	18	50.0	2	20.0	20	37.7	11	39.3	0	0.0	11	37.9
Hardly	5	13.9	2	44.8	7	13.2	1	3.6	0	0.0	1	3.5
Never	0	0.0	1	5.9	1	1.9	0	0.0	0	0.0	0	0.0
Number of respondents	36	100.0	17	100.0	53	100.0	28	100.0	2	100.0	29	100.0

Table 22 continued

Presence of Quality culture	Malaysia						Grand Total	%
	Public	%	Pvt.	%	Total	%		
Absolutely	2	28.6	6	28.6	8	28.6	24	21.8
Somewhat positive	2	28.6	7	33.3	9	32.1	36	32.7
Fair	3	42.9	8	80.0	11	39.3	42	38.2
Hardly	0	0.0	0	0.0	0	0.0	8	7.3
Never	0	0.0	0	0.0	0	0.0	1	0.9
Number of respondents	7	100.0	21	100.0	28	100.0	110	100.0

Table 23: Institutional Effort to Transform Organisational Culture.

Any programme held to transform organisational culture?	United States						United Kingdom						Grand Total	%
	Public	%	Pvt.	%	Total	%	Public	%	Pvt.	%	Total	%		
Yes	25	66.7	12	75.0	37	18.5	24	85.7	0	0.0	24	80	60	76.0
No	11	33.3	4	25.0	15	81.5	4	14.3	2	100.0	6	20	19	24.0
Number of respondents	36	100.0	16	100.0	52	100.0	28	100.0	21	100.0	30	100	79	100.0

Any programme held to transform organisational culture?	Malaysia						Grand Total	%
	Public	%	Pvt.	%	Total	%		
Yes	6	100.0	17	81.0	23	85.2	84	77.1
No	0	0.0	4	19.0	4	14.8	25	22.9
Number of respondents	6	100.0	21	100.0	27	100	109	100.0

Table 23 continued.

Tables 22 & 23: It has been found that quality culture has not been widely adopted in most American HEIs whereas Malaysian and British institutions have adopted quality culture in their everyday organisational activities. It is therefore imperative to develop quality culture in American institutions where leadership can play a more important role.

Table 24: Average Rank of Reasons for Implementing Quality Management. Range of Values: 1.0 - 5.0.

There are 54 causal factors for quality management. These factors demand respondent institutions to improve quality of their processes.

	Reasons for implementing quality management	United States		United Kingdom		Malaysia		Pop.	
		Avg. Rank	Cases	Avg. Rank	Cases	Avg. Rank	Cases	mean	Cases
1	To be competitive	3.5	8	4.5	4	3.3	10	3.6	22
2	Customer/student satisfaction	4.3	15	2.4	5	4.1	8	3.9	28
3	Government influence	4.0	2	3.1	13	4.3	4	3.4	19
4	Foreign partner's expectation	0.0	0	0.0	0	3.0	3	3.0	3
5	Improve staff morale	3.7	6	0.0	0	2.5	2	3.4	8
6	Image building	2.2	5	3.0	1	4.1	9	3.4	15
7	Increase efficiency & productivity (incld processes & programmes	2.8	8	4.7	3	3.8	5	3.4	16
8	Continuous improvement	3.6	10	3.3	4	3.3	4	3.4	18
9	Increase market share	0.0	0	2.0	1	4.0	2	3.3	3
10	Encourage teamwork	3.2	11	1.0	1	1.8	4	2.7	16
11	Minimise costs	2.9	8	0.0	0	2.7	3	2.8	11
12	Increase number of meaningful programmes	4.0	2	0.0	0	1.0	2	2.5	4
13	Satisfy industry requirements	5.0	1	0.0	0	4.3	3	4.5	4
14	Upgrade student performance	3.7	3	4.0	1	1.7	3	2.9	7
15	Increase revenue & ensure self-reliance; improve financial position (incld assets)	4.0	1	0.0	0	3.0	1	3.5	2
16	Create value driven employees	2.5	2	3.0	1	2.3	4	2.4	7
17	For high level of service to internal and external customers	3.8	17	3.3	17	3.6	8	3.6	42
18	To meet future plans	3.0	4	5.0	1	3.7	3	3.5	8
19	Warrants continuity	0.0	0	0.0	0	1.0	1	1.0	1
20	Improve effectiveness (incld processes)	3.1	7	3.0	2	1.8	5	2.6	14
21	Better utilisation of resources	3.0	2	2.0	1	0.0	0	2.7	3
22	Keep abreast in field	2.0	1	1.0	1	0.0	0	1.5	2
23	Resolve current problems & overcome weaknesses	3.0	4	3.0	1	1.0	1	2.7	6

Table 24 continued.

	Reasons for implementing quality management	United States		United Kingdom		Malaysia		Pop.	
		Avg. Rank	Cases	Avg. Rank	Cases	Avg. Rank	Cases	mean	Cases
24	Accountability to public	0.0	0	4.7	3	3.7	3	4.2	6
25	Compete for funds	3.0	1	0.0	0	1.5	2	2.0	3
26	Inculcating positive culture (e.g corporatisation & positive work ethics)	2.5	2	2.8	4	3.0	3	2.8	9
27	To manage change (incld processes)	2.5	2	4.5	2	1.0	1	3.0	5
28	Prevention	0.0	0	0.0	0	5.0	1	5.0	1
29	Had satisfactory experience using the approach	4.0	1	0.0	0	0.0	0	4.0	1
30	Survival	3.5	2	0.0	0	5.0	2	4.3	4
31	To improve management	3.7	3	0.0	0	5.0	1	4.0	4
32	Obtain feedback on actions to guide future decisions	2.6	7	3.0	1	0.0	0	2.6	8
33	Improve communication	2.5	2	0.0	0	0.0	0	2.5	2
34	Capitalise on employee talents & innovativeness	2.0	2	0.0	0	0.0	0	2.0	2
35	To develop and provide opportunities to entire institution's community	1.7	3	3.3	3	0.0	0	2.5	6
36	Benchmark against best practice	2.0	1	2.0	1	0.0	0	2.0	2
37	Improve work environment	3.0	2	0.0	0	1.0	1	2.3	3
38	Improve decision making	3.5	2	0.0	0	0.0	0	3.5	2
39	Impove planning	2.8	5	0.0	0	0.0	0	2.8	5
40	To satisfy accreditation requirements	3.9	7	3.3	3	3.5	2	3.7	12
41	Failure of present system	1.0	1	0.0	0	0.0	0	1.0	1
42	Promote interest of lead faculty and individuals	4.5	2	0.0	0	2.0	1	3.7	3
43	Encouragement from management	5.0	1	0.0	0	0.0	0	5.0	1
44	Team and individual empowerment	3.3	4	3.0	1	0.0	0	3.2	5
45	Improving the organisation and its processes	3.6	18	4.5	6	3.5	6	3.8	30
46	To develop new ideas	2.0	1	0.0	0	0.0	0	2.0	1
47	Improve student recruitment and retention process	3.0	2	0.0	0	0.0	0	3.0	2
48	Core business of HEIs	0.0	0	2.0	1	4.0	1	3.0	2

Table 24 continued.

