

100

*Methods for
Total Quality
Management*

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Mike Asher**

100 METHODS FOR TOTAL QUALITY MANAGEMENT

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Sage Publications
London • Thousand Oaks • New Delhi

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First published 1996

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SAGE Publications Ltd
6 Bonhill Street
London EC2A 4PU

SAGE Publications Inc
2455 Teller Road
Thousand Oaks, California 91320

Sage Publications India Pvt Ltd
32 M-Block Market
Greater Kailash – I
New Delhi 110 048

British Library Cataloguing in Publication data

A catalogue record for this book is available from the British Library

ISBN 0 8039 7746 8
ISBN 0 8039 7747 6 (pbk)

Library of Congress catalog record available

Typeset by Photoprint, Torquay, Devon
Printed in Great Britain at the University Press, Cambridge

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PREFACE

An essential part of the development of a total quality management (TQM) process should be the education and training of everyone in the organization. The main objective should be to provide information on the principles and philosophy of TQM and training in the methods to help the organization implement total quality management in a systematic way. One of the main purposes of this book is to help all employees to understand the proper use of the total quality management methods required for the achievement of their organization's quality goals. It will also provide the educators and practitioners in this area with a comprehensive set of TQM methods.

Total quality management encompasses certain basic principles. To implement and practise these principles, it is necessary to understand the working of various methods of total quality management. These methods are classified in this book within four categories:

Management methods: for example, Deming wheel (Method 10).

Analytical methods: for example, failure mode and effect analysis (Method 37).

Idea generation: for example, brainstorming (Method 51).

Data collection, analysis and display: for example, tally charts (Method 96), histograms (Method 78) and pie chart (Method 88), respectively.

A list of methods, by category, is given on p. 10; an alphabetical list of *all* methods (with a brief description of their purpose or use) is given on p. 13.

Within each category, each TQM method is explained simply under the following headings:

- purpose
- when to use
- how to use
- benefits
- example

When put into practice, appropriate quality methods can rapidly give rise to quality improvement. Choosing the right methods for the development of a TQM process is one of the vital roles of management and the degree of success obtained will depend upon managerial skill. The total quality management process is complex and the use of some of these methods requires careful consideration and clear understanding.

UNDERSTANDING TOTAL QUALITY MANAGEMENT

Total quality management principles

To understand the process of total quality management (TQM), we will follow Kanji and Asher (1993) where all work is seen as 'process' and total quality management is a continuous process of improvement for individuals, groups of people and whole organizations. What makes total quality management different from other management processes is the concentrated focus on continuous improvement. Total quality management is not a quick management fix; it is about changing the way things are done within the organization's lifetime. To improve the process, therefore, people must know what to do, how to do it, have the right methods to do it, and be able to measure the improvement of the process and the current level of achievement.

Total quality management encompasses a set of four principles and eight core concepts. The four guiding principles are:

- delight the customer
- management by fact
- people-based management
- continuous improvement

Each of the principles can be used to drive the improvement process. However, to achieve this, each principle is expressed with the help of two core concepts to make the principle workable. The eight core concepts are given in Table 1.

Delight the customer

This focuses on external customers and asks 'What would delight them?' This implies a real need to understand the product or service, agree requirements and fulfil them. 'Delight' means being best at what really

Table 1 *Principles and core concepts of TQM*

Principles	Core concepts
Delight the customer	Customer satisfaction Internal customers are real
Management by fact	All work is process Measurement
People-based management	Teamwork People make quality
Continuous improvement	Continuous improvement cycle Prevention

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matters most to the customer and this can change over time. Being in touch with these changes and *always* satisfying the customer are an integral part of total quality management.

Management by fact

Knowing the current quality standards of the product or service in your customer's hands is the first stage of being able to improve. You can only measure your improvement if you know the base you are starting from. Having the facts necessary to manage the business at all levels, and giving that information to everyone so that decisions are based upon fact, are an essential aspect of continuous improvement.

People-based management

If people understand what to do, how to do it and obtain feedback on their performance, they can be encouraged to take responsibility for the quality of their own work. The more people feel involved, the greater will be their commitment to customer satisfaction. Systems, standards and technology themselves will not provide quality. The role of people is extremely important in the continuous improvement of quality within an organization.

Continuous improvement

Total quality management is not a short-term activity that will finish when a set target has been achieved. It is not a programme or a project. It is a management process that recognizes that, however much we may improve, our competitors will continue to improve and our customers will expect more from us. Here, continuous improvement is an incremental change and not a major breakthrough, which should be the aim of all who wish to undertake the total quality management journey.

Core concepts for improvement

Each of the eight core concepts given in Table 1 can be used to drive the process of continuous improvement and to develop a framework for quality improvement over many years.

