"Managing Quality"

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Abstract

According to Juran "Quality is conformance to requirements". But conforming to the requirements is not an easy task. For the sake of this conformance various Quality Management Programmes (QMP) have been introduced time to time by the quality gurus, researchers and academicians. The resources can vary for each programme to flourish depending upon the organization but the ultimate goal of each programme is same and i.e. to achieve 'Quality'. Each programme has its own way of maintaining and increasing the quality of the products/services. Nowadays, with ever increasing competition organizations must follow an appropriate QMP with an objective of identifying and prioritize customer requirements and translate these requirements into appropriate company requirements at each stage of the product life cycle. This paper attempts to review various QMP in a comprehensive manner in order to effectively support the organizations to attain

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Quality Management Programmes

A QMP can be defined as "a set of coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance." The main thrust of a QMP is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced. In order to ensure that quality service is delivered consistently, a QMP should be developed and implemented in each functional area and at critical control points. However, in order to develop a QMP, the customer's expectations need to be identified. The Quality Management System can also be defined as "a documented set of policies and procedures that provide assurance to the customer of the product and service levels expected." It is:

- Systems-based
- People-based
- Process-based

The emphasis is on prevention in all spheres. Quality assurance is the name given to all activities that are used to ensure that the business is carried out effectively and efficiently. Quality management programmes

are used to assure quality. If an organization establishes and uses a flexible and coherent Quality Management System, clients will have confidence that the organization has the ability to meet their needs and expectations. There are various QMP that are being used nowadays. A brief introduction of these QMP is as follows:

a) Total Quality Management (TQM)

The first and most widely used QMP is TQM. The term TQM first appeared in 1961, when the concept was devised by A.V. Feigenbaum and named Total Quality Control (TQC). TQM has been globally recognized as a Japanese approach toward quality improvement (Mani et at, 2003) and in spite of massive research from 1984 to 2002, it remains a hazy and ambiguous concept (Korunka *et al*, 2003). The differences in the prescriptions proposed by the five quality gurus have no doubt contributed to this confusion but TQM is arguably the most significant concept that has swept across institutions over the last few years. Eng and Yusuf (2003) have supported Boaden (1997) and have highlighted that TQM integrates fundamental management techniques, existing improvement efforts and technical tools in a disciplined manner. Pycraft *et al*, (2000), Hammer and Champy (2000) and Yong and Wilkinson (2001) have reported that in recent years TQM has been one of the most prominent ideas applied in the management milieu to reengineer institutions and bring about change. Steen amp (2001) has stated that TQM is not a technique that can be applied artificially to improve the efficiency of an institution, but that

➢ It is a way of life, a passion, something that everybody should do.

➢ It is a culture, which should be lived by everybody in an institution.

It should be modeled by those in positions of leadership, but should eventually be a matter of personal leadership, which is practiced by all members of institutions. Eriksson *et al*, (2003) have stated that TQM brings together the constellation of productivity, ethics, leadership and performance into a unique relationship. According to Dervitsiotis (2003), TQM blurs the boundaries between the institution and the environment. TQM definitions available in literature can be classified under the following broad headings:

➢ TQM as a culture (Sashkin and Kiser, 1993; Ghobadian and Gallear, 1996; Kreitner and Kinicki, 1998; Kanji and Wallace, 2000).

➢ TQM as a management and institutional-wide process (Capezio and Morehouse, 1993; Ross, 1994; Senthil *et al*., 2001; Wicks, 2001; Selladurai, 2002).

➢ TQM as a management philosophy and guiding principles (Perigod, 1990; Elshennawy and McCarthy, 1992; Clauson, 1995; Elmuti and Kathawala, 1999; Djerdjour and Patel, 2000; Hansson, 2001; Yong and Wilkinson, 2001; Pun, 2002; Aksu, 2003; Eng.

➢ and Yusof, 2003).

➢ TQM as a strategy (Dean and Evans, 1994; Jones, 1994).