	Reasons for implementing quality management	United States		United Kingdom		Malaysia		Pop.	
		Avg. Rank	Cases	Avg. Rank	Cases	Avg. Rank	Cases	mean	Cases
49	Academic standards	0.0	0	4.3	3	0.0	0.0	4.3	3
50	Quality and equality of students' experience	0.0	0	5.0	1	0.0	0.0	5.0	1
51	External pressures	0.0	0	3.5	2	0.0	0.0	3.5	2
52	Equaity andvalue for mondey	0.0	0	3.0	1	0.0	0.0	3.0	1
53	Raise teaching profile	0.0	0	4.0	1	0.0	0.0	4.0	1
54	Ability to demonstrate we provide service	0.0	0	3.0	1	0.0	0.0	3.0	1

Table 25: Average Rank of Reasons for Implementing Quality Management Split into TQM and Non-TQM Institutions. Range of Values: 1.0 - 5.0.

	Reasons for implementing quality management	U.S				Pop.		United Kingdom				Pop.	
		Non-TQM	Cases	TQM	Cases	mean	Cases	Non-TQM	Cases	TQM	Cases	mean	Cases
1	To be competitive	3.3	3	3.8	5	3.6	8	4.7	3	4.0	1	4.5	4
2	Customer/student satisfaction	4.4	5	4.3	10	4.3	15	2.4	5	0.0	0	2.4	5
3	Government influence	3.0	1	5.0	1	4.0	2	3.1	11	3.0	2	3.1	13
4	Foreign partner's expectation	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
5	Improve staff morale	5.5	2	2.8	4	3.7	6	0.0	0	0.0	0	0.0	0
6	Image building	2.0	2	2.3	3	2.2	5	3.0	1	0.0		3.0	1
7	Increase efficiency & productivity (incld processes & programmes	4.8	4	2.8	6	3.6	10	4.5	2	5.0	1	4.7	3
8	Continuous improvement	4.8	4	2.8	6	3.6	10	3.5	2	3.0	2	3.3	4
9	Increase market share	0.0	0	0.0	0	0.0	0	0.0	0	2.0	1	2.0	1
10	Encourage teamwork	3.8	4	2.9	7	3.2	11	1.0	1	0.0	0	1.0	1
11	Minimise costs	5.0	1	2.6	7	2.9	6	0.0	0	0.0	0	0.0	0
12	Increase number of meaningful programmes	0.0	0	3.7	3	3.7	3	0.0	0	0.0	0	0.0	0
13	Satisfy industry requirements	0.0	0	5.0	1	5.0	1	0.0	0	0.0	0	0.0	0
14	Upgrade student performance	0.0	0	3.7	3	3.7	3	4.0	1	0.0	0	4.0	1
15	Increase revenue & ensure self-reliance; improve financial position (incld assets)	0.0	0	4.0	1	4.0	1	0.0	0	0.0	0	0.0	0
16	Create value driven employees	0.0	0	2.5	2	2.5	2	3.0	1	0.0	0	3.0	1
17	For high level of service to internal and external customers	3.8	4	3.9	13	3.8	17	3.3	6	0.0	0	3.3	6
18	To meet future plans	5.0	1	2.3	3	3.0	4	5	1	0	0	5.0	1
19	Warrants continuity		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
20	Improve effectiveness (incld processes)	2.7	3	3.5	4	3.1	7	3.0	2	0.0	0	3.0	2
21	Better utilisation of resources	3.0	2	0.0	0	3.0	2	0.0	0	2.0	1	2.0	1
22	Keep abreast in field	0.0	0	2.0	1	2.0	1	0.0	0	1.0	1	1.0	1
23	Resolve current problems & overcome weaknesses	2.0	1	3.3	3	3.0	4	3.0	1	0.0	0	3.0	1
24	Accountability to public	0.0	0	0.0	0	0.0	0	4.7	3	0.0	0	4.7	3

Table 25 Continued.

	Reasons for implementing quality management	U.S				Pop.		United Kingdom				Pop.	
		Non-TQM	Cases	TQM	Cases	mean	Cases	Non-TQM	Cases	TQM	Cases	mean	Cases
25	Compete for funds	3.0	1	0.0	0	3.0	1	0.0	0	0.0	0	0.0	0
26	Inculcating positive culture (e.g corporatisation & positive work ethics)	2.0	1	3.0	1	2.5	2	2.8	4	0.0	0	2.8	4
27	To manage change (incld processes)	3.0	1	2.0	1	2.5	2	5.0	1	4.0	1	4.5	2
28	Prevention	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
29	Had satisfactory experience using the approach	4.0	1	0.0	0	4.0	1	0.0	0	0.0	0	0.0	0
30	Survival	2.0	1	5.0	1	3.5	2	0.0	0	0.0	0	0.0	0
31	To improve management	4.0	2	3.0	1	3.7	3	0.0	0	0.0	0	0.0	0
32	Obtain feedback on actions to guide future decisions	5.0	1	2.2	6	2.6	7	3.0	1	0.0	0	3.0	1 0
33	Improve communication	0.0	0	2.5	2	2.5	2	0.0	0	0.0	0	0.0	0
34	Capitalise on employee talents & innovativeness	2.0	1	2.0	1	2.0	2	0.0	0	0.0	0	0.0	0
35	To develop and provide opportunities to entire institution's community	1.0	1	2.0	2	1.7	3	3.3	3	0.0	0	3.3	3
36	Benchmark against best practice	0.0	0	2.0	1	2.0	1	2.0	1	0.0	0	2.0	1
37	Improve work environment	0.0	0	3.0	2	3.0	2	0.0	0	0.0	0	0.0	0
38	Improve decision making	2.0	1	5.0	1	3.5	2	0.0	0	0.0	0	0.0	0
39	Impove planning	1.0	1	3.3	4	2.8	5	0.0	0	0.0	0	0.0	0
40	To satisfy accreditation requirements	3.0	3	4.5	4	3.9	7	3.3	3	0.0	0	3.3	3
41	Failure of present system	1.0	1	0.0	0	1.0	1	0.0	0	0.0	0	0.0	0
42	Promote interest of lead faculty and individuals	4.0	1	5.0	1	4.5	2	0.0	0	0.0	0	0.0	0
43	Encouragement from management	5.0	1	0.0	0	5.0	1	0.0	0	0.0	0	0.0	0
44	Team and individual empowerment	3.0	1	3.3	3	3.3	4	3.0	1	0.0	0	3.0	1
45	Improving the organisation and its processes	3.8	4	3.6	14	3.6	18	4.5	6	0.0	0	4.5	6
46	To develop new ideas	2.0	1	0.0	0	2.0	1	0.0	0	0.0	0	0.0	0
47	Improve student recruitment and retention process	2.0	1	4.0	1	3.0	2	0.0	0	0.0	0	0.0	0
48	Core business of HEIs							2.0	1	0.0	0	2.0	1
49	Academic standards	0	0	0.0	0	0.0	0	4.3	3	0.0	0	4.3	3

Table 25 Continued.