Customer satisfaction

Many companies, when they start the quality journey, become very introverted and deal with their own internal problems, neglecting their external customers. A better way is for companies to use their customers to learn what is important to them and then measure their own performance against customer expectation. Asking your customers to set customer satisfaction goals is a clear sign of an outward looking company.

To fulfil customer satisfaction, Federal Express, an American company, surveyed their customers to identify the top ten causes of aggravation. The aggravation points were weighted according to customer views of how important these were. A complete check was made of all occurrences and a

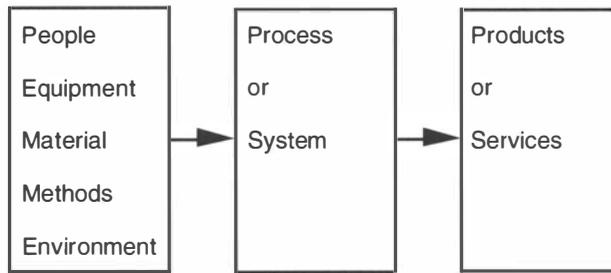


Figure 1 *Process*

weekly satisfaction index compiled. This allowed the company to keep a weekly monitor of customer satisfaction as measured by the customer.

Internal customers are real

Kanji and Asher's (1993) definition of quality – 'satisfying agreed customers' requirements' – relates to internal customers as well external ones. Many people also refer to the customer–supplier chain. We believe that it is necessary to achieve successful internal working relations in order to satisfy the needs of the external customer.

Whether you are supplying products or a service, the people you supply internally are as real as your external customers. They also require speed, efficiency or accurate measurement, but achieving a quality service between internal customers can sometimes be time-consuming. One way to deal with this is to assess poor quality in financial terms. Measuring the actual cost of poor quality, and the way that amount is made up, can provide an impetus for management to follow the quality improvement path. In this way, you can use the idea of the internal customer as a focus for improvement.

All work is process

Another possible focus for improvement is that of business processes. A process is a combination of methods, materials, manpower and machines (see Figure 1) that, taken together, produce a product or service. All processes contain inherent variability and one approach to quality improvement is progressively to reduce variation. This can be done, first, by removing variation due to special causes and, secondly, by driving down the common cause of variation, thus bringing the process under control and then improving its capability.

Measurement

This core concept of total quality management suggests that, in order to improve, we must first of all measure how we are doing at present. By measuring our present situation, we can focus both internal customer

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satisfaction and external customers' requirements. Internal quality measurement of production might include:

- breach of promise
- performance to standard
- reject level
- accidents
- process in control
- yield/scrap
- time cost due to non-available raw material
- number of changes to works order
- cost of quality

Teamwork

Teamwork can provide a real opportunity for people to work together to achieve quality improvement. People who work on their own or in a small group often have a picture of their organization and the work that it does which is very compartmentalized. They are often unfamiliar with the work that is done even by people who work quite near to them: as a result they are unaware of the consequences of poor quality in the work they themselves do.

Bringing people together in teams, with the common goal of quality improvement, aids communication between departmental or functional activities. Teamwork slowly breaks down the communication barriers and acts as a platform for change. Communication is part of the cement that holds together the bricks of the total quality management process supporting the principle of people-based management.

To communicate properly, it is necessary to focus on the receiver of the message. Communication is very much a two-way process. Managers often talk about the 'middle management sponge' into which information seems to go but out of which no information comes. Part of the problem is a lack of focus on the needs of those receiving the information. Figure 2 depicts a company with poor communication. For successful communication, you need to build credibility into the message and in the person giving the message. Anything that detracts from this does damage to both.

Teamwork also enables a group of people to work as a task force, looking at cross-functional problems, or as an action team, solving local problems, in order to identify and adopt new ways of doing things.

People make quality

Most of the quality problems within an organization are not normally within the control of the individual employee. As many as 80 per cent of these problems are caused by the way the company is organized and managed. The system often gets in the way of employees who are trying to do a good job. In such a situation it is difficult to solve the problem by simply telling the employees to do better. In these circumstances employee

