Conceptualizing a Multi-attribute Diagnostic Model for Total Quality Management

Anna Bella Siriban-Manalang
Asst. Professor, De La Salle University

ABSTRACT

As part of an ongoing research on the development of a diagnostic tool for Total Quality Management, this paper attempts to conceptually define a quantitative assessment approach to measure the dynamic and multi-attribute characteristics of TQM. From a synthesis of the various quality management approaches in the past, identified current practices and expert opinions, the level of TQM adoption at the organizational level is found to be anchored on a systems structure composed of top leadership involvement, customer focus, human resource empowerment, continuous improvement and process vitality as the characterizing attributes.

I. Introduction

The quality issue has become more pervasive in all organizations. With the changing tide of global competition, the quality definition and the methods by which it is attained may change, but it will always be paramount in the agenda of any organization for two principal reasons - survival and competition. The first principal reason recognizes the need for a product or service provider to satisfy its customers in a cost-effective manner if it is to survive. The second focuses on the reality that no provider, whether of product or service, will be free from competition in its lifetime [38].

From a customer's point of view, whether the organization has provided quality goods or services depends not only on what it does, but also on what its competitors do. This competitive environment is influenced by technological, political and social developments, among other factors that shape the future. Because of these, quality has evolved into a dynamic, multi-attribute concept.

Quality Management Systems in organizations have evolved through time. It started with Quality Control (QC) in the 1920s and was transformed and made popular in its many forms : Quality Assurance (QA) and Total Quality Control (TQC) in the 1960s, and Total Quality Management (TQM) in the 1980s [32]. The more popular form, Total Quality Management, is a holistic and integrated management style of ensuring high quality products and services through continuous improvement in an organization. TQM is also known by its many other names : Total Quality Control [11], Company-wide Quality Control [23], Strategic Total Enterprise Management [21] and Focused Quality [7]. Top Management or its implementing body defines the TQM philosophy and its implementing framework to suit the eccentricities, intricacies and uniqueness of the organization.

TQM efforts exerted worldwide have grown tremendously in the last decade. Companies have implemented and launched TQM efforts using different implementation frameworks, re-launched quality circles and continuous improvement programs, attempted to sustain the quality consciousness organization-wide and devised systematic ways to measure the degree of success in the implementation. TQM implementation frameworks across organizations differ because organizations differ. A TQM consultant prescribes a specific implementation framework customized to the organization's nature, culture and company profile.

The paper attempts to define conceptually a quantitative TQM assessment tool. It is part of an ongoing research across manufacturing companies in the Philippines focused on defining a quantitative, multi-attribute model for evaluating the level of TQM adoption in an organization. The initial section of the paper provides an overview of the quality concept and traces its historical evolution during the century. A conceptual framework is then synthesized from the various quality management approaches, identified practices and expert opinions, which all culminated in the identification of key attributes of a TQM system. The last few sections are devoted to detailing the differentiating TQM attributes and to examining the structural linkages of its elements.

II. THE CONCEPT OF QUALITY

The definition of quality has evolved through time. Brian Thomas documents that the traditional method of providing goods and services has been predominantly supplier-led rather than customer-driven, where goods and services are designed and delivered in ways biased towards the needs and requirements of the supplier and not of the customer [38].

The above definition falls under the first three types of quality that David Garvin has identified [14]. Garvin described five major approaches to quality, namely :

- *Transcendent* – Quality is understood only after exposure to a series of objects that develop it characteristics. Quality can't be defined and it is only recognized once seen.
- *Product-based* – Quality is based on the presence or absence of a particular attribute. If an attribute is desirable, greater amounts of that attribute would label that product or service as one of higher quality.
- *Manufacturing-based* – Quality in manufacturing is defined as the conformance of a product or service to a set of predetermined requirements or specifications.
- *User-based* – Quality is determined by the ability to satisfy the customer's requirements, expectations and wants.
- *Value-based* – Quality consists of offering a product or service to a customer with certain characteristics at an acceptable cost or price.

With the advent of TQM, the definition of quality has evidently shifted from the first three approaches to quality to the last two as identified by Garvin. More recent approaches now highlights customer focus in the quality perspective.

Juran defines quality as fitness for use, which means that the product successfully serves the purpose of the user during its usage. Quality is broken down into quality of design, quality of conformance, availability and field service [10].

While Crosby looks at quality as mere conformance to specifications [Cosby, 1979], W. Edwards Deming looks at quality as " a predictable degree of uniformity and dependability at a low cost, suited to the market [38]."

A.V. Feigenbaum believes that product and service quality can be defined as the total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectations of the customer [11].

Taguchi looks at quality in terms of the losses imparted to the society from the time the product is shipped. Among the losses accounted for include customer's dissatisfaction warranty costs, loss of reputation and, ultimately, loss of market share [10].

Indeed, quality has become a result of customer determination. Nowadays, it is neither determined by engineering, nor marketing and general management. It is geared towards satisfying the customer's

requirements – whether stated or not, conscious or merely sensed, implicit or expressed, objective or subjective - in order to deliver total customer satisfaction.

