THE TOTAL QUALITY MANAGEMENT PRACTICES IN YEMENI PUBLIC UNIVERSITIES

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ABSTRACT

There is a mutual relationship between the prosperity of a nation and the quality of education it provides to its people. Quality education improves standard of living of people by enhancing the performance of engines of economic development. This study focuses on the practice and application of Total Quality Management (TQM) in Yemeni universities. A questionnaire was developed after a careful and thorough review of the related literature and consultations with experts. The questionnaire was administered to universities academy staff. The study was performed based on a survey method for collecting data. A total of 262 questionnaires usable surveys were received. Correlation Pearson, t-test, One-way ANOVA were applied to analysis the gathered data from the questionnaire. The data were analyzed using computer-mediated (Statistical Package for Social Sciences) (SPSS). According to the analysis of TQM made in Yemen universities using statistical methods; Cronbach Alpha was high enough to a value of 0.96. Unfortunately, the Yemeni public universities have low turnout of TQM practice.
ABSTRAK

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Arab societies are currently experiencing many changes in various areas of life that requires corporate and private organizations to change their traditional administration and management styles. Thus, it is required that each organization adopt modern management concepts if they desire to achieve their objectives more readily. These changes will increase their competitive edge in the global inter-institutional productivity and rapid technological development in the world in various areas, particularly in communications, computer and laser technologies. Further, this could strengthen economic relationship and interdependencies among neighboring states which could be a factor responsible for the positive advancement of the previously non-industrially developed nations like Malaysia, Taiwan, Philippine, and Indonesia to a developed one.

Some possible application of such development could result into merger or complete acquisition of one company by another, bearing in mind the respective social changes within and without the organizations, the social changes that have occurred in the values, principles and lifestyles of individuals. This requires the development and promotion of scientific research, building of qualified human capital in various areas of social sciences and community leadership.
However, this could only be achieved with scientific and educational functioning institution according to the requirements and needs of the community in which they operate.

Clearly, education is a set of operations being conducted for the training and development of knowledge, skills and thinking of the individual through the various educational institutions to the individual duties to themselves and to the community in which they live (Al-Khfaji, 1995).

It is not any education, because education creates the required individual and society to the reality and dynamics of the technological revolution and the rapid change era. These vast amounts of knowledge are needed for the organization rapidly and continuously, due to the flow of information and identify the ways to use them, in order to progress towards development (Jolie, 2002).

At this moment, universities are the symbol of renaissance of the people and nation, and address of the greatness in culture and advancement. This axis has an essential place of cultural life in the comprehensive sense, and the dimensions of intellectual, literary, scientific and technological development.

Higher education institutions and management are no longer hardware and accountable institutions and fiduciaries for cultural heritage to be transferred to younger generations. It also have become a player in the development of knowledge and the development of the community and development and assist in meeting the challenges in political and economic difficulties together with social and cultural rights. This is imposed on higher education institutions working to change its ways of administrative and educational facilities, if they are to achieve their objectives efficiently and effectively (Al-Mallah, 2005).

Improving the performance of higher education institutions is a global concern in all countries in the world. Among the most important characteristics that distinguish a community from other communities, is its ability to manage institutions and vital programs, not only effectively and efficiently, but fairly innovative. Linked to the size and quality of services in the founder in higher education system-managed, those make the university a letter Compass movement through the guidelines and university ethics. Any success of its founder, is a success in its management, hence the importance of management's commitment to higher education institutions to improve the overall philosophy constantly in order of arrival.
to TQM in universities, which need the participation of all to ensure survival and continuity of Universities (Al-Khatib, 2000).

It supports the field of quality in higher education institutions on an integrated system of educational information and education within each university. On the other hand, an Interdisciplinary Study to identify the best methods to apply the principles of total quality after a diagnosis of the status and knowledge shortcomings and work to address them to gain access to better, brighter future for generations to come. Thus, Total Quality Management performance evaluation is the most important entrances to the university entrance Total Quality Management.

A set of standards and procedures designed and implemented by the introduction of continuous improvement (TQM) in the product, taking into consideration that these actions are not limited to an individual without the other in the institution, not a job without the other, but all the elements of physical and human resources in the enterprise Educational (Jeryes, 2004).

In modern management philosophy, based on a number of (TQM) definition, is a comprehensive quality management concept of modern management-oriented, which is based on the combination of management tools, the efforts innovation, and specialized technical skills in order to improve the level of performance and improvement and ongoing development (Al-Khatib, 2000).