➢ TQM as a system (Stahl, 1995; Lindsay and Petrick, 1998; Scharitzer and Korunka, 2000; Yong and Wilkinson, 2001; Hansson, 2001; Evans and Dean, 2003).

b) Quality Function Deployment (QFD)

QFD is a concept and methodology of new product development (NPD) under the umbrella of total quality management (TQM). It is one of the few techniques that could potentially have a quality improvement impact throughout a company's product development process. Its objectives are to: identify and prioritize customer requirements and translate these requirements into appropriate company requirements at each stage of the product life cycle. First conceptualized in 1966 as a method or concept for NPD under the umbrella of total quality control, hinshitsu tenkai (quality deployment) was developed by Dr. Shigeru Mizuno and Yoji Akao. Yoji Akao detailed methods of quality deployment in 1972. The Japan Society of Quality Control formed a research group to specifically study QFD in 1978. QFD is used to translate customer requirements to engineering specifications. It is a link between Customers - Design Engineers - Competitors - Manufacturing. It provides an insight into the whole design and manufacturing operation from concept to manufacture and it can dramatically improve the efficiency as production problems are resolved early in the design phase (Akao, 1997). (Akao, 2004) defined QFD as a methodology that converts user demands into substitute quality characteristics, determines the design quality of the finished good, and systematically deploys this quality into component quality, individual part quality and process elements and their relationships. (Booker, 2003) described QFD as a "step-by-step deployment of a job function or operation that embodies quality, into their details through systemization of targets and means." QFD is a comprehensive quality system that systematically links the needs of the customer with various business functions and organizational processes, such as marketing, design, quality, production, manufacturing, sales, etc., aligning the entire company toward achieving a common goal (Mazur and Akao, 2003). Different phases of QFD as shown in Figure 1.
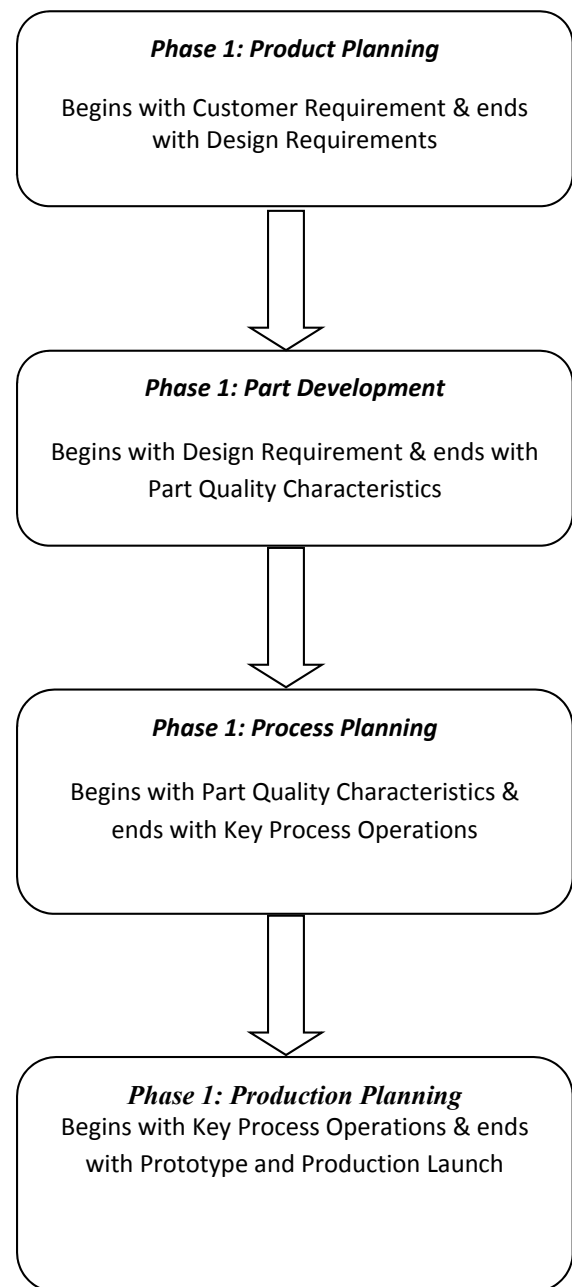

Figure 1: Phases of QFD

c) Advanced Product Quality Planning (APQP)

APQP is described as a philosophy, methodology and breakthrough strategy for developing the products in an organization. The purpose of APQP is to produce a product quality plan, which will support development of a product or service that will satisfy the customer (Wang, 2009). APQP is a process developed in the late 1980s by a commission of experts gathered from the big three US automobile manufacturers: Ford, GM and Chrysler (Driva, 1997). This commission invested five years to analyse the automotive development and production status in the US, Europe and especially in Japan. At that time, the success of the Japanese automotive companies was starting to be remarkable in the US market. APQP was formulated to ensure that product quality is maintained and customer requirements are met (Carbone, 2005). APQP also helps in standardizing procedures and reporting formats across new product projects. The methods and tools of APQP make good business sense. The quality standards have been widely adopted and used in many industries.

