

TQM AND BUSINESS INNOVATION

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Abstract

Business innovation, that is, the adaptation of management systems to the changing conditions of the environment, is a key factor for organisations if they wish to survive and grow. Total Quality Management (TQM) has demonstrated its potential to be a successful way for organisations to eliminate costs, improve productivity and gain a competitive edge in the marketplace. However, are TQM and business innovation compatible? The advantages and disadvantages of TQM as a means of developing and facilitating business innovations are discussed in this paper. It is argued that TQM does not hinder business innovation and some of its dimensions can assist an organisation to be more innovative. The compatibility of reengineering, which is a form of business innovation, is also analysed in the paper, along with the effects of TQM on the successful implementation of information technologies.

Keywords: Total Quality Management, Business Innovation, Information Technology, Reengineering

Introduction

Crawford (1998) argues that one of the main reasons for the present economic stalemate being experienced in Japan is the obstacle to innovation which is presented by the mindset of continuous improvement. He considers that this mentality reflects, in the main, a wish to avoid the embarrassment resulting from potential failures associated with radical change. The point is also made that a strategy of continuous improvement does not work in markets which imply high-risk investment, such as pharmaceuticals and microprocessors. These types of

arguments tend to imply that Total Quality Management (TQM) is not a valid paradigm in a world where changes are becoming increasingly frequent and need to be made at a faster pace. When the concept of TQM first appeared it was considered an innovation in management thinking, but this does not necessarily mean that it is a necessary facilitator of innovation.

Innovation can take several forms: in products, production processes or management systems. Innovation in products is related with R&D and consumers needs. Innovation with processes relates to changes in machinery and other elements not directly related with employees and has the aim of increasing productivity (i.e. increasing quality and reducing costs). Innovation in management systems has the aim of adapting these systems to new environmental conditions and improving the way in which people are managed and work is organised. This form of innovation can become necessary by changes in the process, such as automation and the application of mistakeproofing devices as typically described by Shingo (1986).

Business innovation deals with innovation in management thinking. It is motivated by changes in external and internal environmental conditions: customers, competitors, suppliers, employees, etc. According to Grossi (1990), the ability to adapt to changes in the environment is the main key to success, much more than factors such as company size. For example, an increase in the level of training and welfare of the population, and therefore, of workers, has resulted in companies using the TQM approach to managing the business. On the other hand, in stable environments, improvements in the management of people result in improvements in employee commitment and attitudes, and therefore, in productivity. Curry and Clayton (1992), Imai (1986) and Miller (1995) suggest that there are two ways to apply business innovation: drastic and progressive. The former is the kind of innovation which is

proposed by reengineering, whilst the latter is the type proposed by TQM through continuous improvement.

Some authors argue that TQM is not an obstacle to innovation in business. Bessant et al. (1994) consider that TQM supports innovation and Samaha (1996) argues that TQM focuses on identifying work processes that need revamping or replacing to finding new and more efficient ways of doing business and by so doing support innovation. Imai (1986) reports a case of successful simultaneous applications of continuous improvement and innovation in the Nissan Motor Corporation. On the other hand, Miller (1995) is of the view that whilst a process of continuous improvement does not provide the tools for innovation, it is not hindered by this since improvement can be achieved using appropriate innovation styles.

Table 1 has been constructed, based on the works of Ahire et al. (1996), Dale et al. (1994), Flynn et al. (1994) and Saraph et al. (1989), and shows the main dimensions that constitute TQM. Although these dimensions have been found to be useful for the current environments in which companies operate (e.g. Adam, 1994, Adam et al., 1997, Flynn et al., 1995, Kosko, 1998, Powell, 1995, Reimann, 1995 and Zairi et al., 1994) it is possible that in future environments they will need to be changed and adapted.

Take in Table I.

This paper analyses the role of TQM in the process of business innovation. In the next section, the TQM dimensions that facilitate the process of business innovation are examined. The obstacles to business innovation that TQM could create are discussed and the differences analysed between the TQM and the reengineering approaches and the advantages and disadvantages of applying them in simultaneous mode. The paper also considers the advantages and/or disadvantages of TQM on the introduction of what is, perhaps, the most important source of business innovation today (i.e. information technologies).