Essentially, quality becomes the core of an effective organization. Customer focus requires the satisfaction of various internal and external customers, corresponding to Hutchins' description of quality as " the extent to which a particular product satisfies the expectations of its customers. Quality is the degree of conformance of the product to the applicable specifications, standards and workmanship criteria [22]."

The ISO 8402-1986 encapsulates the definitions of quality as " the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs."

III. A CENTURY OF QUALITY MANAGEMENT PHILOSOPHY

Today's TQM practices, encompassing the structure of organizations, company policies, procedures, managerial behavior and other manifestations of organizational cultures, are legacies of many thinkers and quality experts. The evolution of thinking about organization , management, quality and TQM is depicted chronologically in **Table 1 Evolution of Total Quality Management**.

Early management paradigms grew out of the practices of the Church and the Military. This was followed by the contributions of Weber, Fayol and Taylor which gave rise to Scientific Management and the Classical School. A turning point came in 1929 with the work of Elton Mayo at the Hawthorne plant of Western Electric Company where the Human Relations School was born. This was the beginning of the application of Behavioral Science to the study of organizations. Meanwhile, Scientific Management continued to develop simultaneously along a path which might be regarded as the application of Management Sciences to the study of organizations and management[32].

The underlying philosophy behind the current TQM practices evolved slowly over a period of 80 years. It started from the concept of Quality Control, was transformed into Quality Assurance and, finally, to Total Quality Control before assuming the its present form – Total Quality Management. These changing paradigms are discussed in more detail in the succeeding sections.

3.1 Quality Control

Quality Control (QC) was the prevailing practice of industries around 1920s [39]. QC is defined by Fetter and quoted by Pike and Barnes as " the function of ensuring that the attributes of the product conform to prescribed standards and their relationships are maintained [32]." The emphasis of the quality control process was on product inspection and rejection and one of the crucial issues of the time was determining when and what number of products to inspect. This, in turn, involved a consideration of the features of the product needing to be controlled and the costs involved. The inspection process might have been a 100% check of every item or a random sample based on statistical calculations [32].

Table 1. Evolution of Total Quality Management

	QUALITY CONTROL	QUALITY ASSURANCE	TOTAL QUALITY CONTROL	TOTAL QUALITY MANAGEMENT	STRATEGIC QUALITY MANAGEMENT / STRATEGIC TOTAL ENTERPRISE MANAGEMENT
PREVALENT INDUSTRY QUALITY MANAGEMENT PHILOSOPHY (Tenner and DeToro, 1992)					
DOMINANT PRACTICE	Manufacturing Product Inspection	Manufacturing Process Prevention	Manufacturing Industries / Supporting Functions	Service Industries and Sales R & D and Engineering	
SCOPE OF INFLUENCE	AT & T, USA		Japan	Global	
QUALITY PHILOSOPHERS & CORRESPONDING QUALITY CONTRIBUTION	Shewhart (SPC)	Deming (SQC, PDCA, 14 Pts.) Juran (Technical & Management Aspects of QM, Pareto Chart) Crosby (Zero Defects)	Feigenbaum (TQC) Ishikawa (Japanese Quality Culture, Diagram) Taguchi (Loss Function) Imai (Kaizen)		
DEVELOPMENT OF MANAGEMENT THOUGHT (Pike and Barnes, 1996)	The church The military The cameralists — Bureaucratic model Scientific Management and the Classical School	Human Relations School Mayo Maslow McGregor Hertzberg — Behavioral Sciences -Psychology-Sociology -Social Antropology — Management Sciences · Operations Research · Economics & Accountancy · Statistics · Ergonomics · Quantitative Approaches to decision-making	Systems Approaches Argyris Bertalanffy	Contingency theory Luthans	
MANAGEMENT PHILOSOPHY & PHILOSOPHERS	Taylor Fayol Weber				

1900   1920   1940   1960   1970   1980   1990   2000

The responsibility for quality control belonged to the quality department. The quality manager usually reported directly to the production or plant manager both of whom were faced with conflicting objectives. They were under pressure to meet production targets in terms of number of products 'out of the door', while making sure that products conformed to the specifications. Where a choice had to be made, it was often in favor of letting the faulty goods go in order to meet the desired production target. The consequence of this, however, was an increase in customer complaints or customers who did not complain but did not come back again, together with the problems of having to rectify errors in the field and increasing warranty costs [32].

With Bertalanffy's work, Systems thinking emerged which lead to the contingency theories of management in the 1970s and then into TQM during the 1980s up to the 1990s. Both Deming and Juran were employed in the Hawthorne Plant of Western Electric Limited at the time when the Human Relations school and, later, the Organization Development approaches arising from behavioral science applications began to emerge. Pike and Barnes claim that the seeds of TQM movement were sown during these past years and took more than 50 years for the philosophy to grow and take root in the West. It was recognized, however, that the consequences of rigid adherence to the precepts of the "Scientific Management School" have rendered many organizations inflexible, unresponsive to change and riddled with dysfunctional approaches to improving efficiency and effectiveness[32].