The beginning of many of the administrative institutions in the application of this concept to improve the quality of its services, assistance in the face of difficult challenges, and gaining the satisfaction of society, has made the administrative institutions great success following the implementation of this concept especially in some countries, such as Japan, United States, France and Britain. The concept of Total Quality Management has impacted the administrative role by the achievements of this new type of tangible successes in the department and the description of this concept as the revolutionary wave after the third industrial revolution, the revolution of computers (Al-Saoud, 2002).

The success of management based on industry has provoked the question about the applicability of quality in education and Edward Deming has pointed to the need leading to TQM. The introduction of TQM in education, viewed as a system for quality processes in education, and continuous improvement in the educational process - learning (Al-Musawi, 2003).
The attention to quality management in education does not mean that he plans to make the education institutions, especially universities, businesses, or industrial plan to double the profits to improve their products, but, what should be benefited from the entrance of the Total Quality Management in education. In purpose to develop the methods, one need to achieve educational quality of the product, and in order to double the benefit the beneficiary, first of all is the educational efforts, then the community of all its institutions, and groups, and individuals in the filed of education. This will spark competition among universities in order to achieve the best results (Alawnah, 2004).

The Quality is a relative phenomenon related to and rooted in educational institutions, and differs from one institution to another in many ways. Whether the institution uses the principles of Total Quality Management or other trends, it is imperative that there is a link between the principles of Total Quality Management on one hand, and organizational culture of your organization on the other. Not coming to this workshop to take root successfully, but Total Quality Management of the leader in the organization is important for the Total Quality Management to be successful. Within the campus, the university presidents have to cling to the possibility of its application, and not idiomatic meaning, but they should also, work on the preparation of the implementation of TQM management brilliant setting to take place in the appropriate academic environment (Badah, 2003).

The researcher felt that the interest in the study of Total Quality Management (TQM) by previous researchers focused only on the organization of commodity production, while service organizations, especially educational institutions such as university, has not received adequate attention. From here, it could be conceived, that this study to induce the importance of conducting studies on the subject in higher education institutions generally in the Arab peninsula, and Yemeni universities in particular.
Problem Statement

The achievement of Total Quality Management in institutions of higher education meant the organization's ability to provide a high level of service quality excellence, and through which it can meet the needs of students, faculty members, parents, employers, and society and others, and in a form which is consistent with their expectations and requirements of the times and the environment of scientific and technological resources, including achieving satisfaction and happiness to them. This is done through pre-established standards to assess the output, and check the status of excellence (Al-Saoud, 2002).

Seeking higher education institutions in Yemen for the development of inputs and operations requires continuous work to improve the performance of its functions and to link them to their societies, in order to obtain the best output, in a shorter time, and less cost.

Since the entrance of Total Quality Management an important step and the entrance are essential in the development of performance in Yemeni universities and brings them to the desired level, especially in light of the continuous fast paced and interactive world in which we live these days. This has resulted in challenges, which calls for a greater willingness to face the fears, apprehensions, competitiveness, and international conflicts.

The problem for the study mentioned in the following:
What is the reality of the practice and application of total quality management in the Yemeni universities as perceived by faculty members?

1.2 Questions of the Study

To address the Listed below objectives and provide solutions to the research problem, two research questions were identified and formulated as follows:
RQ1: What is the practice and application of total quality management in the Yemeni universities as perceived by faculty members?

RQ2: What is the impact of demographic variables (gender, age, college, experience, academic degree, job Position, qualifications and university where he/she worked) on the responses of faculty members to total quality management?

1.4 Objectives of the Study

This research has the following objectives:
O1: The aim of this study is to qualify and quantify the extent of total quality management practices in Yemeni public universities.
O2: To Identify the impact of demographic variables (gender, age, college, experience, academic degree, job Position, qualifications and university where he/she worked) on the responses of faculty members to total quality management?

1.5 Hypotheses of the Study

Through the questions of the study the following null hypotheses have proposed:
H1: There is no significant differences at the level of significance (α = 0.05) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of gender.
H2: There is no significant differences at the level of significance (α = 0.05) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of age.
H3: There is no significant differences at the level of significance (α = 0.05) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of college.
**H₄:** There is no significant differences at the level of significance (\(\alpha = 0.05\)) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of qualification.

**H₅:** There is no significant differences at the level of significance (\(\alpha = 0.05\)) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of experience.