Achieving business innovation within a TQM environment

The need for business innovation is one of the reasons why companies have embraced TQM. However, it does not necessarily mean that TQM is the appropriate management approach to develop and apply business innovation.

Companies tackle innovation in two basic ways: by copying or developing their own innovations. The first strategy can be useful in situations in which companies enjoy competitive advantages, such as low wages, easy access to raw materials, protected markets, etc. However, in order to obtain competitive advantage, the second strategy is a better approach. This argument is valid not only for innovation in products and processes but also for innovation in management. The TQM approach can be applied to both types of strategies. Companies applying TQM can more easily assimilate innovations imported from other situations due to the willingness of its employees to accept new ideas which are promoted by the TQM approach. They can also develop their own innovations by building on the work of both continuous and breakthrough improvements.

One of the main elements of TQM is the need for adequate customer focus. Companies have to identify current and future consumers' needs and their level of satisfaction and loyalty. It is foreseeable that in the future global consumers will become increasingly demanding, in particular with the development of the quality management approach in the less-advanced countries (e.g., China, South America and South-East Asia). Any changes have to be undertaken with customer's needs in the mind, therefore this TQM dimension constitutes a stimulus to business innovation. If consumers' needs are not treated seriously, the changes may accomplish some limited aims but the overall results may be negative.

Another of the TQM dimension outlined in Table 1 underlines the importance of training and education programmes. The availability of well-trained employees facilitates business innovation since new ways of operating can be more easily learned by employees working in a TQM environment. This is not only important with respect to the training for the work which the employee is actually required to perform but also, for the development of his/her basic knowledge. An employee with good fundamental knowledge is usually prepared to accept and understand new systems of operating. This is important as jobs become more intellectually demanding and less mechanical in nature.

Empowerment and teamwork contribute to the generation of improvements proposed by employees. These business improvements permeating upwards from the bottom of the organisational hierarchy have the enormous advantage of generating a dynamic force which assists with changing the attitudes of those employees who are more resistant to change. In order to get improvements flowing from the bottom of the organisation, good training is essential. Mertins et al. (1997) argues that empowered employees who take part in the change process are more willing to get fully involved in making continuous improvement to the process for which they have responsibility.

The approach of TQM to process flow management is ruled by rationality. SPC and other quality management tools and techniques have as their aim decision making using real data and to facilitate the rational analysis of the problems (Deming, 1986). This is against the non-innovative way of thinking that frequently appears in companies in which things are done the way they have always being done. Therefore, a company that works and operates according to a TQM philosophy will be more willing to accept and adapt to any management innovation.

Benchmarking is included amongst the TQM dimensions proposed by authors such as Ahire et al. (1996) and Zairi and Leonard (1994). This management approach is

fundamentally innovative, since its aim is to know if other organisations do things better, to copy and adapt them or to develop other ways to transfer and achieve their levels of efficiency in the companies taking part in the benchmarking process.

Changing TQM to facilitate business innovation

Grossi (1990) states that innovation requires changes in the operating system and therefore must be driven topdown. However, many of the changes generated by a TQM policy are provided by all members of the company, from shop floor to administrative departments, in particular when a policy deployment is employed. Without a deployment using the Catch, Reflect, Improve, Scrutinise and Pass (CRISP) cycle as outlined by Lee and Dale (1998), these sources of innovations could be biased by the specific interests of the people who work in each department and function and this could hinder achievement of company vision and its vital few objectives.

Long term relationships with suppliers in a partnership approach dictate that if changes are made then these need to be implemented with the involvement of the supplier and without a change in source of supply, certainly in the short term. It could be considered that this TQM dimension could be an obstacle to changes in supplier management, since breakthrough changes could imply the need to change the supplier.