Organizations structure the APQP process according to their needs, but past history within an organization also impacts on the existing product development methodology. However, methods such as APQP are required in order to facilitate the flow of information across the organization, within projects, and from project to project, while at the same time reducing paperwork Ghalayini and Noble (1996). Griffin and Page (1996) points out that the power of APQP is better estimating during project planning by integrating all of the required development information early,

rather than redesigning and reworking the new product during manufacturing. APQP is intended to ensure that both the planning and the reviews of the project information are done in accordance with quality standards and the project objectives (Bobrek and Sokovic, 2005). APQP consists of five phases (Figure 2). In this section, it is explained how the APQP methodology is integrated as a development methodology within an organization for developing a new product. The goal of APQP is to facilitate communication between all persons and activities involved in a program and ensure that all required steps are completed on time, with a high quality-of-event, at acceptable cost and quality levels.
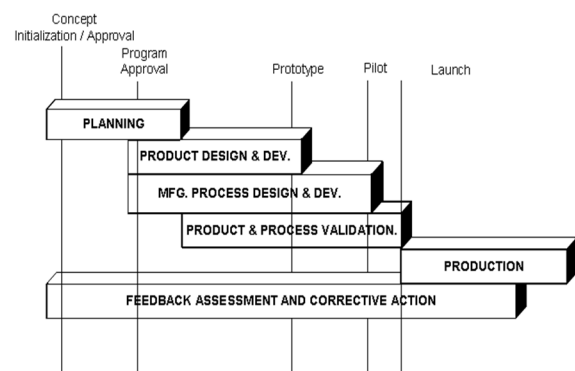
5 PHASES OF APQP

Figure 2: Phases of APQP Page Layout

d) Quality Circles

"A Quality Circle is volunteer group composed of members who meet to talk about workplace and service improvements and make presentations to their management with their ideas". These are related especially to the quality of output or services in order to improve the performance of the organization and motivate employees. This group carries on continuously as a part of organization-wide

control activities, self and mutual developments and control and improvement within the workplace utilizing quality control techniques with all the members participating. Generally six to twelve volunteers from the same work area make up a circle (Abo-Alhol et. al. 2005). The members receive training in problem solving, statistical quality control and group processes. Quality Circle generally recommends solutions for quality and services which may be implemented by the management. Thus Quality Circle is not merely a suggestion system or a quality control group but extends beyond that because its activities are more comprehensive. Furthermore, it is not a taskforce because it can be made a permanent feature of the organization or a department. Author has studies the role of quality circle as a management tool to enhance the effectiveness of technique. It argues that the concept encourages employee participation as well as promotes teamwork and motivates people to contribute towards Organizational effectiveness through group processes (Allen and Raut 1996). Different steps used in quality circle program are shown in figure.
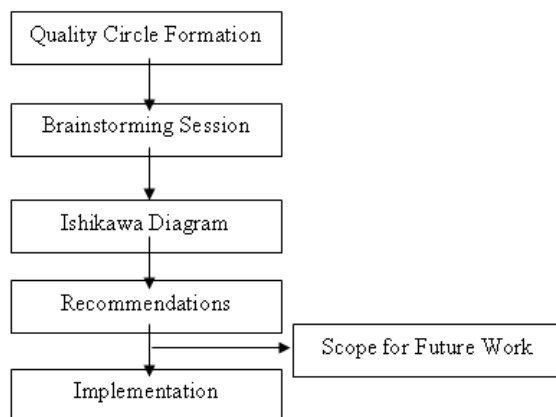