**H₆:** There is no significant differences at the level of significance (\(\alpha = 0.05\)) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable academic degree

**H₇:** There is no significant differences at the level of significance (\(\alpha = 0.05\)) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of job Position.

**H₈:** There is no significant differences at the level of significance (\(\alpha = 0.05\)) for the respondents about their perceived of the principle of the total quality management in Yemeni universities according to the variable of the university.

### 1.6 Importance of the study

The important of this study derived from the importance of the implementation of the principles of total quality management. Total Quality management considered as one of the most important tools in measuring the effectiveness of the universities work. Through using of a total quality management, the university can produce a product - student- that performs according to its stated promises. Using of total quality management to improve the quality of the outputs of the universities and to improve the quality of the output and to design a new programs and requirements that feeding the marketplace with suitable workforce. Furthermore, the implementation of the total quality management principles provides a methodology to create the type of product- i.e., Student- that the workplace needed. Therefore, this study aims to measure to what extent Yemenis' universities have applied the total quality management principles, and how this implementation will affect the output of these
universities to the workplace. The importance of this study is illustrated in the following points:

i. This research has merit in the sense that it can help the Yemeni universities to implement TQM and improve their performance continuously.

ii. This study considered a fundamental that can rely on in establishing an indicator for the performance of the Yemeni universities.

iii. The results of this study will help the interested people in higher education in understanding the ways to improve the performance of the universities.

1.7 Study Scopes

This research was carried out in Yemen, the data were collected from faculty members of the government owned universities located in eight universities in the second semester of 2010-2011 academic session. Only full-time faculty members with masters and PhD degrees were given the questionnaires.

1.8 Definitions of Key Terms

**Quality**: The ability of a product or service to meet or exceed customer requirements.

**Quality management**: An approach to achieving and sustaining high quality products and/or services by focusing on the continuous improvement of processes throughout all levels and functions of an organization in order to meet or exceed customer requirements

**Total Quality Management** (TQM): An approach to “continuous improvement that is focused on responding to customer needs, basing decisions on data, and allowing Everyone to participate in the process”

**University**: an independent scientific institution with a specific organizational structure, systems, customs and traditions of academic Particular, and primary
functions of teaching, scientific research, community service, consisting of A group of colleges and departments of the specialized scientific nature. Offering programs of study in a variety of Different disciplines, including what is on the undergraduate level, including what is on the level of studies High, and gives degrees to students. 

**Faculty members:** They are all members of the teaching staff at universities Yemen Of the master's degrees or doctorates. *(Al-Abasi, 2004).*
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents the review of related literature. Papers (books) and electronic (internet) sources have been explored to extract most relevant and current information about the historical development in the field of total quality management in education set up in Yemen presently. An effort has been made to link the individual contribution of the researchers and academics in the field under review.

The University education in Yemen suffers from many problems. The University education has not been able to achieve the main purpose of higher education. Among which is; to produce people with good moral, intellectual excellence and academic ability that can develop logical thinking and contribute effectively towards the industrial, economic, technological and social development of the country and citizenry. Paraphrases, if higher education would attain its due level, Yemen can tackle some global challenges of insecurity and technological advancement.

The content of the conceptual framework of TQM is given by some definitions. For better understanding and clarification, it is related to the historical development and the most important principles, tools and tries to adapt these concepts to the needs of higher education particularly in university. It also clarifies most problems for the application of these concepts in the field of higher education,
and try to develop and keep pace with the needs of the times and innovation. Consequently, optimum education would achieve.

2.2 Total Quality Management

Total Quality Management (TQM) is a comprehensive, customer focused system that many companies are now adopting to improve the quality of their products and services. Also, TQM is a way of managing the organization at all levels top management in Frontline to achieve customer satisfaction. It involves all employees in continuously improving the company’s work processes.

Many believe that the worldwide effort to improve the quality of products and services through the application of TQM principles represents a fundamental change in management style and philosophy that will dramatically alter the way successful enterprises are managed. In fact, the impact of TQM quality movement affects the way many United States of America (USA) companies have recast their management approach and already been profound results in market share, profitability, productivity and worker involvement have been spectacular. Gradually, some segments of the construction industry are adopting TQM as an overriding management approach (Lewis, 1995).