Quality management tools and techniques can be treated as “traditional” improvement instruments which have been around for some considerable time. This can imply that they are used as they have always been. In the future some of these tools and instruments may become obsolete or will need changes in how they are applied. For example, increased levels of automation may change the way in which quality-related data is collected and this may have

an influence on how SPC is applied (i.e. automated devices can collect the data and intelligent and expert systems can aid the decision making).

Companies should not look at TQM as a static set of recommendations that are going to be valid for ever; just as TQM is about challenging the status quo, this also applies to the TQM dimensions. Top management have to lead this way of thinking.

TQM versus reengineering as business innovation approaches

In the first book devoted entirely to the subject of reengineering (i.e. Hammer and Champy, 1993), it is considered that whilst reengineering shares some features with TQM, such as the recognition of the importance of processes and the concern about the needs of the customer, they have significant differences. For example, reengineering seeks breakthroughs, not by enhancing existing processes, but by discarding them and replacing them with entirely new ones. Born (1994) considers that reengineering is a successor to TQM, making the point that rather than continually improving a process, reengineering challenges the need for a process.

Clearly TQM and reengineering are different philosophies for improving the performance of business processes. The question is: can they be applied simultaneously with some degree of success? Some authors consider that reengineering and TQM are compatible. According to Love and Gunasekaran (1997) and De Bruyn and Gelders (1997), TQM is an enabler of reengineering. Harrington (1995), Kelada (1994) and MacDonald and Dale (1999) state that TQM and reengineering are complementary and that reengineering has to have TQM aims at the forefront in order for it to be successful. Grover and Malhorta (1997) consider that TQM can often serve as the building block for subsequent reengineering efforts.

On the other hand, Leach (1996) argues that continuous improvement is a better and less risky means of making changes in a company than reengineering and it also helps to

maintain stability. He also points out that, as reengineering implies radical changes, it does not allow employees to assimilate the changes and that when reengineering leads to downsizing, the commitment of employees decreases. According to Miller and Pearce (1988), gaining employee commitment to improvement efforts can be difficult when both quality and innovation are of concern. MacDonald and Dale (1999) have also analysed the differences between TQM and reengineering and amongst their conclusions are:

- large step changes are riskier, more complex and more expensive than continuous improvement,
- reengineering places more emphasis on equipment and technology and TQM more emphasis on people,
- reengineering tends to concentrate on one process at a time using a project planning methodology, whereas TQM takes a more holistic view of the organisation, building improvement into all its areas of operation.

Dixon et al. (1994) have studied some companies which were simultaneously developing TQM policies and reengineering initiatives and found there were several similarities. In both cases the size of the project affected the entire company, the improvement rate was similar, cross-functionality was a requirement, IT was important for reengineering and considered to be useful for TQM and there was a need for management support in both initiatives. The main underlying difference is that with TQM, changes were made with the active participation of employees, whereas with reengineering, changes were dictated by top management.

Rohleder and Silver (1997) have developed a framework for business process improvement that uses elements of both reengineering and TQM. For example, benchmarking is proposed as the technique to select the processes which need to be improved

and Pareto Analysis is used to identify the most important processes on which to work. SPC is considered as the means to determine if a process meets the targets that have been identified and, thus, decide if radical change is necessary.

In the authors' opinion both kinds of approaches can be developed simultaneously, but it is necessary to consider the pitfalls. For example, if a company is trying to convince the workers of the benefits of continuous improvement and, at the same time, decides to reorganise a process and this results in redundancies, the outcome could be different to that which is required. One of the authors has knowledge of a German company who had introduced a new production process and as a consequence made 40 employees redundant; the remaining employees established an unwritten agreement to maintain the same levels of production. In short, the jobs of employees who are made redundant after the implementation of a reengineering project have to be retained and relocated if a company wants to apply reengineering in conjunction with a TQM policy. If a company applying TQM can also apply reengineering by maintaining the commitment of employees, the process of improvement could double its pace, as shown in Figure 1.

Take in Figure 1.