	Reasons for implementing quality management	U.S				Pop.		United Kingdom				Pop.	
		Non-TQM	Cases	TQM	Cases	mean	Cases	Non-TQM	Cases	TQM	Cases	mean	Cases
50	Quality and equality of students' experience	0	0	0.0	0	0.0	0	5.0	1	0.0	0	5.0	1
51	External pressures	0	0	0.0	0	0.0	0	2.0	1	5.0	1	3.5	2
52	Equaity andvalue for mondey	0	0	0.0	0	0.0	0	0.0	0	3.0	1	3.0	1
53	Raise teaching profile	0	0	0.0	0	0.0	0	4.0	1	0.0	0	4.0	1
54	Ability to demonstrate we provide service	0	0	0.0	0	0.0	0	3.0	1	0.0	0	3.0	1

Table 27: Average Rank of Critical Success Factors Split into TQM and Non-TQM Institutions. Range of Values: 1.0 - 10.0.

	Critical success factors	United States				Pop.		United Kingdom				Pop.	
		Non-TQM	Cases	TQM	Cases	mean	Cases	Non-TQM	Cases	TQM	Cases	mean	Cases
1	Leadership	9.1	16	9.6	36	9.5	52	8.0	24	8.0	4	8.0	28
2	Continuous improvement	7.1	16	6.9	34	6.9	50	8.0	23	9.7	3	8.2	26
3	Prevention	3.1	14	3.3	31	3.2	45	3.5	13	2.3	3	3.3	16
4	Measurement of resources	3.4	14	4.1	32	3.9	46	4.8	18	4.0	2	4.7	20
5	Process improvement	6.3	16	6.4	36	6.3	52	6.7	17	7.5	2	6.8	19
6	Internal customer satisfaction	7.5	15	6.5	33	6.8	48	6.1	20	8.0	4	6.4	24
7	External customer satisfaction	7.1	14	7.1	33	7.1	47	7.4	22	8.0	4	7.5	26
8	People management	5.6	15	4.8	34	5.6	49	6.5	17	5.0	3	6.3	30
9	Teamwork	6.3	14	5.7	36	5.9	50	6.9	19	5.0	3	6.6	22
10	Other	0.0	0	5.0	2	5.0	2	9.0	1	0.0	0	9.0	1

Table 27 continued.

In the three countries it was found that there are nine TQM critical success factors of Quality Management. The factors, in order of importance are: (1) leadership; (2) continuous improvement; (3) prevention; (4) teamwork; (5) process improvement; (6) internal customer satisfaction; (7) external customer satisfaction; (8) people management; and (9) teamwork. The CSFs for U.S institutions are: (1) leadership; (2) external customer satisfaction; (3) continuous improvement, (4) internal customer satisfaction; (5) process improvement; (6) teamwork; (7) people management; (8) measurement of resources; and (9) prevention.Similarly for Malaysian institutions -- (1) leadership; (2) continuous improvement; (3) external customer satisfaction; (4) teamwork; (5) people management; (6) internal customer satisfaction; (7) process improvement; (8) measurementof resources; and 9) prevention. And British Institutions-- (1) continuous improvement; (2) leadership (3) external customer satisfation; (4) process improvement; (5) teamwork; (6) internal customer satisfaction; (7) people management; (8) measurement of resources; and (9) prevention. Leadership is the highest ranked quality management critical success factor inUnited States and Malaysia but is ranked second in United Kingdom.

	Critical success factors	Malaysia				Pop.	
		Non-TQM	Cases	TQM	Cases	mean	Cases
1	Leadership	8.3	16	9.2	11	8.7	27
2	Continuous improvement	6.9	15	7.7	11	7.3	26
3	Prevention	4.2	13	2.6	11	3.5	24
4	Measurement of resources	4.0	14	3.6	11	3.8	25
5	Process improvement	4.8	12	5.8	11	5.3	23
6	Internal customer satisfaction	6.7	12	5.3	11	6.0	23
7	External customer satisfaction	8.0	13	5.7	11	6.9	24
8	People management	6.0	13	6.9	11	6.4	24
9	Teamwork	6.8	14	6.2	11	6.5	25
10	Other	1.0	2	1.0	1	1.0	3

Table 28. Average Rank of Emphasis Given on CSFs During TQM Implementation.
Range of Values: 1.0 - 10.0.

During implementation of quality management, the role of leadership is less demanding compared to its perceived degree of importance. It indicates that there is a lack of understanding about the importance of leadership in the implementation process of quality management.

	Critical success factors	U.S				Pop.		U.K.				Pop.	
		Non-TQM	Cases	TQM	Cases	mean	Cases	Non-TQM	Cases	TQM	Cases	mean	Cases
1	Leadership	8.1	10	8.3	32	8.3	42	7.94	16	8.5	4	8.1	20
2	Continuous improvement	6.9	10	7.7	28	7.5	38	9.17	18	10.0	3	9.3	21
3	Prevention	4.4	5	4.9	10	4.7	15	8.00	2	0.0	0	8.0	2
4	Measurement of resources	5.2	5	4.6	18	4.7	23	6.57	7	5.0	1	6.4	8
5	Process improvement	6.5	11	6.7	29	6.6	40	7.73	11	9.0	2	7.9	13
6	Internal customer satisfaction	6.6	10	6.8	24	6.7	34	7.23	13	7.3	4	8.0	17
7	External customer satisfaction	6.2	11	6.6	27	6.5	38	8.15	13	7.25	4	7.95	17
8	People management	4.8	4	4.4	14	4.4	18	8.90	11	7.5	2	8.1	13
9	Teamwork	7.2	10	6.3	27	6.5	37	7.00	14	5.0	1	6.9	15
10	Other	9.0	1	4.0	2	5.7	3	0.00	0	0.0	0	0.0	0

Table 28 Continued.

	Critical success factors	Malaysia				Pop. mean	Cases
		Non-TQM	Cases	TQM	Cases		
1	Leadership	9.17	12	7.7	11	8.5	23
2	Continuous improvement	8.33	15	7.6	11	8.0	26
3	Prevention	5.50	6	2.7	7	4.0	13
4	Measurement of resources	6.00	37	4.4	8	4.8	11
5	Process improvement	6.10	10	6.0	11	6.1	21
6	Internal customer satisfaction	6.90	10	6.1	7	6.6	17
7	External customer satisfaction	7.91	11	5.1	10	6.6	21
8	People management	6.17	6	6.9	9	6.6	15
9	Teamwork	8.10	10	5.6	11	6.8	21
10	Other	0.00	0	0.0	0	0.0	0

Table 29: Kendal and Spearman Correlation Between Importance of CSFs and Emphasis Given to Them During TQM Implementations in HEIs.

The coefficient values indicate moderate to strong correlation (95% significant) between importance of CSFs and emphasis given to them during implementation.

Coefficient	U.S.	U.K.	M'sia
Kendall	0.6000	0.4444	0.7778
Spearman	0.8061	0.4333	0.8833

Table 30: Whether CSF Rankings in HEIs Change Over Time.