Tenner and DeToro credited Walter A. Shewhart (1891-1967), a statistician employed by Bell Laboratories during the 1920s and 1930s to have influenced Deming in the use of sampling and control charts. Shewhart's "Economic Control of Quality of Manufactured Products" was considered by statisticians as a landmark contribution to the efforts to improve the quality of manufactured goods. He reported that variations existed in every facet of manufacturing but that variations could be understood through the application of simple statistical tools such as sampling and probability analysis[39].

Deming's approach was predicated on the concept that "quality is primarily the result of senior management actions and decisions and not the result of actions taken by workers[12]." He stressed that "it is the system of work that determines how work is performed and only managers can create the system through the allocation of resources, provision of training to workers, selection of the equipment and tools that workers use, and provision of the facilities and the environment conducive to achieving quality [12]." Only senior managers determined the markets in which the firm would participate and what products or services would be sold. The worker, in turn was responsible for the resolution of those special problems caused by actions or events directly under his or her control. If the output remained unacceptable despite the attainment of process stability (removal of all the special variations that could occur within the work process), Deming advised the management to redesign the system and eliminate the common problems.

Deming's perspectives and paradigms on quality differed from the philosophies of Dr. Joseph M. Juran and Philip Crosby, the other significant exponents of TQM. Juran defined quality as fitness for use, measured in terms of five dimensions, namely: quality of design, conformance, availability, safety and field use. Juran believed that planning is key to quality management and that an organization's goal must ultimately be to increase conformance to specifications, while decreasing the cost of quality [12].

Juran's approach attacked organizational realities in three segments: a program for sporadic problems, one for chronic problems and an annual quality program. The role of the workforce in these programs was minimal as the burden fell mostly on quality consultants, and middle and top management. He recommended developing a cost of quality scoreboard to measure quality costs and track its improvement. His philosophy was best represented by his quality management trilogy - Quality Planning, Quality Control and Quality Improvement. To Juran, zero-defect is impractical as there is economic cost to quality. The maintenance of a quality standard, or the optimal quality level, should be aspired for, instead of attempting to further reduce costs [12].

Contrary to Deming and Juran, Crosby subscribed to a simplified approach to quality management. To him, quality was conformance to (customer) requirements, measurable by the cost of non-conformance, or scrap or inspection cost[32]. He devised five absolutes of quality management, meant to be the basis of subsequent quality programs. These were:
a) Quality means conformance – not elegance;
b) There is no such thing as a quality problem – go to the source (machinery or engineering problems);
c) It is always cheaper to do the job right the first time;
d) The cost of quality is the only performance indicator; and
e) The only performance standard is zero-defect.

Crosby believed that prevention was an essential tool in maintaining quality[27]. He believed staunchly that higher quality reduced costs and raised profits. Quality improvements could be measured using the quality management grid, a matrix that charts the different stages of management growth. Crosby placed TQM responsibility on management, limiting the role of he workforce to reporting problems[27].

3.2 Quality Assurance

As the Quality "gurus" were forming these philosophies, Quality Control evolved into Quality Assurance. Gryna (1988) defined quality assurance as "the activity of providing the evidence needed to establish confidence, among all concerned, that the quality function was being effectively performed[16]."

One of the first standards that had been formalized was the British Standard 600R[32]. The British Standards Institute played a considerable role in the development of standards for the whole spectrum of industrial and commercial activities. Much of the impetus for the development of standards came from the Ministry of Defense with what became known as 'Def Stan', followed by an appropriate number. For example, Def Stan 9000 is a standard relevant to Quality Assurance in electronic components[32].

A majority of these standards related to individual products and components of products or services. However, from 1979 a new standard, known as BS5750 in the United Kingdom, came into effect which related to the Quality Management System as a whole, rather than to the products of the system. BS5750 and ISO9000 were subsequently revised in 1987 and combined with EN29000, a European standard, and published together starting in 1995 as BS EN ISO 9000[32]. Certification of an organization's QM system enabled it to publicize its achievement and this was often regarded as a marketing tool. It indicated to potential customers that the organization had taken the trouble to get its systems and procedures in order, and up to an objectively assessed standard such that its customers could have the confidence that the quality function was being effectively performed [32].

Pike and Barnes (1996) argued that "companies which believe that the attainment of the ISO 9000 standard is the end of the journey in building a quality organization are very much mistaken" as this approach has inherent weaknesses. "Many companies with ISO9000 certification standard still operate the traditional quality control inspection processes, making products meet the specifications which they themselves may have determined and have no processes for winning over the 'hearts and minds' of employees in a constant struggle to bring about continuous improvement. There is frequently very little focus on the needs of the customer. Indeed the 20 elements of ISO9000 make very little mention of them." ISO 9000 is a QM System which emphasized formal procedures and work instructions to guide employees. The expectation was that all employees would comply with the procedures in order to ensure that the work was done properly. Internal and external audits were carried out and corrective action was taken to merely remedy the deficiencies. The focus, was therefore on the technical system and the way it operated[32].