TQM and information technologies

One of the most important factors that creates the need for business innovation is the application of information technologies (IT). Information technology is increasing in importance for companies and its effects on global trading are becoming more widely felt (for details, see for example Mahan and Gotlieb (1992) and Chandler (1998)). It is frequently argued (e.g. McFarlan, 1984 and Parsons, 1983) that IT has rapidly become the most important factor in increasing productivity and reducing costs. According to Mathaisel and

Kvaal (1995), companies who think about and plan for the impact of the information superhighway on retailing may be the industry leaders of tomorrow. An analysis of the way in which the changes that IT implies in a TQM environment can be demonstrative of the compatibility of TQM and business innovation. According to Ayers (1993) applying the principles and practices of TQM to IT applications has the potential to eliminate wasteful investments in technology. However, it is possible that some of the situations which the introduction of IT generates do not necessarily support the TQM philosophy and its ideals.

IT is usually applied in one of three tasks: the control of automated processes, processing of data and information interchange. Information interchange through the Internet is creating a number of new possibilities to business which include offering and selling products. A recent survey (Cembrero, 1998) has shown that 28% of companies from a sample of German, French, Italian, Dutch, Spanish and British companies use Internet to sell their products, and the managers surveyed consider that the annual growth of electronic commerce is going to be around 24%. As a consequence, these types of applications can facilitate the substitution of employees by machines and thereby presenting a number of problems for companies. In a company following a TQM philosophy employees whose jobs are made redundant because of improvements made to the process should be relocated to other jobs, in order to maintain the necessary level of employees' commitment to the goal of continuous improvement. This is possible when improvements help to sell more products and thereby grow the company. Moreover, in the Management Information System (MIS) field it is now accepted that it is unlikely that any greater savings in staff can be made through the application of IT, indeed as IT becomes more critical for the organisation it is essential that the appropriate personnel are in place to support the initiative. Thus, we now see many organisations increasing the number of staff as IT becomes more prevalent (e.g. IT specialists in Lotus Notes, Web page development, etc.).

One of the key tenants of TQM is its focus on the customer and this can be useful in the application of IT to the company-client relationship. In terms of this, IT has the capacity to facilitate customers' information processing and related communication and if these data are analysed using TQM principles and practices, the advantages that can be obtained from this can be considerable. This same situation can be also applied to the relationships with suppliers.

Eason (1988) argues that there are two possible approaches to the application of IT. One of them is focused on the use of IT as an agent to control work processes, this approach is supported by Beniger (1986) and Wilson (1994). This kind of application can lead to deskilling and monitored jobs, with the usual results of higher productivity, increased control and command, and inflexibility. The other approach is focused on the use of IT as an enabling mechanism, arising in enriched jobs with increases in job satisfaction. The result of this is not necessarily higher productivity (although it would be unlikely to decrease), but it is expected that there will be increases in performance, employee initiative and flexibility.

These two kinds of IT implementation are sometimes applied simultaneously in companies, the first type impacts on clerical staff and the second on professional staff. If the labour required is more intellectual, autonomous and less mechanical controlled as a result of the IT implementation, training becomes more important and the content should reflect the new knowledge needs. When work becomes more intellectual, the argument put forward by quality management experts is that supervisors should function as coaches rather than giving subordinates' orders. On the other hand, if IT implies less autonomy and intellectual challenging jobs, this conflicts with a number of the TQM principles and practices (e.g. empowerment, trust and discretion, and teamworking, in particular, self managing workgroups).

There are a number of other IT applications in relationship to TQM, these include:

- IT is useful in Design of Experiments (Mezgar et al., 1997), Failure Mode and Effects Analysis (Webber, 1990) and Quality Function Deployment (Rangaswamy and Lilien, 1997 and Zhang et al. 1996). In all these cases, IT does not change the way in which these quality techniques are used but it helps to facilitate a more complete use of all their possibilities and eases their application.
- IT can improve the process flow management in different ways: automated maintenance (Dilger, 1997; Krouzek, 1987), reduction of process variance through automation (Freund et al., 1997), elimination of a number of inspection type activities (Litsikas, 1997) and SPC application (Kendrick, 1995 and Papadakis, 1990).
- Companies developing their quality management system to meet the requirements of the ISO 9000 series will welcome those applications of ITs that facilitate administrative work, since the application of the various clauses of the series requires the use and upkeep of documentation.
- Companies now have access to a variety of software to assist them in the process of self assessment against a recognised Business Excellence model such as the EFQM and MBNQA (Ward, 1998).
- The most recent application areas of IT (communication - e-mail, web, filesharing, etc.) can be seen as either: continuous improvement of existing forms of communication or as redesign or reengineering communication within/without organisations.