For most institutions, the rankings of CSFs change over time.

Does ranking of CSFs change over time?	U.S. HEIs		U. K. HEIs		M' sian HEIs		Total	%
	Count	%	Count	%	Count	%		
Yes	40	76.9	20	80.0	23	85.2	83	79.8
No	12	23.1	5	20.0	4	14.8	21	20.2
Number of respondents	52	100	25	100.0	27	100	104	100.0

Table 31: Types of Measure Used to Evaluate Organisational Performance.

(Multiple response question: percentages do not add up to 100.0%)

Most private institutions use measures based on financial conditions that depend on customer satisfaction. This is because the survival of private institutions depends on their financial performance. One of the measures of business excellence is customer satisfaction, which is nonon-financial, but contributes to an organisation's future revenues.

Measures used to evaluate	U.S. HEIs						U.K. HEIs		Malaysian HEIs						Grand	
organisational performance	Public	%	Pvt.	%	Total	%	Total	%	Public	%	Pvt.	%	Total	%	Total	%
Financial condition	22	48.9	17	81.0	39	59.1	33	76.7	6	54.5	27	56.3	33	55.9	105	62.5
Competitiveness	19	42.2	11	52.4	30	45.5	23	53.5	7	63.6	19	39.6	26	44.1	79	47.0
Market share	21	46.7	8	38.1	29	43.9	28	65.1	2	18.2	18	37.5	20	33.9	77	45.8
Superiority of product or service	22	48.9	6	28.6	28	42.4	26	60.5	5	45.5	25	52.1	30	50.8	84	50.0
Goodwill	10	22.2	5	23.8	15	22.7	13	30.2	4	36.4	17	35.4	21	35.6	49	29.2
Other	10	22.2	2	9.5	12	18.2	9	20.9	1	9.1	2	4.2	3	5.1	24	14.3
Number of respondents	45		21		66		43		11		48		59		168	

Table 32: Types of Measures Used to Evaluate Progress of Quality Management.

(Multiple response question: percentages do not add up to 100.0%)

Unlike in Malaysia, performance indicators are more widely used in the U.S. and U.K. HEIs . The use of performance indicators have been criticised by researchers because they merely represent indicators of quality, which may not be accurate.

Measures used to evaluate	U.S HEIs						U.K. HEIs		Malaysian HEIs						Grand	
Quality Management	Public	%	Pvt.	%	Total	%	Total	%	Public	%	Pvt.	%	Total	%	Total	%
Use of performance indicators	25	64.1	14	82.4	39	69.6	17	65.4	5	71.4	8	38.1	13	46.4	69	0.6
Based on goal achievement	21	53.8	12	70.6	33	58.9	14	53.8	6	85.7	14	66.7	20	71.4	67	0.6
Based on financial position of the organisation	4	10.3	4	23.5	8	14.3	9	34.6	2	28.6	10	47.6	12	42.9	29	0.3
Based on how well processes are moving	16	41.0	7	41.2	23	41.1	15	57.7	5	71.4	11	52.4	16	57.1	54	0.5
Other	3	7.7	0	0.0	3	5.4	4	15.4	1	14.3	1	4.8	2	7.1	9	0.1
Number of respondents	39		21		56		26		7		21		28		110	1.0

Table 33. Assessment of Organisational Performance.

Tables 33 & 34: In all three countries, most institutions report good overall organisational performance & good to excellent Quality performance.

Organisational performance	U.S. HEIs		U.K. HEIs		M' sian HEIs		Total	%
	Count	%	Count	%	Count	%		
Excellent	8	11.1	5	10.2	3	5.0	16	8.8
Very good	22	30.6	14	28.6	15	25.0	51	28.2
Good	32	44.4	23	46.9	32	53.3	87	48.1
Fair	7	9.7	7	14.3	10	16.7	24	13.3
Poor	3	4.2	0	0.0	0	0.0	3	1.7
Number of respondents	72	100.0	49	100.0	60	100.0	181	100.0

Table 34. Assessment of Quality Management.

Performance of Quality Management	M' sian HEIs		U.S. HEIs		U.K. HEIs		Total	%
	Count	%	Count	%	Count	%		
Excellent	6	10.0	10	13.8	6	12.2	22	12.2
Very good	14	23.3	24	33.3	21	42.9	59	32.6
Good	29	48.3	33	45.8	18	36.7	80	44.2
Fair	11	18.3	5	6.9	4	8.2	20	11.0
Poor	0	0.0	0	0.0	0	0.0	0	0.0
Number of respondents	60	100.0	72	100.0	49	100.0	181	100.0

Table 35. Organisational and Quality Performances of Non-TQM and TQM Institutions.

Performance	United States HEIs								United Kingdom HEIs							
	Non-TQM				TQM				Non-TQM				TQM			
	Org'nl	%	Quality	%	Org'nl	%	Quality	%	Org'nl	%	Quality	%	Org'nl	%	Quality	%
Excellent	2	12.1	4	12.1	4	10.3	6	15.4	4	8.9	5	11.1	1	25.0	1	25
Very Good	9	27.3	10	30.3	13	33.3	14	35.9	14	31.1	21	46.7	0	0.0	0	
Good	13	39.4	17	51.5	19	48.7	16	41.0	21	46.7	16	35.6	2	50.0	2	50.0
Fair	4	12.1	2	6.1	3	7.7	3	7.7	6	13.3	3	6.7	1	25.0	1	25.0
Poor	3	9.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	33	100.0	33	100.0	39	100.0	39	100.0	45	100.0	45	100.0	4	100.0	4	100.0

Table 35 Continued.

In all three countries, most TQM institutions outperform non-TQM institutions in organisational and Quality performance.

Performance	Malaysian HEIs							
	Non-TQM				TQM			
	Org'nl	%	Quality	%	Org'nl	%	Quality	%
Excellent	1	2.2	4	8.9	2	13.3	2	13.3
Very Good	12	26.7	9	20.0	3	20.0	5	33.3
Good	23	51.1	21	46.7	9	60.0	8	53.3
Fair	9	20.0	11	24.4	1	6.7	0	0.0
Poor	0	0.0	0	0.0	0	0.0	0	0.0
Total	45	100.0	45	100.0	15	100.0	15	100.0

Table 36. Kendall and Spearman Correlation Between Organisational and Quality Performance of Institutions.

In the three countries, especially for U.S. and U.K HEIs, good Quality performance is associated with good organisational performance (95% significant) for TQM and non-TQM institutions.

Coefficient	M'sia	U.S	U.K.
Kendall	0.5603	0.6761	0.7043
Spearman	0.5534	0.7263	0.7609

Table 37. Institution's Future Plan to Improve Quality.

(Multiple response question: percentages do not add up to 100.0%)

There is moderate interest to implement TQM among many non-TQM institutions in Malaysia. Many TQM insitutions in the U.S. have moderate interest to expand TQM to cover wider Quality activities. In general, this result indicates that there is reasonable support for TQM in both countries. U.K. HEIs are more concerned with other quality improvement approaches not specificaly listed in the table.