2.2.1. Concepts of Total Quality Management

After World War II, the concept of TQM was applied broadly in Japan. W. Edward Deming introduced these new quality control concepts. During the early 1980s, a number of North America manufacturers began to implement basic quality concepts and added other management techniques in the area of employee motivation, business process measurement and rewards. This blend of quality management
techniques and philosophies is generally referred to as Total Quality Management (Weis, 2001).

Now TQM has become one of the most popular and widely used management practices in Americas companies. Based on the above definitions, we can say that Total Quality Management is comprised of multiple components, the most important ones, are four components, as shown in Figure 2.1 as follows:

i. The constant quest to achieve customer satisfaction.
ii. Ongoing work and tireless work to improve the quality and development.
iii. Use of task forces, and the involvement of all employees in the organization.
iv. Interest of the information and systems development.

![Figure 2.1: Elements of Total Quality Management (Al-Hammadi, 1999)](image)

According to Lau and Anderson (1998), to understand and successfully implement TQM requires utilizing TQM concepts and relating these concepts to the specific application under consideration. They extracted the common elements used in defining TQM at the philosophical level. These are summarized in Table 2.1 below.
<table>
<thead>
<tr>
<th>TOTAL</th>
<th>QUALITY</th>
<th>MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Require employee participation and teamwork</td>
<td>Customer (internal and external) driven</td>
<td>Require commitment from top management</td>
</tr>
<tr>
<td>Everyone must develop a sense of quality ownership</td>
<td>Emphasis on continuous improvement (Kaizen)</td>
<td>Establish purposes and values of the company</td>
</tr>
<tr>
<td>Involve every level and function of the company</td>
<td>Technical issues: training for skills and knowledge</td>
<td>Leadership is critical</td>
</tr>
<tr>
<td>Apply systems thinking.</td>
<td>Humanitarian issues: encourage innovation.</td>
<td>Make appropriate changes in organizational culture.</td>
</tr>
</tbody>
</table>

(Zadry, 2005)

2.2.2. Definition of Total Quality Management (TQM)

Different authors have given various definitions of Total Quality Management. TQM is a strategy which is concerned with changing the fundamental beliefs, values and
culture of a company, harnessing the enthusiasm and participation of everyone (Atkinson and Naden, 1989).

According to Juran (1986), TQM is a philosophy aimed at achieving business excellence through the use and application of tools and techniques, as well as the management of soft aspects, such as human motivation at work. Berry (1991) defined the TQM process as a total corporate focus on meeting and exceeding customer’s expectations and significantly reducing costs resulting from poor quality by adopting a new management system and corporate culture.

The definition offered in the Department of Defense Total Quality Management Guide is one of many definitions of TQM which is popularly applied (Saylor, 1992). TQM is both a philosophy and a set of guiding principles that laid the foundation of a continuously improving organization. Total Quality management is the application of quantitative methods and human resources to improve the material services supplied to an organization, all the processes within the organization, and the degree to which the needs of the customer are met, now and in the future.

Total Quality management is a long-term process, which relies on relative achievements through continuous improvement. Problem identification, Problem solving, teamwork and quality circles are all-important aspects of driving the improvement wheel forward. Successful TQM implementation can only come from radically challenging and changing the culture of the organization (Zairi, 1996).

Therefore, one may say that TQM is a philosophy, concept and powerful management approach. It involves management and empowerment of people in order to create satisfied customers and improve organizational performance.

“Long-term commitment to new learning and new philosophy is required of any management that seeks transformation. The timid, the fainthearted, and the people that expect quick results, are doomed to disappointment.” (Deming).
2.2.3. Definition of Quality

The quality is not a new or recent development. Although much of the business literature on the subject of quality is fairly recent, in that it was written in the latter half of the twentieth century, quality has been an integral component of cultures throughout the world for several millennia. Nowadays quality has become an increasingly predominant feature of our lives. The existence of this desire for quality has caused industries and organizations throughout the world to attempt to develop a philosophy, which can deliver the quality they require (Walsh, 2002).

Many definitions of quality can be found in the literature. As in Juran (1986) defined quality as “fitness for use”. Similarly, Crosby (1979) defined quality as “conformance to requirements”. Both of these definitions focus on the satisfaction of customers’ needs. According to Feigenbaum (1983), quality is the total composite of product and service characteristics of marketing, engineering, manufacture and maintenance through which the product and service will meet the expectation of the customers’ demand.

Quality as defined in the ISO 9000 is the totality of features and characteristics of a product or service that bear upon its ability to satisfy stated or implied needs (ISO 9000, 1992). Garvin (1988) expand quality by examining eight principal dimensions which are: performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality.