Conclusions

The advantages and disadvantages of TQM to develop and facilitate business innovations have been discussed in this paper. It is argued that TQM does not hinder business innovation. In fact, some of the TQM dimensions, such as customer focus, training,

empowerment and teamwork, rationality in the analysis of production processes and benchmarking can assist an organisation to be more innovative in its business activities. However, for this to happen the TQM concept has to be well understood by management, in particular, the senior management team. Continuous improvement does not mean that the changes made are the sole responsibility of employees, management need to be fully involved in facilitating process improvements and providing the requisite leadership. It should also not be forgotten that TQM is also subject to change and has to adapt to new conditions of work, competition and environmental situations, all driven by business innovation.

The compatibility of reengineering and TQM has also been analysed in the paper. The conclusion reached is that organisations should try to ensure that the two concepts are integrated. It is our view that reengineering should build on a TQM foundation. However, this has to be done with appropriate considerations to avoid the lack of employees commitment created by the suppression of jobs that can result from a reengineering project.

Finally, the effect of TQM on the successful implementation of one of the most important sources of business innovation (i.e. IT) has been examined. It has been shown that TQM can be useful in this task. However IT implementation can also generate problems with TQM. Firstly, when it is applied as an agent to control work processes it can lead to deskilling and monitored jobs. Secondly when jobs are made redundant as a consequence of its implementation. A careful application of TQM, perhaps changing some aspects of its dimensions about workforce management, has to be undertaken when IT implies a decrease in the autonomy of employees and/or to make some of them redundant.

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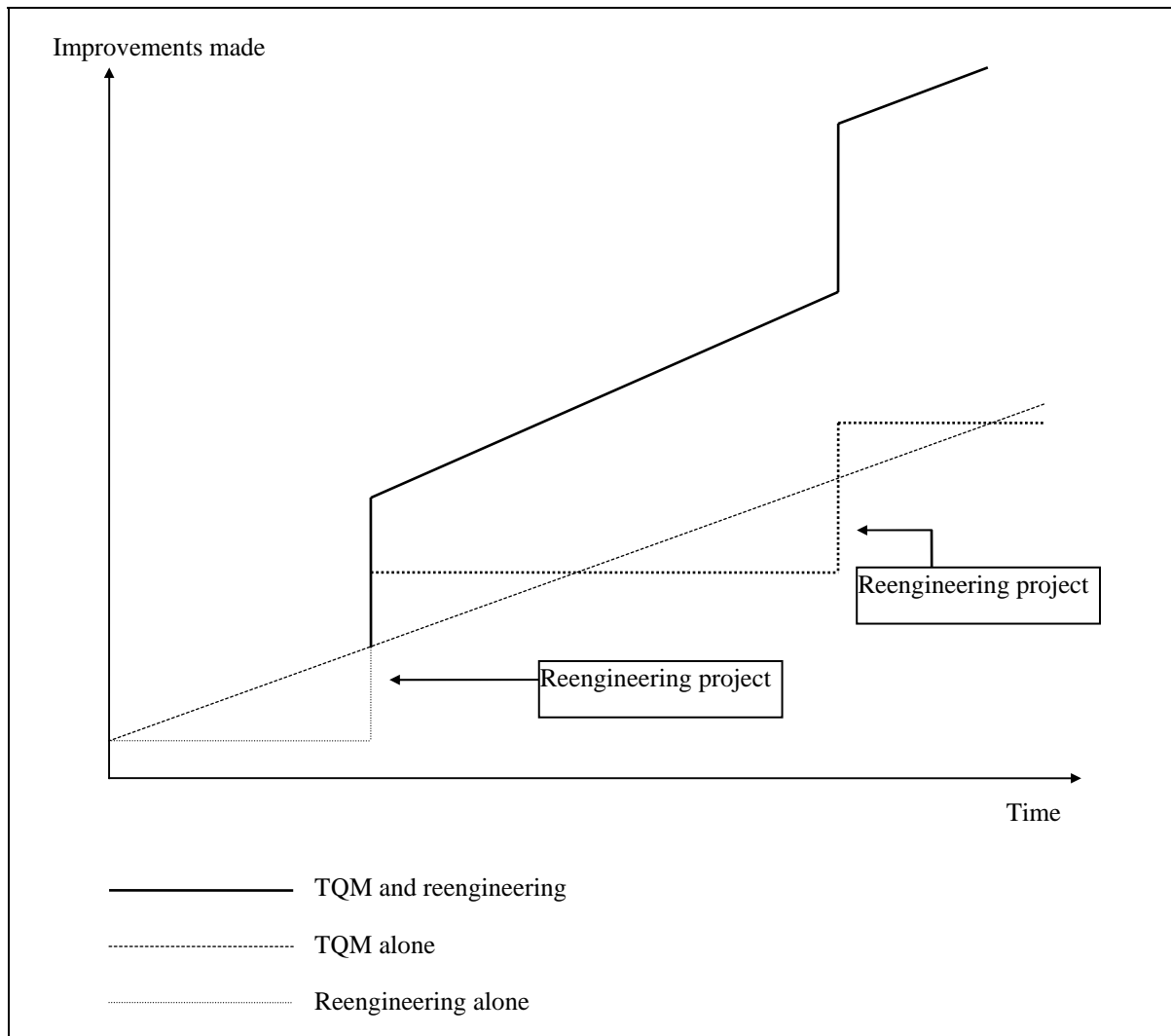