Future plans for Quality improvement	U.S. HEIs		U.K. HEIs		Malaysian HEIs		Total	%
	Count	%	Count	%	Count	%		
Obtain ISO9000 certification	4	7.0	0	0.0	25	43.1	29	22.7
Bid for Quality Award	12	21.1	6	18.2	9	15.5	33	25.8
Implement TQM	7	12.3	1	3.0	25	43.1	34	26.6
Expand TQM to cover wider aspect of organisation	26	45.6	2	6.1	9	15.5	37	28.9
Other	17	29.8	24	72.7	14	24.1	81	63.3
Number of respondents	57		33		58		128	

QCC programme exists?	M' sian HEIs		U.S. HEIs		Total	%
	Count	%	Count	%		
Yes	14	48.3	9	16.7	23	27.7
No	15	51.7	45	93.9	60	72.3
Number of respondents	29	100.0	54	100.0	83	100.0

Table 38. Number of Institutions Implementing Quality Control Circle Programme.

QCC programme	Malaysian HEIs			U.S HEIs		
	TQM			TQM		
	Yes	No	Total	Yes	No	Total
Yes	8 72.7%	3 27.0%	11	8 88.9%	1 11.1%	9
No	5 22.7%	17 77.0%	22	29 64.4%	16 35.6%	45
Number of respondents	13	20	33	37	17	54

Table 39. QCC Programme and TQM.

Correlation	Msia	U.S
PHI	-0.48	-0.20
Contingency	0.43	0.19

Table 40. PHI and Contingency Correlations of QCC and TQM in HEIs.

Tables 39 - 40: There is no evidence to suggest that institutions that implement QCC programmes would practice TQM as well.

QCC programme exists?	M' sian HEIs		U.S. HEIs		Total	%
	Count	%	Count	%		
Yes	14	48.3	9	16.7	23	27.7
No	15	51.7	45	93.9	60	72.3
Number of respondents	29	100.0	54	100.0	83	100.0

Table 38. Number of Institutions Implementing Quality Control Circle Programme.

QCC programme	Malaysian HEIs			U.S HEIs		
	TQM			TQM		
	Yes	No	Total	Yes	No	Total
Yes	8 72.7%	3 27.0%	11	8 88.9%	1 11.1%	9
No	5 22.7%	17 77.0%	22	29 64.4%	16 35.6%	45
Number of respondents	13	20	33	37	17	54

Table 39. QCC Programme and TQM.

Correlation	Msia	U.S
PHI	-0.48	-0.20
Contingency	0.43	0.19

Table 40. PHI and Contingency Correlations of QCC and TQM in HEIs.

Tables 39 - 40: There is no evidence to suggest that institutions that implement QCC programmes would practice TQM as well.

Table 42. Average Rank of Reasons for Failure of Individual QCCs.

Range of Values: 1.0 - 5.0.

Most of the factors in the table are associated with barriers that originate from organisational members.

	Reasons for failure of QCCs	Malaysian HEIs		U.S HEIs		Pop.	
		Ranks Avg.	Cases	Ranks Avg.	Cases	mean	Cases
1	Lack of commitment	3.0	4	5.0	1	3.4	5
2	Lack of knowledge	2.7	3	0.0	0	2.7	3
3	Afraid of change	4.0	1	0.0	0	4.0	1
4	Complacency	3.0	3	0.0	0	3.0	3
5	Lack of teamwork	3.0	3	1.0	1	2.5	4
6	Improper training	4.0	1	0.0	0	4.0	4
7	Staff pressed with daily work	3.5	2	0.0	0	3.5	2
8	Lack of incentives	2.0	2	0.0	0	2.0	2
9	Poor management response to feedback	0.0	0	5.0	1	5.0	1
10	No immediate result	2.0	1	0.0	0	2.0	1
11	Poorly scheduled projects	0.0	0	4.0	1	4.0	1
12	Lack of supervision	0.0	0	5.0	1	5.0	2
13	Unclear mission	0.0	0	5.0	1	5.0	1
14	Lack of leadership	5.0	1	4.0	1	4.5	2
15	Inadequate resources	0.0	0	3.0	1	3.0	1
16	Unrealistic expectations	0.0	0	2.0	1	2.0	1

Table 43. Progress of QCC Programme.

Many QCC programmes are still operating after several years of implementation. This suggests that implementation of Quality Management approaches such as TQM is sustainable because QCCs have adopt three of the important critical success factors, e.g., leadership, teamwork, and management by fact, which are important for TQM as well.

Is QCC programme still operating?	Malaysian HEIs		U.S. HEIs		Total	%
	Count	%	Count	%		
Yes (1 - 19 years)	9	81.8	7	87.5	16	84.2
No	2	18.2	1	12.5	3	15.8
Number of respondents	11	100.0	8	100.0	19	100.0

Table 44. Average Rank of Reasons for Suspension of QCC Programme.
Range: 1.0 - 10.0.

Lack of commitment is a common threat to QCC programmes. It is also a barrier to TQM.

	Reasons for suspension of QCC programme	Malaysian HEIs		U.S. HEIs		Pop. mean	Cases
		Avg.Rank	Cases	Avg.Rank	Cases		
1	Lack of commitment	5.0	2	5.0	1	5.0	3
2	Waste of resources	5.0	1	0.0	0	5.0	1
3	Change of management	0.0	0	5.0	1	5.0	1

Table 45. The Outcome of QCC Programme.

(Multiple response question: percentages do not add up to 100.0%)

QCC programmes do work for many HEIs. Many respondents believe that they have a potential for improving future organisational performance.

Outcome of QCC programme	M'sian HEIs		U.S. HEIs		Total	%
	Count	%	Count	%		
Improved performance	5	45.5	5	55.6	10	50
Has the potential of improving performance in the future	5	45.5	2	22.2	7	35.0
No difference in performance	1	9.1	0	0.0	1	5.0
Other	0	0.0	2	22.2	2	10.0
Number of respondents	11		9		20	

Table 46. Major Factors that Influence QCC Results.

(Multiple response question: percentages do not add up to 100.0%)

Teamwork is the main factor for the success of QCC programmes. It is a critical success factor for TQM as well.

Factors that influence QCC results	M'sian HEIs		U.S HEIs		Total	%
	Count	%	Count	%		
Teamwork	10	90.9	7	87.5	17	89.5
Problem-solving techniques used	5	45.5	7	87.5	12	63.2
Delegation of authority	7	63.6	5	62.5	12	63.2
Advice given by the consultant	2	18.2	2	25.0	4	21.1
Motivation derived from working in group	9	81.8	5	62.5	14	73.7
Intrinsic reward gained	3	27.3	3	37.5	6	31.6
Support by management	8	27.3	7	87.5	15	78.9
Other	1	3.4	1	12.5	2	10.5
Number of respondents	11		8		19	

APPENDIX D

MEASUREMENT INSTRUMENT

BUSINESS EXCELLENCE IN HIGHER EDUCATION

<Date>

Dear <Title><Name>

Thank you for your participation in the Higher Education International Survey in Total Quality Management that was conducted early this year. The survey had generated interesting and valuable information on: Quality status and TQM in higher education institutions; TQM critical success factors; TQM and institutional performance; and implementation of quality control circles programme. As promised, enclosed is a summary of findings that gives information on the role of Quality in institutional development. An expanded version of the findings will appear as a paper in the Total Quality Management journal edited by Professor Gopal Kanji in 1999 and The Best in Quality (International Academy for Quality, Vol. 10).