The defining quality as:”The quality of a product is its ability to satisfy, or preferably exceed, the needs and expectations of the customer”. Each of these definitions comes from different perspectives and emphasizes on different issues. For example, Crosby has defined quality as “conformance to requirements” that has a producer perspective, and Deming’s and Juran’s definitions have a user-based perspective.

It can be seen from the above definitions that the emphasis on quality has broadened to focus on customer needs. What the customers actually want are the “solutions” to their needs and not just quality products.
2.2.4 The Emergence of the Concept of TQM

Total Quality Management began its modern meaning in the United States. However, it has grown and flourished in Japan as a system management. Due to the emergence of total quality in the early years of the twentieth century studies of time and movement in 1911 as advocated by Taylor where the sign of the birth of the concerns of modern efficiency. When adopted by the Japanese at the beginning, fifty applications of statistical concepts of quality as a means to rebuild the industrial destroyed infrastructure in all areas, which had the greatest impact on the success of Japanese companies in the late seventies.

This helped to spread the use of total quality management outside Japan, embraced by European and American companies, which began in the early eighties through the introduction of ideas (Deming) about quality, productivity, and competitive position. It then became in the mid nineties being taught and applied in institutions and universities of America (Badah, 2003).

From the above, history, we can deduce that this concept differed from period of time due to the results of research and studies related to measuring the desires of consumers, producers or others interested in this subject, and in the various countries of the world, in general these stages can be illustrated as in Table 2.2.

Table 2.2: The historical development of the concept of quality in industrialized countries

<table>
<thead>
<tr>
<th>Year</th>
<th>Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1911</td>
<td>(Taylor): The first to study time and movement was a pioneer of scientific management school, where his obsession was the basic working proficiency and thus production.</td>
</tr>
<tr>
<td>1931</td>
<td>(Shewart): Provide a statistical quality control in his famous book &quot;Control of Quality &quot;.</td>
</tr>
<tr>
<td>1941</td>
<td>(Deming): Helped by joining the circle of war in America which serve as a teacher of Technologies Quality control.</td>
</tr>
<tr>
<td>1950</td>
<td>(Deming): Drew his popular ideas in the scientific fields in Japan, where</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>1951</td>
<td>(Juran): Published a book on quality control.</td>
</tr>
<tr>
<td>1961</td>
<td>(Martin): Provided the concept of Zero defects.</td>
</tr>
<tr>
<td>1970</td>
<td>(Crosby) Introduced the concept of Zero defects.</td>
</tr>
<tr>
<td>1979</td>
<td>(Crosby) Published a book on freedom of quality.</td>
</tr>
<tr>
<td>1980</td>
<td>Began to influence the Japanese television broadcast in the U.S., and raised the question that if Japan was an efficient, why not us? This recognition of successful ideas of Deming in Japanese management.</td>
</tr>
<tr>
<td>1981</td>
<td>Ford Motor Company took hold seminars, and invited Deming to talk with top management about the importance of the relationship between the producers and quality, and the consolidation of this relationship.</td>
</tr>
<tr>
<td>1987</td>
<td>U.S. Congress established the (Malcom Baldridge) for Total Quality Management.</td>
</tr>
<tr>
<td>1988</td>
<td>Issued by the U.S. Secretary of Defense guidance and direction to the Department of Defense to adapt the suit of their Total Quality Management.</td>
</tr>
<tr>
<td>1989</td>
<td>The first U.S. company, a company of Florida Power, wins Deming’s Award in Japan.</td>
</tr>
<tr>
<td>1993</td>
<td>Has become the entrance to the overall quality which is widely taught in colleges and universities in America.</td>
</tr>
<tr>
<td>2003</td>
<td>Spread the concept of total quality management in industrialized countries, and also in some of the developing countries, for the fate of the popularity and attention by scholars and specialists in this area.</td>
</tr>
</tbody>
</table>

*(Al-Mallah, 2005)*
2.2.5 The Stages of Total Quality Management

i. The stage of inspection or examination (1900-1940):

Quality has been in the focus stage just to detect errors and to correct them. Error, defect or damage might actually happen, that the screening process discovered the error, but did not banish it from the foundation phase.

ii. Stage of statistical quality control (1940-1960):

Quality had been approved at this stage of the use of modern statistical methods for quality control. According to this concept, the set quality is well advanced on the examination with regard to the complexity of methods, and the development of systems used.

iii. Stage of quality assurance (1960-1985):

Forward all of the focus on the efforts to prevent the occurrence of errors, and thus described as a stage-based system based on prevention of errors from the beginning, which is otherwise known as the principle of zero damage.

iv. Stage of Total Quality Management (1986-present):

Aims at the quality of processes in addition to product quality, and focuses on the teamwork and encourage the participation of workers and their integration, as well as to focus on the participation of beneficiaries and suppliers.