Figure 1. Advantages of applying TQM and reengineering jointly. A similar figure, comparing innovation and Kaizen, can be found in Imai (1986).

DIMENSIONS	DESCRIPTION
TOP MANAGEMENT SUPPORT	Top management commitment is one of the major determinants of successful TQM implementation. Top management has to be the first in applying and stimulating the TQM approach, and they have to accept the maximum responsibility for the product and service offering. Top management also has to provide the necessary leadership to motivate all employees.
CUSTOMER RELATIONSHIP	The needs of customers and consumers and their satisfaction have always to be in the mind of all employees. It is necessary to identify these needs and their level of satisfaction.
SUPPLIER RELATIONSHIP	Quality is a more important factor than price in selecting suppliers. Long-term relationship with suppliers has to be established and the company has to collaborate with suppliers to help improve the quality of products/services.
WORKFORCE MANAGEMENT	Workforce management has to be guided by the principles of: training, empowerment of workers and teamwork. Adequate plans of personnel recruitment and training have to be implemented and workers need the necessary skills to participate in the improvement process.
EMPLOYEE ATTITUDES AND BEHAVIOUR	Companies have to stimulate positive work attitudes, including loyalty to the organisation, pride in work, a focus on common organisational goals and the ability to work cross-functionally.
PRODUCT DESIGN PROCESS	All departments have to participate in the design process and work together to achieve a design that satisfies the requirements of the customer, according to the technical, technological and cost constraints of the company.
PROCESS FLOW MANAGEMENT	Housekeeping along the lines of the 5S concept. Statistical and nonstatistical improvement instruments should be applied as appropriate. Processes need to be mistake proof. Self inspection undertaken using clear work instructions. The process has to be maintained under statistical control.
QUALITY DATA AND REPORTING	Quality information has to be readily available and the information should be part of the visible management system. Records about quality indicators have to be kept, including scrap, rework and cost of quality.
ROLE OF THE QUALITY DEPARTMENT	Quality department need access to top management and autonomy and also has to combine the work of other departments.
BENCHMARKING	A benchmarking policy for key processes should be in place.
Table I. Dimensions of TQM.	