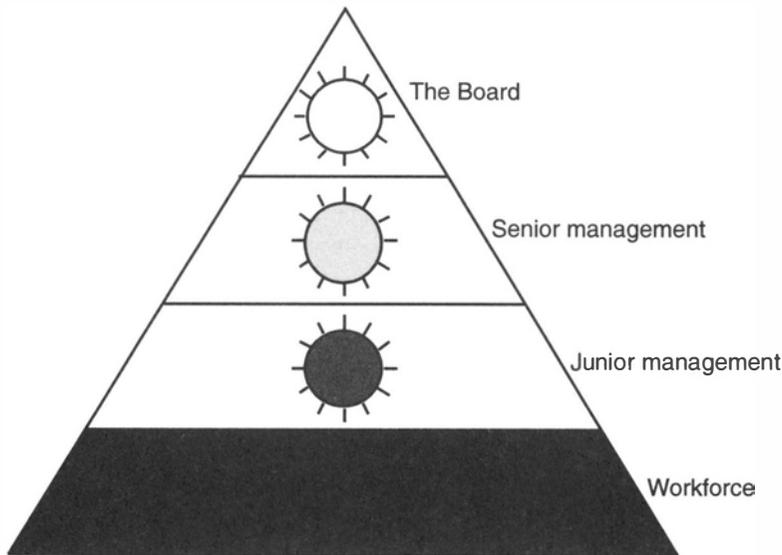


Figure 2 *Poor communication in an organization*

motivation alone cannot work. It requires real practical efforts on the part of managers to remove the barriers to quality improvement.

The role of managers within an organization is to ensure that everything necessary is in place to allow people to make quality. This, in turn, begins to create the environment where people are willing to take responsibility for the quality of their own work. Releasing the talents of everyone within the organization in this way can create a culture for quality improvement.

Continuous improvement cycle

The continuous cycle of establishing customers' requirements, meeting these requirements, measuring success and keeping on improving can be used both externally and internally to fuel the engine of continuous improvement. By continually checking customer requirements, a company can keep finding areas in which improvements can be made. This continual supply of opportunities can be used to keep quality improvement plans up to date and to reinforce the idea that the total quality journey is never-ending.

Prevention

This concept is central to total quality management and provides a positive approach to achieving continuous improvement. Prevention means seeking to ensure that failures will not occur. The continual process of removing the problems and failures out of the system will create a culture of continuous improvement.

There are several methods which are widely used for this purpose. Failure mode and effect analysis (Method 37) is a well-known method associated with both design and process analysis.

Pyramid model and leadership

From the outset, the total quality management approach has the vision that concentrated management action can improve the quality of service or products of an organization, at a very competitive cost, satisfying customers' needs and increasing market share. This increased market share will be stable because it has been earned with the help of solid customer goodwill and not by gimmicky advertising.

Kanji and Asher (1993) suggested a model which illustrates the principles of TQM as a pyramid. The base of the pyramid is occupied by the four principles of TQM and two core concepts correspond to each side of the pyramid. Although in Kanji and Asher's model the leadership of top management is central to the creation of a TQM organization, this is not emphasized in their diagram. We therefore produce a modified version of the pyramid model of TQM (see Figure 3) by simply extending the base of the pyramid. Here the organization has to be guided through the TQM principles and core concepts by top management leadership.

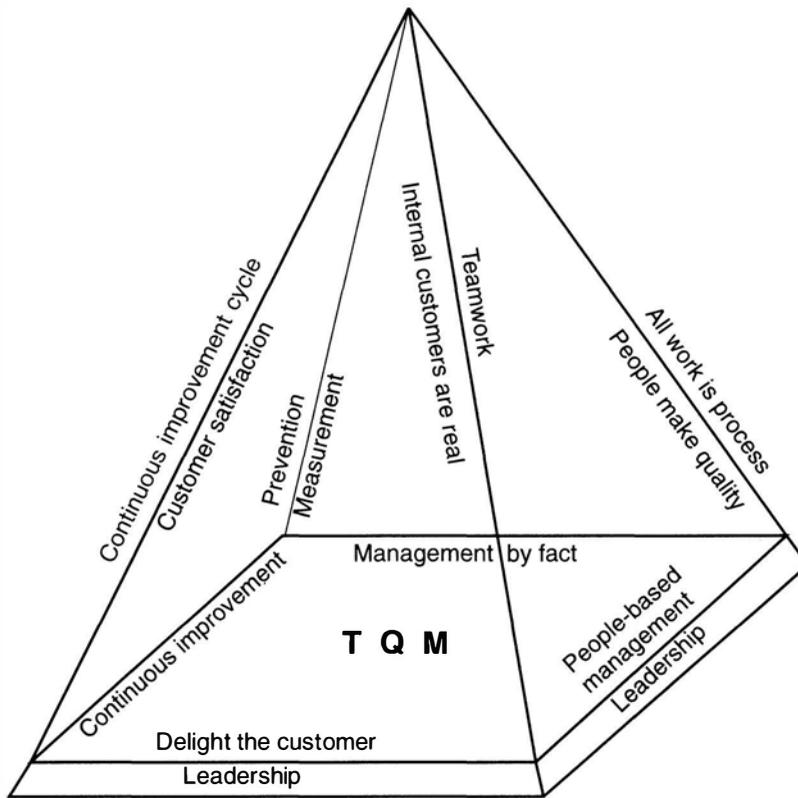


Figure 3 *Pyramid model of TQM*

Source: Kanji and Asher, 1993

THE ROLE OF TQM METHODS

Total quality management can be implemented by putting into practice suitable TQM methods. However, adopting the right kind of method is one of the most important jobs of senior management and the degree of success obtained will depend on their knowledge and understanding of these methods. TQM methods are unlikely to be useful if not used properly.