Figure 3: Steps of implementing Quality Circle

e). Six Sigma

The newest and most successful QMP is Six Sigma. Sigma is a Greek letter representing standard deviation or the amount of variation within a given process (McAdam and Lafferty, 2004). According to Harry and Schroeder (2000), Six Sigma is a powerful breakthrough business improvement strategy that enables companies to use simple and powerful statistical methods for achieving and sustaining operational excellence. It is a business strategy that allows companies to drastically improve their performance by designing and monitoring everyday business activities in ways that minimize waste and resources while increasing customer satisfaction. Park (2002) described that Six Sigma implies three things: statistical measurement, management strategy and quality culture. It is a measure of how well a process is performing through statistical measurement of quality level. It is a new management strategy under leadership of the top management that creates quality innovation and total customer satisfaction. It is also a quality culture. It provides the way to do things right at the first time and to work smarter by using data information. It also provides an atmosphere to solve many CTQ (critical-to-quality) problems through team efforts. Statistical representation of Six Sigma describes quantitatively how a process is performing. The goal of Six Sigma is to design processes that do what they are supposed to do with very high reliability, ultimately producing very consistent products and services (Coronado and Antony, 2002). The numerical goal of Six Sigma is reducing defects less than 3.4 parts per million (PPM) also known as 'Defects Per Million

Opportunities' (DPMO), reducing cycle time and reducing costs dramatically which impact the bottom line (Behara *et al*., 1995; Goh and Xie, 2004). The methodology used under six sigma QMP is Define, Measure, Analyse, Improve, Control (DMAIC), shown in Figure 4, and this is briefly described below.

Figure 4: Six Sigma Methodology
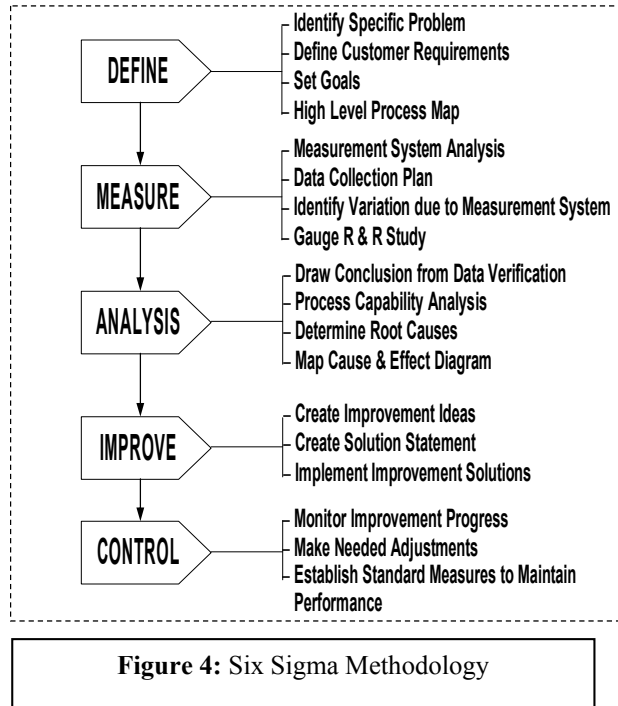
Define—Identify, evaluate and select projects for improvement and select teams.

Measure—Collect data on size of the selected problem, identify key customer requirements, and determine key product and process characteristics.

Analyse— Analyse data, establish and confirm the 'vital few' determinants of the performance.

Improve—Design and carry out experiments to establish cause and effect relation¬ships and optimize the process.

Control—Design the controls, make improvements, implement and monitor.

These were the some of the various QMP used these days by organizations. But one thing is

that the organizations must update and manufacture the necessary changes in the QMP they are using according to their requirement.

Advantages of a Quality Management Programme

An organization will derive many benefits from implementing a Quality Management System. Some of the advantages are listed below:

➢ Defines and conveys the provider quality objectives, policies and practices

➢ Facilitates uniformity in practice

➢ Reduces, eliminates and prevents quality deficiencies

➢ Facilitates training of new employees

➢ Expedites the interchange of employees between various jobs

➢ Eliminates important system changes being made without due consideration

➢ Assists in maintaining good organizational practices

➢ Eliminates unnecessary informal instruction.

➢ Provides a basis for audits to be conducted.

➢ Provide assurance to the client.

➢ Assists the provider towards achieving accreditation.

Conclusions

A QMP enables an organization to achieve the goals and objectives set out in its policy and strategy. It provides consistency and satisfaction in terms of methods, materials, equipment, etc, and interacts with all activities of the organization, beginning with the identification of customer requirements and ending with their satisfaction, at every transaction interface. It can be envisaged as a

"wedge" that both holds the gains achieved along the quality journey, and prevents good practices from slipping. But the selection of a QMP is also very important. Every organization must keep in mind its organizational structure, employees' skills, monetary issues, its products and government policies as well before selecting a QMP. QMP will definitely help an organization to rise high, but something must be given to gain something. Further study of the QMP' before its use is recommended.

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