At present, the research focuses on building a TQM model suitable for higher education institutions. For that, detailed information is required on the critical success factors identified in the previous survey. In order to obtain this information, a final questionnaire has been prepared and enclosed. This time, the questionnaire is much shorter and requires respondents to cross the relevant boxes only. We would be extremely grateful if you could contribute to the research by completing the questionnaire and returning it when you can. Please use the self-addressed envelope provided.

As in the last survey, we give assurance of the confidentiality of the information you provide. Thus, the research results will be reported in aggregate only. A summary of findings will be provided that will give you information on the TQM model suitable for higher education institutions and how it can be used.

Thank you for your time and assistance.

Yours sincerely,

Professor Gopal K. Kanji
A.Tambi
Director, Management Sciences

Research Centre
University
Sheffield Hallam University

Abdul Malek bin

Research Student

Sheffield Hallam

INTERNATIONAL SURVEY ON TQM CRITICAL SUCCESS FACTORS FOR BUSINESS EXCELLENCE IN HIGHER EDUCATION

The purpose of this survey is to determine your perceptions of the extent to which your institution practices TQM critical success factors and their effect on organisational excellence. The measurement items in this survey are by no means an attempt to assess individual higher education institutions but to model and measure relationship between critical success factors and business excellence. It is hoped that the outcomes of this research will benefit TQM practitioners at higher education institutions.

Thank you for your time and interest.

Directions: In all the following, please cross the appropriate box to indicate how you would rate **the extent to which your institution practices TQM critical success factors and evaluate business excellence.**

A glossary of terms used is provided at the back page for your reference.

SECTION A: CRITICAL SUCCESS FACTORS AND BUSINESS EXCELLENCE

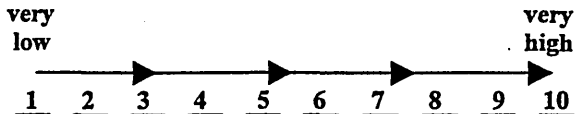
1. LEADERSHIP

The extent to which:

	very little → very much									
	1	2	3	4	5	6	7	8	9	10
Top management assumes responsibility for quality performance.	..... ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Major department heads participate in quality improvement process.	..... ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
The institution's quality goals are clearly defined.	..... ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
The institution's quality values are adopted and reinforced throughout the institution.	..... ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
The quality values are integrated into day-to-day leadership.	..... ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
The people are feeling well-managed and motivated.	..... ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2. DELIGHT THE CUSTOMER

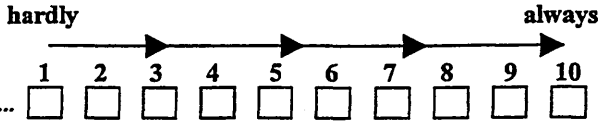
The extent to which the institution:



- Determines current and future customer requirements and expectations. .....
- Provides effective management in order to achieve customer loyalty. .....
- Uses information gained from customers to improve customer services. .....

3. CUSTOMER SATISFACTION (EXTERNAL)

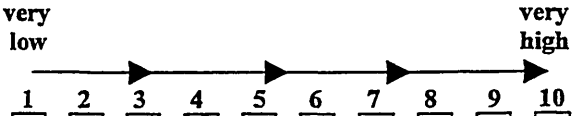
The extent to which the institution:



- Is committed to its explicit and implicit promise underlying its services to customers. .....
- Handles complaints, resolves them, and uses complaint information for quality improvement and for prevention of recurrence of problems. .....
- Uses methods for determining external customer's perceived quality. .....
- Uses methods for determining external customer's perceived value. .....
- Uses methods for determining external. customer's satisfaction .....
- Compares its customer satisfaction results with that of competitors'. .....

4. INTERNAL CUSTOMERS ARE REAL

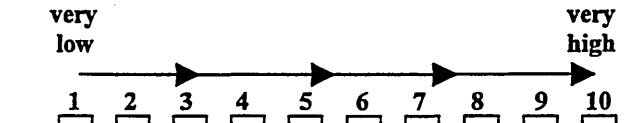
The extent to which:



- There is strong employee interaction with customers and suppliers. .....
- There exists methods to improve co-ordination of interdependent tasks. .....
- The institution focuses on external customers when tasks are being performed. .....
- The institution provides what is needed by employees for them to perform their jobs. .....

5. MANAGEMENT BY FACT

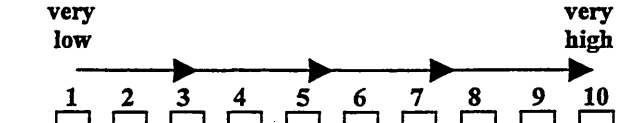
The extent to which the institution:



- Has performance measurement system that evaluates its quality improvement processes? ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Disseminates performance measurements to those that require them? ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Uses the performance measurements to improve its services? ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

6. ALL WORK IS PROCESS

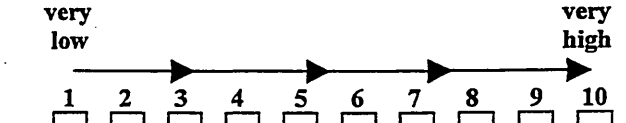
The extent to which the institution:



- Has processes that are designed to meet all the service quality requirements. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Assesses the quality of its processes. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Has effective policy for recruitment and admission of students. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Has procedures to improve student learning outcomes. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Has effective policy for recruitment of highly outstanding academic and non-academic staff. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Has effective policy for maintaining highly outstanding staff. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

7. MEASUREMENT

The extent to which the institution:



- Collects a wide range of complete and accurate performance indicators. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Has appropriate methodology for comparing or assessing quality. ..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

8. PEOPLE-BASED MANAGEMENT

The extent to which :

	very low → very high	1	2	3	4	5	6	7	8	9	10
Feedback is provided to employees on their performance.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
The institution's overall human resource management effort supports its quality objectives.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Means are available for all employees to contribute effectively to meeting the institution's quality objectives.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

9. TEAMWORK

The extent to which:

	very low → very high	1	2	3	4	5	6	7	8	9	10
Teamwork is encouraged for employees to communicate to others about their jobs.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Teams are used to solve cross-functional problems.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Action-teams are used to solve local problems.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