When TQM is implemented in an organization, it invariably starts with a simple procedure: the setting up of teams to solve particular problems. However, total quality management deals with quality culture, which is all about culture change based on a desire to satisfy the customer and eliminate existing problems permanently.

Education and training are key factors in total quality management, including the process of learning TQM methods. If teams start to look at quality management problems without proper training they will lose their way and become disheartened. If the quality problem is not identified accurately and the TQM method selected for solution based only on data analysis, then the problem will not be eliminated forever. In addition, the quality improvement process needs to be managed by an effective leader to ensure that proper implementation is achieved. By applying TQM methods properly and not fluctuating from one step to another before completion, the quality team will have a much greater chance of completing the task successfully.

The problem-solving process is a natural and logical sequence for overcoming quality problems and improving the standard of decision-making. It is also a guide for identifying which total quality management methods to be applied. Problems, no matter what their size or complexity, can best be solved by proceeding through a sequence of steps. This ensures that everything possible will be done by applying the available TQM methods in the most effective manner. It also gives the opportunity to consider a number of options and to select the best solutions.

Many quality problems, on the surface, appear to be simple to solve, and it is easy to leap to the first available solution. However, in the long term, for many problems it is unlikely that the best solutions will be found in this easy way. It is also possible that some side-effects will be generated, causing problems in other areas.

In total quality management all work is a process and the problem-solving process is a continuous cycle of opening your mind to a wide range of possible solutions and then deciding on the most feasible option. It is this continuous approach and the narrowing of the options that makes the TQM process so powerful.

The basic role of TQM methods in problem-solving for quality improvement is to help meet customer requirements. The methods also help to generate possible root causes and potential solutions, and to use data and information to select the best options for managing quality. To implement total quality management, it will be necessary to apply the methods in every aspect of business life.

LIST OF METHODS (BY CATEGORY)

Management methods

1	Acceptable quality level (AQL)	20
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5	Consensus reaching	30
6	Contingency planning	32
7	Cost-benefit analysis	33
8	Criteria testing	35
9	Customers' contingency table	37
10	Deming wheel (PDCA)	39
11	Departmental purpose analysis (DPA)	41
12	Error proofing (pokayoke)	43
13	Force analysis	44
14	Gantt charts	46
15	ISO 9000	48
16	Just in time (JIT)	50
17	Kaizen	51
18	Mystery shopping	52
19	Objective ranking	54
20	Pareto analysis	56
21	Potential problem analysis (PPA)	59
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24	Programme evaluation and review (PER) technique	65
25	Quality circles	67
26	Quality function deployment (QFD)	69
27	Relation diagram	72
28	Teamwork	74
29	Total productive maintenance	75
30	Why-how charting	77
31	Zero defects	78

Analytical methods

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33	Critical path analysis (CPA)	81
34	Departmental cost of quality	85
35	Domainal mapping	87
36	Evolutionary operation (EVOP)	89

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PURPOSE OF METHODS (ALPHABETICAL LIST)

	Method	Page
Acceptable quality level (AQL) To provide a structure of sampling plans, risks and inspection strategies to ensure that the customer receives the quality that the supplier has contracted to deliver.	1	20
Affinity diagram To organize large amounts of data in groups according to some form of natural affinity.	2	23
Arrow diagram To show the time required for solving a problem and which items can be done in parallel.	3	25
Bar charts To display discrete data collected by checksheets so that patterns can be discovered.	68	154
Basic statistics The mean, median, mode, range and standard deviation are ways of summarizing and describing large volumes of data. The first three are measures of location, the last two are measures of spread.	69	156
Benchmarking To identify and fill gaps in performance by putting in place best practice, thereby establishing superior performance.	4	27
Box and whisker plots To provide a simple way of drawing the basic shape of the distribution of a set of data.	70	159
Brainstorming To generate as many ideas as possible without assessing their value.	51	123
Brainwriting To generate as many ideas as possible.	52	125
Breaking set To overcome blocks in thinking by generating new ideas. It is particularly useful in prompting a group to be more receptive to new suggestions.	53	127
Buzz groups A way of getting the immediate reaction of a group to a new idea or problem.	54	129
Cause and effect analysis To examine effects or problems to find out the possible causes and to point out possible areas where data can be collected.	32	79
C chart To identify when the number of defects in a sample of constant size is changing over time.	71	161
Checksheets To collect data when the number of times a defect or value occurs is important.	72	164
Concentration diagrams To collect data when the location of a defect or problem is important.	73	166
Consensus reaching To give a team a methodical way of examining alternatives to reach a collective conclusion which all team members can accept.	5	30