At the same time that QA was developing, other quality experts have emerged in recent times, mostly proponents of the Japanese quality management culture. These were Masaaki Imai, Dr. Kaoru Ishikawa, and Genichi Taguchi. Armand Feigenbaum, who came to Japan with Juran a few years after World War II also made substantial contributions to quality management.

3.3 Total Quality Control

Feigenbaum extended Juran's cost of quality approach. He suggested that high-quality products were more likely produced through quality control than isolated effort. He maintained that half of the primary responsibilities in the total quality control matrix belonged to the quality control department[8]. Feigenbaum was credited for coining the term "Total Quality Control[35] ", a term used to refer to the Japanese Quality Management System. Imai also referred to it as Company Wide Quality Control (CWQC)[23].

The Japanese quality management culture had the most marked influence on TQM. Although Japanese companies initially contracted the help of quality "gurus," such as Deming and Juran, leading Japanese experts built a solid reputation and a unique quality management philosophy. Accordingly, Dr. Kaoru Ishikawa developed the Cause-and-Effect Diagram as a problem-solving tool which later became popular as the Ishikawa Diagram. He also affirmed the seven tools of quality control, which was an expansion of Juran's philosophy. In fact, his fish-bone diagram was a development in this aspect. His diagram presented a more instructive and focused alternative in determining the causes and effects of a given problem, separating the causes from the symptoms and making it easier to diagnose for solutions. Ishikawa determined four root causes of organizational problems: personnel, methods, equipment and environment. Differing situations may also manifest other causes, such as organizational policy, procedure and finances [15].

3.4 Total Quality Management

TQM has emerged as a widely accepted management system. Its popularity has resulted in a diversity of definitions. In 1988, the US Department of Defense described TQM as a series of "continuous improvement activities involving everyone in the organization – managers and workers - in a totally integrated effort toward improving performance at every level[15]." According to the US Department, this improvement satisfied cross-functional goals, such as quality, cost, schedule, mission, need and suitability. TQM was the integration of management techniques, current improvement efforts and technical tools towards continuous improvement, in order to increase customer/user satisfaction[15].

Vinzant and Vinzant (1996) characterized TQM as a "total organizational approach for meeting customer needs and expectations that involved all managers and employees in using quantitative methods to improve continuously the organization's processes, products and services[40]." Ross (1995) looked at TQM as a systems approach to quality that integrates interrelated functions and considers the interaction of various elements of the organization[34]. Rampey and Roberts (1992) defined TQM as "a people-focused management system that aimed at continual increase in customer satisfaction at continually lower real cost. Total Quality was a total system approach (not a separate area or program), and an integral part of high-level strategy. It worked horizontally across functions and departments involving all employees, top to bottom, and extended backwards and forward to include the supply chain and the customer chain...[8]"

From the various definitions, three concepts were consistently mentioned: customer focus, company-wide people involvement and continuous improvement. Thus, it can be generalized that TQM is a management system and organizational philosophy that drives the continuous improvement of all processes in the organization towards total customer satisfaction in order to achieve growth and industry success.

IV. DEFINING THE DIFFERENTIATING ATTRIBUTES

4.1 Various Experts' TQM Constructs

Quality management experts have identified several factors as important. Saraph, Benson and Schroeder (1989) propose eight TQM factors, namely: 1) **Role of Management Leadership; 2) Quality Policy; 3) Training; 4) Product/Service design; 5) Supplier Quality Management; 6) Process Management/Operating Procedures; 7) Quality Data and Recording; and 8) Employee Relations.** Data from 162 general managers and quality managers of 89 divisions of 20 companies are analyzed to develop operational measures of these factors, using principal component factor analysis to test construct validity [36].

Flynn, Schroeder and Sakakibara (1995) present similar factors such as : 1) **Top Management Support; 2) Product Design; 3) Supplier Relationship; 4) Process Flow Management; 5) Statistical Control and Feedback; 6) Workforce Management; 7) Work Attitudes; and 8) Customer Relationship.** In their study, data from 42 manufacturing plants are used, in conjunction with practitioner and empirical literature. Path analysis is used to test the proposed model, utilizing multiple regression to determine path coefficients[13].

Powell (995) identifies the following TQM factors: 1) **Executive Commitment; 2) Training; 3) Flexible Manufacturing; 4) Closer Supplier Relationships; 5) Process Improvement; 6) Measurement; 7) Adoption and Communication of TQM; 8) Open organization; 9) Zero Defects Mentality; 10) Closer Customer Relationships; 11) Benchmarking; and 12) Employee Empowerment**[33].

Ahire, Golhar and Waller also developed constructs which were compared with those included in the Malcolm Baldrige National Quality Award, using the results of a survey of 371 manufacturing firms in the motor vehicle parts and accessories industry at the plant level as a strategic business unit. The 12 TQM constructs according to Ahire, Golhar and Waller are: 1) **Top management commitment; 2) Customer Focus; 3) Supplier quality management; 4) Design quality management; 5) Benchmarking, 6) Statistical Process Control Usage; 7) Internal Quality Information Usage 8) Employee Empowerment; 9) Employee Involvement; 10) Employee Training, 11) Product Quality and 12) Supplier Performance** [3].