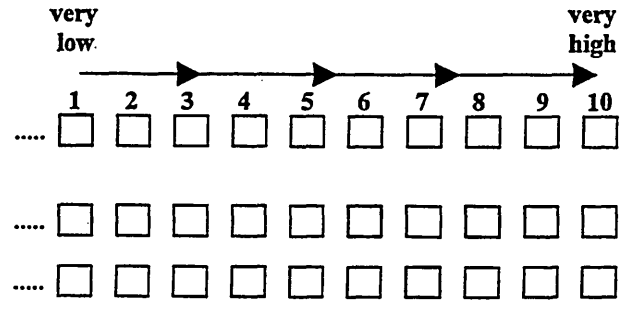
10. PEOPLE MAKE QUALITY

The extent to which :

	very low → very high	1	2	3	4	5	6	7	8	9	10
Quality related training is given to managers.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Quality related training is given to employees.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
There are resources available for employee training.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Managers remove the barriers that prevent people from improving quality, e.g. lack of training, poorly defined jobs, etc.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
People are proud to work for the institution.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
The institution promotes innovation by empowering individuals within the organisation.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

11. CONTINUOUS IMPROVEMENT

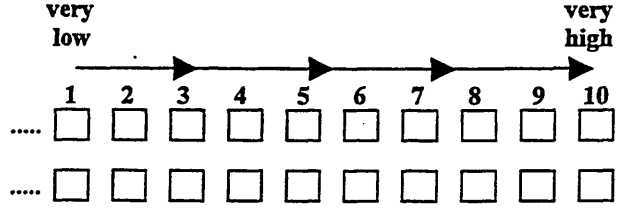
The extent to which:



- The institution reacts to trends in its customer satisfaction and indicators of adverse customer response. .....
- Quality improvement methods are used to improve all services. .....
- The institution compares current quality levels of service features with those of competitors'. .....

12. CONTINUOUS IMPROVEMENT CYCLE

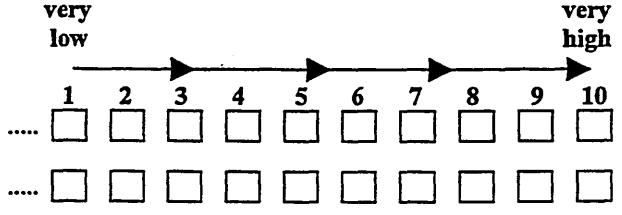
The extent to which :



- The institution has quality culture of continuous improvement. .....
- An active employee suggestion scheme is used. .....

13. PREVENTION

The extent to which:



- Improved customer services are introduced to drive out failures. .....
- The institution's processes are designed to prevent potential problems. .....

14. BUSINESS EXCELLENCE

The extent to which the institution :

	very low → very high	1	2	3	4	5	6	7	8	9	10
Compares current performance of organisation with that of competitors'.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Compares current performance of organisation with that of world market leaders'.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has strong financial performance.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has high customer demand.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Achieves its goals.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has performed recruitment and admission of students effectively.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has achieved the desired student learning outcomes.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has performed recruitment of highly outstanding staff.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has able to maintain outstanding staff.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Has applied an assessment criteria to its external suppliers, e.g., for supply of buildings, computers, pens, pencils, etc.	.....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SECTION B: **The following items are for statistical information only.**

15. What is your institution's name?
(You are reassured of anonymity) ☐

16. Is it a public or private institution?

☐ Public ☐ Private

17. What is the date of establishment of the institution? (Year) ☐☐☐☐

18. What is the type of institution?

☐ University ☐ College ☐ Other
☐ Institute ☐ Polytechnic (Please specify:.....)

19. How many full-time and part-time employees does the institution have? (Write number in boxes)

Part-time ☐ Full time ☐

20. How many students? (Write number in boxes)

Part-time ☐ Full time ☐

21. About you as a contact person. (Fill in particulars)

a. What is your name? ☐
b. What is your job title? ☐
c. What is your telephone number? ☐
d. What is your Fax number? ☐
e. What is your E-mail address? ☐

If you would like to make any comments or suggestions, please use the space below:

☐ Please cross here if you would like to receive a summary of findings.
Thank you very much for your co-operation.

GLOSSARY

External customers	Those outside the organisation to whom the organisation offers its products, e.g. businesses, government, students, parents, , etc.
Goals	Organisation's purpose, mission, and objectives.
Internal customers	Employees that require inputs such as information, materials, etc. from other employees in order to complete part of the whole job.
Local problems	Problems that are localised to a particular work unit.
Measurement	Use of quality tools to obtain measurements of quality attributes.
People-based management	Concepts or techniques needed to carry out the people or human resource aspect of management.
Perceived quality	Consumer's judgement about an entity's overall excellence or superiority.
Process	A series of actions which is carried out in order to achive a particular result, e.g. informational process, storage, locational, physical, and physiological.
Products	Include goods ad services.
Total Quality Management (TQM)	A process of continuously satisfying customer requirements at lowest costs, by harnessing the commitment of everyone in the organisation.

Sheffield Hallam University

BUSINESS EXCELLENCE IN HIGHER EDUCATION

<Date>

Dear <Title> <Name>

Recently we had sent you a questionnaire on Business Excellence in Higher Education. However, we have not had any response as yet. We would be extremely grateful if you could complete and return the questionnaire as soon as possible. Once we have received the questionnaire, we would analyse the data and would provide you with business excellence indices of your institution. Please let us know if you need another copy of the questionnaire so that we could provide you with one.

Please ignore this request if you have already returned the questionnaire.

Thank you and hope to hear from you soon. Happy New Year.

Yours sincerely,

Professor Gopal K. Kanji
Director, Management Sciences
Research Centre
Sheffield Hallam University
E-mail: g.k.kanji@shu.ac.uk

Abdul Malek bin A.Tambi
Research Student
Sheffield Hallam University
E-mail: a.malek@shu.ac.uk

Sheffield Business School
City Campus Howard Street Sheffield S1 1WB UK
Telephone +44 (0) 114 225 3171 Fax +44 (0)114 225 3161
Director of School Reverend Professor Ian Draffan MSc FBCS MIDPIM CEng

Divisions
Applied Statistics Information Systems Computing and Networks

APPENDIX E

CORRELATION COEFFICIENT AMONG LATENT VARIABLES OF BUSINESS EXCELLENCE MODEL

Table 1: Correlation Matrix of Mean Scores among Critical Success Factors and Business Excellence for Combined Institutions.

CSFs & BE	1	2	3	4	5	6	7	8	9	10
1. Leadership	1									
2. Delight the customer	0.7959	1								
3. Customer focus	0.7992	0.8117	1							
4. Management by fact	0.7631	0.6685	0.8305	1						
5. Process performance	0.8507	0.7903	0.9040	0.8760	1					
6. People-based management	0.8428	0.7003	0.8235	0.8027	0.8027	1				
7. People performance	0.8215	0.7574	0.8919	0.8507	0.8507	0.8862	1			
8. Continuous improvement	0.8394	0.8024	0.8825	0.7992	0.7992	0.8380	0.8621	1		
9. Improvement culture	0.8181	0.7542	0.8814	0.8145	0.8145	0.8106	0.8516	0.8845	1	
10. Business excellence	0.7799	0.7391	0.9056	0.8346	0.8346	0.7983	0.8925	0.8611	0.8837	

Table 2: Correlation Matrix of Mean Scores among Critical Success Factors and Business Excellence for U.S. Institutions.