Since then, it has become more difficult in the exercise of administrative work with the rapidly changing societies and their development together with the consequent emergence of new crisis and needs. Requiring specific solutions, which do not stop merely at providing a solution itself, but rather the search for efficiency and effectiveness of this solution, which requires an ongoing change in the
administrative way of thinking, and this is the introduction of the concept of total quality management, because there were no certain concepts that were well established in the minds of management experts, according to the traditional administration thought (Badah, 2003).

In fact, there is one thing needed for any organization which is: requirement of changes in the management system in term of quantity and the quality management system. In order to do this, the leaders should understand that the old quantum system, which focused entirely on the results, can be improved by stitching together the good and fresh ideas.

One must create a new culture and new system to replace the old system. Should the new system focus on the philosophy of continuous improvement; it must begin with the definition of the official leaders in the foundation of the nature of the tasks assigned to them (Dobbins and Mason, 1997).

2.2.6 The principles of Total Quality Management

Despite the multiplicity of definitions of the concept of total quality management, there is one general agreement on the most important principles to be adopted and introduced when attempting to apply TQM successfully, these principles are:

i. **Top Management Leadership and Support**

The total quality is a management-led process. As a result, success in its implementation depends on the demonstration of top management’s commitment, the commitment and involvement of management needs to be demonstrated and visible. Commitment means a willingness to devote resources to TQM, to invest in the program, and the willingness to invest now, in order to reap benefits later. Now a commitment to total quality means a willingness to change the style (and culture) in which the company operates, which may mean changes in the company’s
management philosophy or new relationships between managers and their subordinates (Islam, 2008).

ii. **Strategic Quality Planning**

It plays a vital role in ensuring quality outputs (products or services) of an organization. By undergoing the process of strategic planning, organizations are able to identify their strengths and weaknesses thereby, formulate appropriate strategies in line with the changing situation/environment so as to meet customers' requirements and demands. Strategic quality planning involves five steps, which are: external environment analysis, internal environment analysis, formulation of the organization's vision, formulation of quality objectives, and identification of improvement activities.

iii. **Focus on the Customer**

Quality is conformance to customer requirements. To achieve maximum customer satisfaction, every employee, supervisor, and manager must develop a passionate commitment in meeting customer requirements, which is the key to quality and profitability (Miller, 1995). A strong commitment and involvement of managers, supervisors, and employees in the customer focus process will assure quality, cost reduction, and gain competitive advantage for the organization concerned.

iv. **Measurement and Analysis**

Measurement is one of the most critical functions in quality assurance. A performance measurement system provides important data and information to management on the current performance of a work process that is being implemented.
v. **Commitment to Training and Recognition**

Successful implementation of TQM depends on the support and participation of a skillful and knowledgeable workforce with positive attitudes and values towards the work. This requires continuous training and recognition of a system that motivates the workforce to produce high quality outputs. For TQM organizations, where employee involvement in decision-making, teamwork, self-direction, customer focus, partnership, and continuous improvement rise from clichés to core realities, training is very useful – it is essentially and extremely important. Recognition is an appreciation of the contributions of the employees and team-work to the being of the organization as a whole. The contributions of employees over the years cannot be ignored. Due recognition and appreciation in various forms should be in place and rewarded through promotion and/or award.

vi. **Employee Empowerment and Teamwork**

Teamwork among employees of a department is a unifying force in ensuring success of the department’s quality improvement efforts. The most common vehicle for employee participation is a team. Posits that “teams do most things better than individuals because the members stimulate each other; they possess a broader range of skills, and anyway, working in a team can be more fun”. Teamwork enhances three key aspects of the quality improvement process: facilitates the free exchange of information and ideas, builds up trust among the employees, and improves communication within the department (Islam, 2008).

vii. **Quality Assurance.**

Quality assurance focuses on planned and systematic actions for the prevention of quality problems to ensure the production of defect-free outputs. Stated that in overcoming the limitations of quality inspection and quality control approaches, many organizations have turned to quality assurance as an alternative. Therefore, quality assurance involves the
planning and the management of the right method in the production of goods or rendering services.