Black and Porter (1996), in the Identification of the Critical Factors of TQM, used the same criteria as those of the   Malcolm Baldrige National Quality Award model as the basis for questionnaire development, recognizing that it is the best established and recognized TQ framework. They systematically dissected each Baldrige award item into component parts from which the questionnaires were based, interviewed 28 organizations and generated 204 completed questionnaires, from which the data were examined using several well-established analytical techniques that identified critical factors of TQM. The following critical factors were identified: 1) **People and customer management 2) Supplier partnerships; 3) Communication of Improvement Information; 4) Customer satisfaction orientation; 5) External Interface Management; 6) Strategic Quality Management; 7) Teamwork structures for Improvement; 8) Operational Quality Planning; 9) Quality Improvement Measurement systems; and 10) ; Corporate Quality Culture**[6].

Ross (1995) embraces the following TQM criteria: 1) **Leadership; 2) Information Systems and Analysis; 3) Strategic Planning; 4) Human Resources; 5) Process Quality; 6) Productivity; and 7) Customer Focus**[34].

Considering all the TQM constructs, nine (9) common factors surface across the foregoing quality experts' philosophies covering the organizational elements in **Table 2 TQM Factors.** In summary, the essential TQM factors are **Top Management Commitment & Leadership, Strategic Planning, Human Resource Development & Management, Design Quality Management, Supplier Quality Management, Process Management, Continuous Improvement, Information & Analysis, and Customer Focus.**

Hackman and Wageman (1995) conclude that TQM passes the convergent validity test. The test reflects the degree to which versions of TQM promulgated by its founders and observed in organizational practice share a common set of assumptions and prescriptions. As can be seen from the summary above, there is substantial agreement among TQM gurus, researchers and experts on the various TQM factors. Moreover, Hackman and Wageman claim that contemporary TQM practice is generally consistent with the founders' ideas. They also conclude that there is impressive convergence - across theorists, across practitioners and across time – of basic ideas of TQM[19].

4.2 Quality Awards

ISO 9000 is a series of five international standards published in 1987 by the International Standard Organization (ISO), Geneva, and Switzerland. Companies can use the standards to help determine what is needed to maintain an efficient quality management system. ISO 9000 registration determines whether a company complies with its own quality system. Overall, ISO 9000 registration covers less than 10 percent of the MBNQA.

ISO 9000 is the quality cornerstone of the European Economic Community and is validated by recognized third party audits. Certification to the standard must be renewed every three years and it carries with it recognition that the certified business operates in a consistent manner, utilizing a business framework which supports continuous improvement, customer satisfaction and product quality. It does not certify the quality of the product but the capability and consistency of the business[42].

The Malcolm Baldrige National Quality Award (MBNQA) was established in 1987 by the US Congress to raise awareness about quality management and to recognize US companies that have successful quality management systems. The MBNQA focuses more on results and service, relies upon the involvement of many different professional and trade groups, provides special credits for innovative approaches to quality, includes a strong customer focus and stresses the importance of sharing information[5]. The MBNQA has evolved since 1987 when it gave away its first award. It has gone through revisions and has improved the point contribution of each assessment category.

The Malcolm Baldrige National Quality Award (1999) submits one of the most comprehensive list of factors. Used to judge the quality-worthiness of qualified companies, the seven factors included in the criteria are 1) Leadership (125 pts.); 2) Strategic Planning (85 pts.); 3) Customer and Market Focus (80 pts.); 4) Information and Analysis (85 pts.); 5) Human Resource Focus (85 pts.); 6) Process Management (85 pts.) and 7) Business /Organizational Results (450 pts.) [28].

The Malcolm Baldrige criteria have been the basis of many quality awards in various countries: Japan National Quality Award, Singapore Quality Award, Australia Quality Award, Philippine Quality Award and the Malaysian Prime Ministers Award[29].