CSFs & BE	1	2	3	4	5	6	7	8	9	10
1. Leadership	1									
2. Delight the customer	0.8696	1								
3. Customer focus	0.9087	0.8854	1							
4. Management by fact	0.8647	0.7244	0.8571	1						
5. Process performance	0.8923	0.8221	0.9256	0.9168	1					
6. People-based management	0.8836	0.8070	0.9005			1				
7. People performance	0.8687	0.8749	0.8844	0.8194	0.8897	0.9113	1			
8. Continuous improvement	0.8803	0.8596	0.9246	0.8001	0.8718	0.8924	0.8812	1		
9. Improvement culture	0.8937	0.8723	0.9312	0.8433	0.9125	0.9107	0.9127	0.9416	1	
10. Business excellence	0.9014	0.8570	0.9484	0.8867	0.9192	0.8871	0.8633	0.9178	0.9040	1

Table 3: Correlation Matrix of Mean Scores among Critical Success Factors and Business Excellence for U.K. Institutions.

CSFs & BE	1	2	3	4	5	6	7	8	9	10
1. Leadership	1									
2. Delight the customer	0.2762	1								
3. Customer focus	0.5983	0.6122	1							
4. Management by fact	0.5331	0.4551	0.5768	1						
5. Process performance	0.5997	0.7578	0.7144	0.6081	1					
6. People-based management	0.7681	0.4829	0.4997	0.4026	0.7229	1				
7. People performance	0.8226	0.6238	0.7946	0.6460	0.8317	0.8435	1			
8. Continuous improvement	0.6550	0.2780	0.5594	0.7524	0.4990	0.5151	0.6358	1		
9. Improvement culture	0.5120	0.6741	0.5798	0.8124	0.6947	0.5623	0.6516	0.5873	1	
10. Business excellence	0.6832	0.6404	0.8371	0.5958	0.7810	0.7825	0.8913	0.6170	0.6644	1

Table 4: Correlation Matrix of Mean Scores among Critical Success Factors and Business Excellence for Malaysian Institutions.

CSFs & BE	1	2	3	4	5	6	7	8	9	10
1. Leadership	1.0000									
2. Delight the customer	0.9177	1.0000								
3. Customer focus	0.8159	0.7227	1.0000							
4. Management by fact	0.7605	0.6524	0.8185	1.0000						
5. Process performance	0.8738	0.7876	0.9270	0.8888	1.0000					
6. People-based management	0.8131	0.7190	0.8566	0.9228	0.8925	1.0000				
7. People performance	0.7876	0.7299	0.8345	0.8281	0.8451	0.8835	1.0000			
8. Continuous improvement	0.8606	0.8315	0.8548	0.7978	0.8663	0.8399	0.8548	1.0000		
9. Improvement culture	0.8750	0.7847	0.8400	0.8051	0.8460	0.8497	0.8368	0.8770	1.0000	
10. Business excellence	0.7921	0.6789	0.9220	0.8266	0.9187	0.8850	0.8626	0.8531	0.8539	1.0000

APPENDIX F

REVISED INDICES AND MEAN SCORES FOR U.S., U.K., AND MALAYSIAN INSTITUTIONS (LEADERSHIP INDEX FIXED AT 75%)

Critical Success factor and business excellence	Upper limit	Original index BE = 60	Target business excellence index 65	70	75	80	85	90	95
1. Leadership	75	75	75	75	75	75	75	75	75
2. Delight the Customer	75	58	58	58	58	66	75	75	75
3. Customer focus	75	60	60	60	60	60	60	75	75
4. Management by fact	75	47	47	47	47	47	47	47	53
5. Process performance	75	56	56	56	56	56	70	75	75
6. People-based management	75	51	51	51	65	75	75	75	75
7. People performance	75	55	55	71	75	75	75	75	75
8. Continuous improvement	75	50	50	50	50	50	50	50	50
9. Improvement culture	75	53	53	53	53	53	53	53	75

Table 1: Revised Indices of Critical Success Factors and Business Excellence for U.S. Institutions with Leadership Fixed at 75%.

Leadership	Old mean	New mean
Top management involvement	6.10	7.00
Institution's goal definition	6.10	6.51
Institution's quality values	5.90	6.95
People management	5.30	5.99
People-based management		
Human resource management	5.5	6.45
Employee quality involvement	5.7	6.97

Table 2: New Mean Scores of Affected Factors for U.S. Institutions with Leadership Fixed at 75%.

Critical Success factor and business excellence	Upper limit	Original index BE = 63	Target business excellence index 65	70	75	80	85	90	95 (2.3)
1. Leadership	75	75	75	75	75	75	75	75	75
2. Delight the Customer	75	67	67	67	67	67	67	67	75
3. Customer focus	75	59	59	59	59	59	75	75	75
4. Management by fact	75	57	57	57	57	75	75	75	75
5. Process performance	75	65	66	75	75	75	75	75	75
6. People-based management	75	46	46	46	46	46	46	68	75
7. People performance	75	57	57	63	75	75	75	75	75
8. Continuous improvement	75	57	57	57	57	57	70	75	75
9. Improvement culture	75	48	48	68	75	75	75	75	75

Table 3: Revised Indices of Critical Success Factors and Business Excellence for U.K. Institutions with Leadership Fixed at 75%.

Item	Old mean	New mean
Manager's involvement	6.70	7.04
Institution's goal definition	6.80	7.56
Everyday leadership	5.70	6.37

Table 4: New Mean Scores of Affected Factors for U.S. Institutions with Leadership Fixed at 75%.

Critical Success factor and business excellence	Upper limit	Original index BE = 64	Target business excellence index 65	70	75	80	85	90	95 (9.2)
1. Leadership	75	75	75	75	75	75	75	75	75
2. Delight the Customer	75	69	69	69	73	75	75	75	75
3. Customer focus	75	61	61	71	75	75	75	75	75
4. Management by fact	75	59	59	59	59	75	75	75	75
5. Process performance	75	66	66	66	75	75	75	75	75
6. People-based management	75	62	62	62	62	62	75	75	75
7. People performance	75	65	65	65	65	65	75	75	75
8. Continuous improvement	75	67	67	67	67	67	67	75	75
9. Improvement culture	75	65	65	65	65	65	75	75	75

Table 5: Revised Indices of Critical Success Factors and Business Excellence for Malaysian Institutions with Leadership Fixed at 75%.

Leadership	Old mean	New mean
Top management involvement	7.50	7.86
Institution's goal definition	7.10	7.30
Institution's quality values	7.10	7.28
Everyday leadership	6.90	7.24
People management	6.60	6.95
Delight the customer		
Customer requirements	7.40	7.54
Customer loyalty	7.20	7.65
Customer services	7.20	7.35
Customer focus	Old mean	New mean
Handling customer complaints	7.10	7.15
Customer perceived valued	6.40	6.60
Task co-ordination	6.30	6.36
Employee job requirements	6.70	6.75

Table 6: New Mean Scores of Affected Factors for U.S. Institutions with Leadership Fixed at 75%.