### 2.2.7 Total Quality Management Tools

The following are some of the most common TQM tools in use today, used in identifying specific information in a specific manner. It should be noted that tools should be used in conjunction with other tools to understand the full scope of the issue being analyzed or illustrated. Simply using one tool may inhibit your understanding of the data provided, or may close you off to further possibilities.

i. **Pareto Charts**: The Pareto charts are used when we want to decide in which order problems must be solved. In fact, Pareto chart makes serious problems visible. When the most serious problem is solved, we can go to the next problem, Bergman (*Bergman & Klefsjo (2003)*).

ii. **Histograms**: This is a graphic summary of variation in a set of data. It enables us to see patterns that are difficult to be seen in a simple table of numbers. Can be analyzed to draw conclusions about the data set. (*Payne, 2004*)

iii. **Cause and Effect, Ishikawa or Fishbone Diagrams**: The cause-and-effect diagram is a method for analyzing process dispersion. The diagrams purpose is to relate causes and effects. Three basic types: Dispersion analysis, Process classification and cause enumeration. The effect = problem to be resolved, opportunity to be grasped, result to be achieved. Excellent for capturing team brainstorming output and for filling in from the 'wide picture'. Helps organize and relate factors, providing a sequential view. Deals with time direction but not quantity. Can become very complex. Can be difficult to identify or demonstrate interrelationships. (*Wiley, 1987*)
iv. **Scatter Plots**: this is effectively a line graph with no line - i.e. The point intersections between the two data sets are plotted but no attempt is made to physically draw a line. The Y axis are conventionally used for the characteristic whose behavior we would like to predict. Use to define the area of relationship between two variables. *(Wiley, 1987)*

v. **Control Charts**: Method of Statistical Process Control, SPC control system for production processes. They enable the control of distribution of variation rather than attempting to control each individual variation. Upper and lower control and tolerance limits are calculated for a process and sampled measures are regularly plotted about a central line between the two sets of limits. The plotted line corresponds to the stability/trend of the process. Action can be taken based on the trend rather than on individual variation. This prevents over-correction/compensation for random variation, which would lead to many rejects *(Wiley, 1987)*.

vi. **Flow Charts**: Pictures, symbols or text coupled with lines, arrows on the lines show direction of flow. Enables modeling of process problems/opportunities and decision points etc. Develops a common understanding of a process of those involved. No particular standardization of symbols, so communication to a different audience may require considerable time and explanation. *(Cara Payne 2004)*.

vii. **Check Lists**: contains items that are important or relevant to a specific issue or situation. Checklists are used under operational conditions to ensure that all important steps or actions have been taken. Their primary purpose is for guiding operations, not for collecting data. Generally used to check that all aspects of a situation have been taken into account before action or decision making. Simple, effective. *(Cara Payne, 2004)*

viii. **Check Sheets**: this is a data recording form that has been designed to readily interpret results from the form itself. It needs to be designed for the specific data it gathers. Used for the collection of quantititative or qualitative repetitive data. Adaptable to different data gathering situations. Minimal interpretation of results
required. Easy and quick to use. No control for various forms of bias - exclusion, interaction, perception, operational, non-response, estimation. *(Cara Payne, 2004).*

ix. **Continuous Improvement:** The total quality management based on the principle that the development of opportunities has been a never-ending improvement process, no matter how efficient the performance and effectiveness are, and the level of quality best wished by the beneficiaries.

Their expectations are not fixed but variable, so it must provide a constant quality and work to improve upon it, according to information that is collected and analyzed periodically.

The continuous work in Total Quality Management has been always in the look for the development of opportunities as confirmed by one of the Deming’s pioneers in total quality management. Through the wheel of Deming quality cycle, it can be illustrated in the Deming’s cycle and their relationships to continuous improvement, consisting of four activities are carried out periodically and in a circle without any interruption, are:

- **PLAN:** what we want to accomplish over a period of time and what we are going to do to get there.
- **DO:** something that furthers the goals and strategies developed in number one Plan.
- **CHECK:** the results of our actions to make sure there is a close fit between what we hoped to accomplish and what was actually achieved.
- **ACT:** by making changes that are needed to more closely achieve the initial goals or by developing procedures to ensure continuance of these plans that were successful.
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