Table 2
TQM Factors

TQM Factors	Variants
1) Top management commitment and leadership	Role of management leadership (Saraph et al, 1989) Top Management Support (Flynn et al, 1995) Top management commitment (Ahire et al, 1995) Executive Commitment (Powell, 1995) Leadership (Ross, 1995)
2) Strategic Planning	Quality Policy (Saraph et al, 1989) Strategic Quality Management (Black & Porter, 1996) Strategic Planning (Ross, 1995)
3) Human Resource Development & Management	Training (Saraph et al, 1989); (Powell, 1995) Workforce Management (Flynn et al, 1995) Employee Relations (Saraph et al, 1989); Employee Empowerment(Powell, 1995) Employee Involvement (Ahire et al, 1995) Work Attitudes (Flynn et al, 1995) Zero Defects Mentality (Powell, 1995) Corporate Quality Culture (Black & Porter, 1996) Open Organization (Powell, 1995) Adoption And Communication Of TQM (Powell, 1995) People & Customer Management (Black & Porter, 1996) Human Resources (Ross, 1995)
4) Design Quality Management	Product/Service design (Saraph et al, 1989) Flynn et al, 1995) Design quality management (Ahire et al, 1995) Product Design (Flynn et al, 1995) Product Quality (Ahire et al, 1995)
5) Supplier Quality Management	Supplier Quality Management (Saraph et al, 1989) (Ahire et al, 1995) Supplier Performance (Powell, 1995) Supplier partnerships (Black & Porter, 1996) Supplier Relationships (Flynn et al, 1995) Closer Supplier Relationships (Powell, 1995)
6) Process Management	Process Management/Operating Procedures (Saraph et al, 1989) Standardization Flexible Manufacturing(Powell, 1995) Process Improvement (Powell, 1995) Process Flow Management (Flynn et al, 1995) Operational Quality Planning (Black & Porter, 1996) Process Quality (Ross, 1995)
7) Continuous Improvement	Process Improvement Quality Improvement Measurement Systems (Black & Porter, 1996) Benchmarking (Ahire et al, 1995) Teamwork Structures for Improvement (Black & Porter, 1996)
8) Information and Analysis	*Quality data and recording (Saraph et al, 1989)* Measurement (Powell, 1995) SPC Usage (Ahire et al, 1995) Communication of Improvement Information (Black & Porter, 1996) Productivity (Ross, 1995) Internal Quality Information Usage (Ahire et al, 1995) Information Systems & Analysis (Ross, 1995) Statistical Control & Feedback (Flynn et al, 1995)
9) Customer focus	Customer focus and satisfaction External Interface Management (Black & Porter, 1996) Customer satisfaction orientation (Black & Porter, 1996) Customer Focus (Ahire et al, 1995) (Ross, 1995) People & Customer Management (Black & Porter, 1996) Customer Relationship (Flynn et al, 1995) Closer Customer Relationship (Powell, 1995)

The European Quality Award was developed in October 1990 by the Governing Committee of the European Foundation for Quality Management (EFQM) in conjunction with the European Commission and European Organization for Quality, launched during the 1991 European Quality Management Forum in Paris [31,25].

Under the award assessment, a company is rated on its results and improved performance in customer satisfaction, employee satisfaction, business performance and impact on society. It is composed of eight specific categories of criteria and their relevant values are shown in the **Table 3** below.

The European Quality Award (EQA) criteria are very similar to the MBNQA criteria except for the point system used for each category. The European Model for Quality shows that leadership, people management, policy and strategy, resources and processes are its enablers and the other half of the assessment areas are people satisfaction, customer satisfaction, impact on society and business results as the outcome.

Table 3
The European Quality Award Criteria (Kelada, 1996)

CATEGORY	CRITERIA	VALUE (%)
Customer Satisfaction	The perceptions of external customers, direct and indirect, of the company and of its products and services.	20
People	The management of the company's people and the people's feelings about the company.	18
Business Results	The company's achievement in relation to its planned business performance.	15
Processes	The management of all of the value-adding activities within the company.	14
Leadership	The behavior of all managers in transforming the company toward total quality.	10
Resources	The management, utilization and preservation of - Financial resources - Information resources - Technological resources	9
Policy and strategy	The company's vision, values and direction, and the ways in which it achieves them.	8
Impact on society	The perceptions of the company on the part of the community at large. Views on the company's approach to quality of life, to the environment, and to the need for the preservation of global resources are included.	6

The Deming Prize is the forerunner of the national quality award fashion and was established by the Japanese Union of Scientists and Engineers. The award uses the following criteria to assess organizations: understanding and zeal of top management for quality; policy, goal and purpose; organization for quality (including systems and personnel); education in quality; implementation of quality improvement process and future policy, plan and measures of performance.[Pike and Barnes, 1996] Existing literature is silent on the point system being used by this system.

Hoffner (1994) reiterates the criteria for the Deming Prize, one of the highest quality awards conferred in Japan in honor of Dr. William Edwards Deming who has been enormously influential in starting and advancing the "total quality" revolution , as **1) Policies and Objectives; 2) Operation of the Organization; 3) Education ; 4) Information Management; 5) Analysis; 6) Standardization; 7) Control; 8) Quality Assurance; 9) Results and 10) Future Plans.** However, no point system is similarly

given. **Table 4 Comparison of Assessment Areas Among International Awards** cross-checks the criteria that various award bodies use against organizational TQM elements.

The Philippine Quality Award is adopted from the Malcolm Baldrige NQA criteria. It was established through Executive Order No. 448, issued by Pres. Fidel V. Ramos on October 3, 1997 as a specific strategy of the National Action Agenda for Productivity (NAAP) to promote quality excellence in private and public sector organizations. It gave its first award in year 1998. It has four levels of performance: PQA for Performance Excellence, PQA Quality Mastery Award, PQA Quality Proficiency Award and PQA Quality Commitment Award.

Table 4

Comparison of Assessment Areas Among International Quality Awards

TQM ELEMENTS	1999 MBNQA	DEMING PRIZE	1998 PHILIPPINE QUALITY AWARD	EUROPEAN QUALITY AWARD	ISO 9000
Leadership	12.5 %		11 %	10 %	Management Responsibility
Information & Analysis	8.5%	Information Management; Analysis	8 %		Document Control; Quality Records
Strategic Planning	8.5 %		8 %		
Human Resources	8.5%	Education	10 %	18 %	Training
Quality Assurance		Quality Assurance; Control			Design Control; Process Control; Inspection & Testing; Inspection, Measuring & test equipment; Inspection & test status; Control of non-conforming product; Internal Quality Audits; Statistical Techniques
Business Results	45 %	Operation of Organization	45 %	15 %	
Customer Satisfaction	8.5%		8 %	20 %	
Process Management	8.5%	Standardization	10 %	14 %	Quality system, Contract review, Purchasing; Purchaser supplied product; Corrective & preventive action; Servicing
Resources				9 %	
Impact on Society	(4 %, incorporated under Leadership)		(3 %, incorporated under Leadership)	6 %	
Policy and Strategy	(4.5 %, incorporated under Strategic Planning	Policies and Objectives; Future Plans	(4 %, incorporated under Strategic Planning)	8 %	
TOTAL	100 %		100 %	100 %	

Source : [27], [21], [30], [26], [31]

V. THE DIFFERENTIATING ATTRIBUTES : A SYNTHESIS

5.1 Comparison With Other Change Strategies

TQM is unique as a form of a change strategy. Hackman And Wageman (1995) assessed the distinctiveness of TQM and considered three comparison groups, namely : 1) programs that are subsumed by a full-fledged TQM; 2) those that are clearly different from TQM; and 3) those that are, like TQM, broad and multi-faceted organizational improvement programs [19].

As articulated by its founders, TQM clearly subsumes a number of smaller and more focused initiatives such as quality circles, cross-functional project teams and zero-defects programs. It is also distinct from interventions such as job enrichment, performance-contingent rewards and goal-setting, some of which are explicitly disavowed by one or more of three founders – for example, the emphasis of

some job-design models on employee autonomy about methods, pay for performance programs that tie financial rewards to bottom-line outcomes and goal-setting programs that specify explicit performance objectives within a department or function[19].

TQM is also distinguishable from other broad, multi-faceted initiatives such as participative management and Quality of Work Life (QWL) programs. Participative management has no generally accepted set of "must-do" management practices. The way participation is implemented in one organization often bears little resemblance to its use in another; thus, it is concluded to be as the same kind as TQM but not as distinctive conceptually[19].

The values of QWL movement center on fostering labor-management cooperation to improve simultaneously productivity and quality of employees' worklives. Key organizational devices include labor-management committees and surveys of employee satisfaction, among others. QWL is concluded to be different from TQM both in philosophy and in practice[19]. Comparing TQM against other popular change modalities as shown in **Table 5 Comparison Among Change Strategies** further highlights its uniqueness.

Leach (1996) says that TQM is to be preferred over reengineering or business process reengineering (BPR) since it creates a complex-adaptive organization. The study of complex, dynamic and nonlinear systems, often referred to as the science of complexity can be applied to the study of organizations which are themselves complex systems. Complexity theory supports the concept that change can occur in organizations through continual improvement. By focusing on the process of continual improvement, TQM enables an organization to manage and learn from change and become an adaptive system. This results in other benefits such as compounded improvements, avoidance of system deterioration and reduction of risk. Reengineering, on the other hand, aims to make immediate breakthroughs by discarding entire processes and designing new ones, often resulting in inadequate organizational learning.

Table 5
Comparison Among TQM and Other Change Strategies

Basis of Comparison	Change Strategy			
	BPR or Innovation [25,26]	TQM	Organizational Development [20]	Application of Operations Research
Type Of Change	Radical	Incremental, Gradual or Continuous	Maybe Radical or Incremental	Maybe Radical or Incremental
Area of Change	Process	Total Organization	Behavioral	Decision-making Process
Requires Top Mgt. Support	1	1	1	1
Top Leadership Has to Be Involved	2	1	2	2
Employee Involvement	3	1	1	3
Customer Focus	2	1	2	2
Employee Empowerment	3	1	2	3
Supplier Quality	2	1	3	3
Process Management	1	1	3	3
Design Quality Management	3	1	3	3
Benchmarking	1	1	2	2
SPC Usage	2	1	3	3
Internal Quality Information Usage	2	1	1	1
Continuous Improvement	3	1	2	2

Legend: *1*-Strongly Applicable   *2*-Moderately Applicable   *3*-Not Applicable

5.2 The Multi-Attribute TQM Framework

The TQM system surfaces as the sum total of all the integrated effects of a multitude of factors that are installed to create an environment that ensures continuous improvement of all processes towards customer satisfaction. From the nine factors identified, five (5) characteristic attributes clearly evolve. These are: (1) continuous improvement, (2) process vitality, (3) customer focus, (4) people empowerment, and (5) top leadership involvement. A TQM system can be differentiated from an ordinary organization by these five (5) characteristic attributes. The structure of the TQM attributes, indicating their linkages and construct relationships, is schematically shown in **Figure 1 The TQM System Characterizing Attributes.**

Implementing TQM means *continuous improvement* of processes in order to deliver goods and services in the most cost-effective and efficient way to delight the customer. Processes are designed to create products of excellent, reliable and consistent quality *(process vitality)* that *meets or exceeds customer requirements (customer focus)*. *Empowerment of people* enables workers to deliver what is expected from them. What drives these elements is the *Top management leadership* which assumes the responsibility for quality initiative and performance.
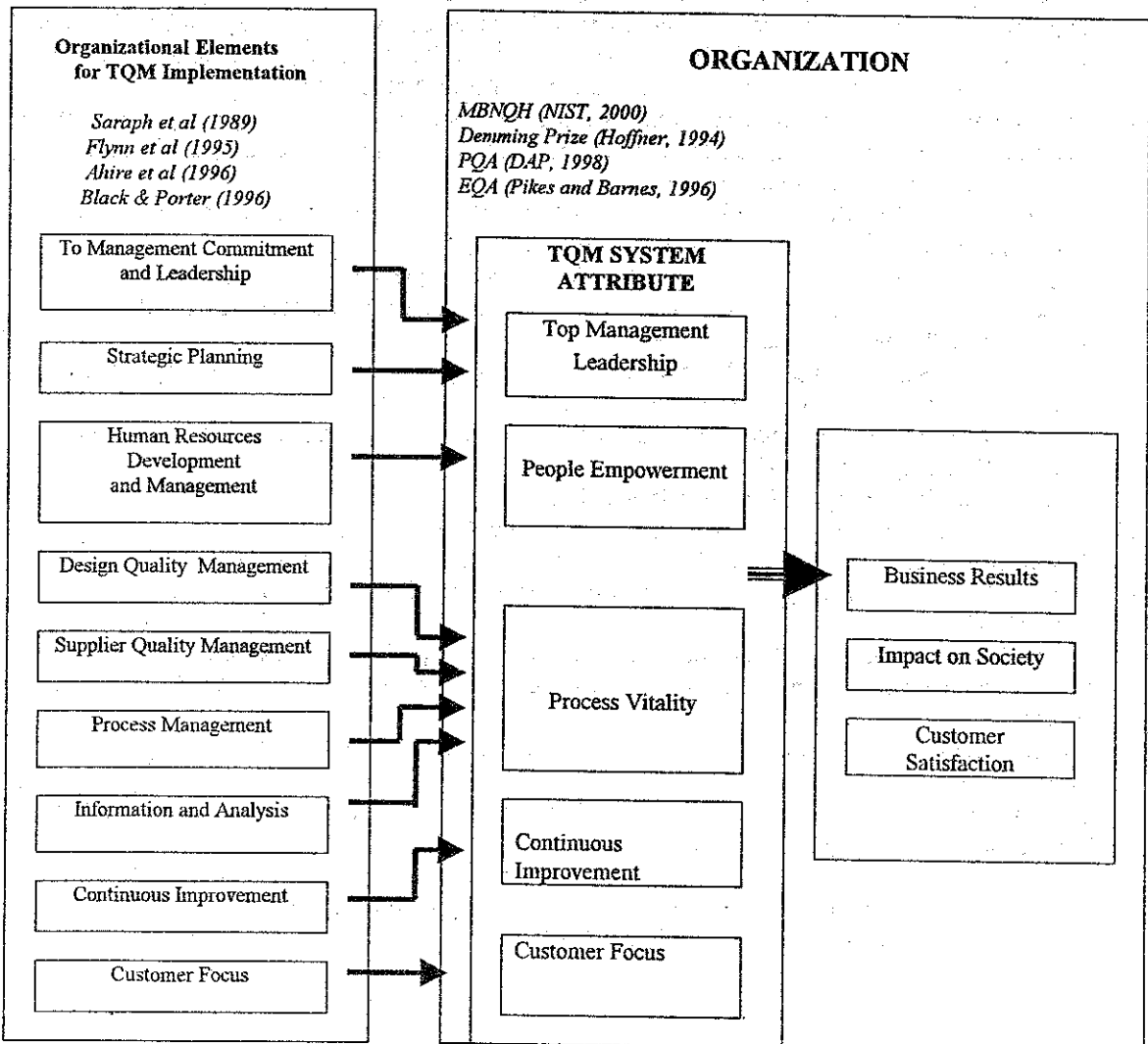

Figure 1 TQM System Characterizing Attributes

VI. CONCLUDING REMARKS

The differentiating attributes of Total Quality Management is seen as the synthesis of various quality factors. An historical account of the evolution of quality interventions and a cross-sectional examination of various change strategies indicate a commonality in the factors that make up the TQM system. From the various factors emerge five (5) distinct attributes. These characterizing attributes are after-the-fact characteristics of the TQM implementation in an organization. These are the elements which can describe the robustness or immaturity of the existing TQM system in place.

Consequently, there is a need to identify the set of indicators that can be used to quantitatively measure to what extent an organization has matured along the five (5) attributes. A necessary second step to the analysis is the identification of these indicators, which is the subject of an ongoing data collection across a large sample of manufacturing companies in the Philippines.

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